ANSWER SHEET
Model Test 1

Section 1: Reading

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Section 2: Writing and Language

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ANSWER SHEET
Model Test 1

Section 3: Math (No Calculator)

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ANSWER SHEET
Model Test 1

Section 4: Math (Calculator)

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35. 36. 37. 38.

READING TEST

Turn to Section 1 of your answer sheet to answer the questions in this section.

Directions: Following each of the passages (or pairs of passages) below are questions about the passage (or passages). Read each passage carefully. Then, select the best answer for each question based on what is stated in the passage (or passages) and in any graphics that may accompany the passage.

Questions 1–11 are based on the following passage.

In this adaptation of an excerpt from An Occurrence at Owl Creek Bridge, *a short story set in Civil War times, a man is about to be hanged. The first two paragraphs set the scene; the remainder of the passage presents a flashback to an earlier, critical encounter.*

A man stood upon a railroad bridge in Northern Alabama, looking down into the swift waters twenty feet below. The man's
Line hands were behind his back, the wrists
(5) bound with a cord. A rope loosely encircled his neck. It was attached to a stout cross-timber above his head, and the slack fell to the level of his knees. Some loose boards laid upon the sleepers supporting the metals of
(10) the railway supplied a footing for him and his executioners—two private soldiers of the Federal army, directed by a sergeant, who in civil life may have been a deputy sheriff. At a short remove upon the same temporary
(15) platform was an officer in the uniform of his rank, armed. He was a captain. A sentinel at each end of the bridge stood with his rifle in the position known as "support"—a formal and unnatural position, enforcing an erect
(20) carriage of the body. It did not appear to be the duty of these two men to know what was occurring at the center of the bridge; they merely blockaded the two ends of the foot plank which traversed it.
(25) The man who was engaged in being hanged was apparently about thirty-five years of age. He was a civilian, if one might judge from his dress, which was that of a planter. His features were good—a straight
(30) nose, firm mouth, broad forehead, from which his long, dark hair was combed straight back, falling behind his ears to the collar of his well-fitting frock coat. He wore a moustache and pointed beard, but no
(35) whiskers; his eyes were large and dark grey and had a kindly expression that one would hardly have expected in one whose neck was in the hemp. Evidently this was no vulgar assassin. The liberal military code makes
(40) provision for hanging many kinds of people, and gentlemen are not excluded.
Peyton Farquhar was a well-to-do planter, of an old and highly respected Alabama family. Being a slave-owner, and, like other
(45) slave-owners, a politician, he was naturally an original secessionist and ardently devoted to the Southern cause. Circumstances had prevented him from taking service with the gallant army that had fought the disastrous
(50) campaigns ending with the fall of Corinth, and he chafed under the inglorious restraint, longing for the release of his energies, the larger life of the soldier, the opportunity for distinction. That opportunity, he felt,

GO ON TO THE NEXT PAGE

(55) would come, as it comes to all in war time. Meanwhile, he did what he could. No service was too humble for him to perform in aid of the South, no adventure too perilous for him to undertake if consistent with the character

(60) of a civilian who was at heart a soldier, and who in good faith and without too much qualification assented to at least a part of the frankly villainous dictum that all is fair in love and war.

(65)   One evening while Farquhar and his wife were sitting near the entrance to his grounds, a grey-clad soldier rode up to the gate and asked for a drink of water. Mrs. Farquhar was only too happy to serve him with her own

(70) white hands. While she was gone to fetch the water, her husband approached the dusty horseman and inquired eagerly for news from the front.

     "The Yanks are repairing the railroads,"

(75) said the man, "and are getting ready for another advance. They have reached the Owl Creek bridge, put it in order, and built a stockade on the other bank. The commandant has issued an order, which

(80) is posted everywhere, declaring that any civilian caught interfering with the railroad, its bridges, tunnels, or trains, will be summarily hanged. I saw the order."

     "How far is it to the Owl Creek bridge?"

(85) Farquhar asked.

     "About thirty miles."

     "Is there no force on this side of the creek?"

     "Only a picket post half a mile out, on the

(90) railroad, and a single sentinel at this end of the bridge."

     "Suppose a man—a civilian and a student of hanging—should elude the picket post and perhaps get the better of the sentinel,"

(95) said Farquhar, smiling, "what could he accomplish?"

The soldier reflected. "I was there a month ago," he replied. "I observed that the flood of last winter had lodged a great quantity of

(100) driftwood against the wooden pier at the end of the bridge. It is now dry and would burn like tow."

     The lady had now brought the water, which the soldier drank. He thanked her

(105) ceremoniously, bowed to her husband, and rode away. An hour later, after nightfall, he repassed the plantation, going northward in the direction from which he had come. He was a Yankee scout.

1. As used in line 13, "civil" most nearly means

    (A) polite.
    (B) noncriminal.
    (C) nonmilitary.
    (D) individual.

2. In cinematic terms, the first two paragraphs most nearly resemble

    (A) a wide-angle shot followed by a close-up.
    (B) a sequence of cameo appearances.
    (C) a trailer advertising a feature film.
    (D) two episodes of an ongoing serial.

3. It can most reasonably be inferred from the passage that the man awaiting hanging was

    (A) innocent of any criminal intent.
    (B) an unlikely candidate for execution.
    (C) a victim of mistaken identity.
    (D) purposely assuming a harmless demeanor.

4. Which choice provides the best evidence for the answer to the previous question?

   (A) Lines 25–27 ("The man . . . age")
   (B) Lines 27–29 ("He was . . . planter")
   (C) Lines 33–38 ("He wore . . . hemp")
   (D) Lines 44–47 ("Being . . . cause")

5. The author's tone in discussing "the liberal military code" (line 39) can best be described as

   (A) approving.
   (B) ironic.
   (C) irked.
   (D) regretful.

6. It can most reasonably be inferred from the passage that Peyton Farquhar would consider which of the following a good example of how a citizen should behave in wartime?

   (A) He should use even underhanded methods to support his cause.
   (B) He should enlist in the army without delay.
   (C) He should turn to politics as a means of enforcing his will.
   (D) He should avoid involving himself in disastrous campaigns.

7. As used in line 59, "consistent" most nearly means

   (A) unchanging.
   (B) compatible.
   (C) logically sound.
   (D) steady and predictable.

8. It can most reasonably be inferred from the passage that Mrs. Farquhar is

   (A) sympathetic to the Confederate cause.
   (B) too proud to perform menial tasks.
   (C) uninterested in news of the war.
   (D) reluctant to ask her slaves to fetch water.

9. Which choice provides the best evidence for the answer to the previous question?

   (A) Lines 56–64 ("No service . . . war")
   (B) Lines 68–70 ("Mrs. Farquhar . . . hands")
   (C) Lines 70–73 ("While she . . . front")
   (D) Lines 104–106 ("He thanked . . . away")

10. From Farquhar's exchange with the soldier (lines 84–102), it can most reasonably be inferred that Farquhar is going to

    (A) sneak across the bridge to join the Confederate forces.
    (B) attempt to burn down the bridge to halt the Yankee advance.
    (C) remove the driftwood blocking the Confederates' access to the bridge.
    (D) undermine the pillars that support the railroad bridge.

11. The main purpose of the concluding sentence of the passage is to

    (A) offer an excuse for Farquhar's failure to destroy the bridge.
    (B) provide context useful in understanding Farquhar's emotional reactions.
    (C) establish that Farquhar has been entrapped into taking an unwise action.
    (D) contrast Farquhar's patriotic behavior with the scout's treachery.

Questions 12–21 are based on the following passage.

The following passage is taken from Franklin Delano Roosevelt's Third Inaugural Address, made on January 20, 1941, nearly a year before the bombing of Pearl Harbor triggered America's entry into the Second World War.

A nation, like a person, has something deeper, something more permanent, something larger than the sum of all its parts.

Line It is that something which matters most to
(5) its future—which calls forth the most sacred guarding of its present.

It is a thing for which we find it difficult—even impossible—to hit upon a single, simple word.

(10) And yet we all understand what it is—the spirit—the faith of America. It is the product of centuries. It was born in the multitudes of those who came from many lands—some of high degree, but mostly plain people, who
(15) sought here, early and late, to find freedom more freely.

The democratic aspiration is no mere recent phase in human history. It is human history. It permeated the ancient life of early
(20) peoples. It blazed anew in the middle ages. It was written in the Magna Carta.

In the Americas its impact has been irresistible. America has been the New World in all tongues, to all peoples, not because this
(25) continent was a new-found land, but because all those who came here believed they could create upon this continent a new life—a life that should be new in freedom.

Its vitality was written into our own
(30) Mayflower Compact, into the Declaration of Independence, into the Constitution of the United States, into the Gettysburg Address.

Those who first came here to carry out the longings of their spirit, and the millions
(35) who followed, and the stock that sprang from them—all have moved forward constantly and consistently toward an ideal which in itself has gained stature and clarity with each generation.

(40) The hopes of the Republic cannot forever tolerate either undeserved poverty or self-serving wealth.

We know that we still have far to go; that we must more greatly build the security
(45) and the opportunity and the knowledge of every citizen, in the measure justified by the resources and the capacity of the land.

But it is not enough to achieve these purposes alone. It is not enough to clothe
(50) and feed the body of this Nation, and instruct and inform its mind. For there is also the spirit. And of the three, the greatest is the spirit.

Without the body and the mind, as all men
(55) know, the Nation could not live.

But if the spirit of America were killed, even though the Nation's body and mind, constricted in an alien world, lived on, the America we know would have perished.

(60) That spirit—that faith—speaks to us in our daily lives in ways often unnoticed, because they seem so obvious. It speaks to us here in the Capital of the Nation. It speaks to us through the processes of governing in the
(65) sovereignties of 48 States. It speaks to us in our counties, in our cities, in our towns, and in our villages. It speaks to us from the other nations of the hemisphere, and from those across the seas—the enslaved, as well as the
(70) free. Sometimes we fail to hear or heed these voices of freedom because to us the privilege of our freedom is such an old, old story.

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The destiny of America was proclaimed
in words of prophecy spoken by our first
(75) President in his first inaugural in 1789—
words almost directed, it would seem, to
this year of 1941: "*The preservation of the
sacred fire of liberty and the destiny of the
republican model of government are justly*
(80) *considered . . . deeply, ... finally, staked on
the experiment intrusted to the hands of the
American people.*"

If we lose that sacred fire—if we let it be
smothered with doubt and fear—then we
(85) shall reject the destiny which Washington
strove so valiantly and so triumphantly to
establish. The preservation of the spirit and
faith of the Nation does, and will, furnish
the highest justification for every sacrifice
(90) that we may make in the cause of national
defense.

In the face of great perils never before
encountered, our strong purpose is to protect
and to perpetuate the integrity of democracy.
(95)   For this we muster the spirit of America,
and the faith of America.

We do not retreat. We are not content to
stand still. As Americans, we go forward, in
the service of our country, by the will of God.

12. As used in line 14, "plain" most nearly means

(A) candid.
(B) ordinary.
(C) homely.
(D) intelligible.

13. The author indicates which of the following
about the American belief in freedom?

(A) It lacked any supporters who belonged to
the upper classes.
(B) It had its origins at the time of the
American Revolution.
(C) It is an ideal that has lost its hold on the
public.
(D) It has deep-seated historical roots.

14. Which choice provides the best evidence for
the answer to the previous question?

(A) Lines 1–3 ("A nation . . . parts")
(B) Lines 17–21 ("The democratic . . . Carta")
(C) Lines 23–28 ("America has been . . .
freedom")
(D) Lines 33–39 ("Those who first . . .
generation")

15. The author uses the Mayflower Compact,
Declaration of Independence, Constitution,
and Gettysburg Address as examples of

(A) subjects of previous inaugural addresses.
(B) expressions of the democratic aspiration.
(C) documents of historical interest.
(D) writings with ongoing legal implications.

16. The author recognizes counterarguments to the position he takes in lines 33–39 ("Those who first . . . generation") by

(A) acknowledging that economic injustices must be addressed before democracy can prevail.
(B) admitting that the native-born descendents of our immigrant forebears have lost faith in democracy.
(C) conceding the lack of resources and capacity that hinder the fulfillment of the American dream.
(D) likening the Nation to a human body with physical, mental, and spiritual needs.

17. As used in line 76, "directed" most nearly means

(A) addressed.
(B) ordered.
(C) supervised.
(D) guided.

18. What main effect does the repetition of the phrase "It speaks to us" in lines 62–70 have on the tone of the passage?

(A) It creates a whimsical tone, endowing an abstract quality with a physical voice.
(B) It creates a colloquial tone, describing commonplace activities in ordinary words.
(C) It creates a dramatic tone, emphasizing the point being made and adding to its emotional impact.
(D) It creates a menacing tone, reminding us of our failure to heed the voices of freedom crying for our aid.

19. It can most reasonably be inferred that the experiment to which Washington refers in line 81 is

(A) a scientific investigation.
(B) a presidential inauguration.
(C) democratic government.
(D) national defense.

20. Which choice provides the best evidence for the answer to the previous question?

(A) Lines 56–59 ("But . . . perished")
(B) Lines 60–62 ("That spirit . . . obvious")
(C) Lines 83–87 ("If we . . . establish")
(D) Lines 92–94 ("In the face . . . democracy")

21. It is reasonable to conclude that a major goal of Roosevelt in making this speech was to

(A) inform American citizens of changes of policy in the new administration.
(B) impress his European counterparts with the soundness of America's foreign policy.
(C) encourage American voters to avoid the divisiveness inherent in partisan politics.
(D) inspire the American people to defend the cause of freedom in dangerous times.

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Questions 22–31 are based on the following passage.

This passage is from Mortal Lessons: Notes on the Art of Surgery, *a classic book written by a contemporary American surgeon about his art.*

One holds the knife as one holds the bow of a cello or a tulip—by the stem. Not palmed nor gripped nor grasped, but lightly, with the
Line tips of the fingers. The knife is not for pressing.
(5) It is for drawing across the field of skin. Like a slender fish, it waits, at the ready, then, go! It darts, followed by a fine wake of red. The flesh parts, falling away to yellow globules of fat. Even now, after so many times, I still marvel at
(10) its power—cold, gleaming, silent. More, I am still struck with dread that it is I in whose hand the blade travels, that my hand is its vehicle, that yet again this terrible steel-bellied thing and I have conspired for a most unnatural
(15) purpose, the laying open of the body of a human being.

A stillness settles in my heart and is carried to my hand. It is the quietude of resolve layered over fear. And it is this resolve that
(20) lowers us, my knife and me, deeper and deeper into the person beneath. It is an entry into the body that is nothing like a caress; still, it is among the gentlest of acts. Then stroke and stroke again, and we are joined by other
(25) instruments, hemostats and forceps, until the wound blooms with strange flowers whose looped handles fall to the sides in steely array.

There is a sound, the tight click of clamps fixing teeth into severed blood vessels, the
(30) snuffle and gargle of the suction machine clearing the field of blood for the next stroke, the litany of monosyllables with which one prays his way down and in: *clamp, sponge, suture, tie, cut.* And there is color. The green
(35) of the cloth, the white of the sponges, the red and yellow of the body. Beneath the fat lies the fascia, the tough fibrous sheet encasing the muscles. It must be sliced and the red beef of the muscles separated. Now there are
(40) retractors to hold apart the wound. Hands move together, part, weave. We are fully engaged, like children absorbed in a game or the craftsmen of some place like Damascus.

Deeper still. The peritoneum, pink and
(45) gleaming and membranous, bulges into the wound. It is grasped with forceps, and opened. For the first time we can see into the cavity of the abdomen. Such a primitive place. One expects to find drawings of
(50) buffalo on the walls. The sense of trespassing is keener now, heightened by the world's light illuminating the organs, their secret colors revealed—maroon and salmon and yellow. The vista is sweetly vulnerable at
(55) this moment, a kind of welcoming. An arc of the liver shines high and on the right, like a dark sun. It laps over the pink sweep of the stomach, from whose lower border the gauzy omentum is draped, and through which veil
(60) one sees, sinuous, slow as just-fed snakes, the indolent coils of the intestine.

You turn aside to wash your gloves. It is a ritual cleansing. One enters this temple doubly washed. Here is man as microcosm,
(65) representing in all his parts the Earth, perhaps the universe.

I must confess that the priestliness of my profession has ever been impressed on me. In the beginning there are vows, taken with
(70) all solemnity. Then there is the endless harsh novitiate of training, much fatigue, much sacrifice. At last one emerges as a celebrant, standing close to the truth lying curtained in the ark of the body. Not surplice and cassock
(75) but mask and gown are your regalia. You hold no chalice, but a knife. There is no wine, no wafer. There are only the facts of blood and flesh.

MODEL TEST 1

22. The passage is best described as

    (A) a definition of a concept.
    (B) an example of a particular method.
    (C) a lesson on a technique.
    (D) a description of a process.

23. It can most reasonably be inferred from the passage that the "wake of red" to which the author refers (line 7) is

    (A) a sign of embarrassment.
    (B) an infectious rash.
    (C) a line of blood.
    (D) the blade of the knife.

24. Which choice provides the best evidence for the answer to the previous question?

    (A) Lines 1–2 ("One . . . stem")
    (B) Lines 2–4 ("Not . . . fingers")
    (C) Lines 7–8 ("The flesh . . . fat")
    (D) Lines 17–18 ("A stillness . . . hand")

25. As used in line 8, "parts" most nearly means

    (A) leaves.
    (B) splits.
    (C) surrenders.
    (D) distributes.

26. As used in line 42, "engaged" most nearly means

    (A) betrothed.
    (B) engrossed.
    (C) hired.
    (D) embattled.

27. In lines 49–50, the comment "One expects to find drawings of buffalo on the walls" metaphorically compares the abdominal cavity to

    (A) an art gallery.
    (B) a zoological display.
    (C) a Western film.
    (D) a prehistoric cave.

28. The author most likely describes the colors of the internal organs as "secret" (line 52) because

    (A) they are beyond ordinary human understanding.
    (B) they normally are hidden from sight.
    (C) their access is limited to authorized personnel.
    (D) they are darker in color than the external organs are.

29. In creating an impression of abdominal surgery for the reader, the author primarily makes use of

    (A) comparison with imaginary landscapes.
    (B) contrast to other types of surgery.
    (C) references to religious imagery.
    (D) evocation of the patient's emotions.

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30. Which choice provides the best evidence for the answer to the previous question?

   (A) Lines 36–40 ("Beneath the fat . . . wound")
   (B) Lines 44–48 ("The peritoneum . . . abdomen")
   (C) Lines 54–57 ("The vista . . . sun")
   (D) Lines 62–64 ("It is a . . . washed")

31. One aspect of the passage that may make it difficult to appreciate is the author's apparent assumption throughout that readers will

   (A) have qualms about reading descriptions of major surgery.
   (B) be already adept at handling surgical tools.
   (C) be familiar with the organs and tissues that are named.
   (D) relate accounts of specific surgical acts to their own experience of undergoing surgery.

Questions 32–42 are based on the following passages.

Passage 1 is taken from a historical study, done in the 1980s, of the relationship between the press and each American president from George Washington to Ronald Reagan. Passage 2 is taken from a 2006 master's thesis on the relationship between the president and the press during the first term of President George W. Bush.

PASSAGE 1

In the shifting relationship between the press and the presidency over nearly two centuries, there has remained one primary
Line constant—the dissatisfaction of one with
(5) the other. No president has escaped press criticism, and no president has considered himself fairly treated. The record of every administration has been the same, beginning with mutual protestations of goodwill,
(10) ending with recriminations and mistrust.

This is the best proof we could have that the American concept of a free press in a free society is a viable idea, whatever defects the media may have. While the Founding Fathers
(15) and their constituencies did not always agree on the role the press should play, there was a basic consensus that the newspaper (the only medium of consequence at the time) should be the buffer state between the rulers
(20) and the ruled. The press could be expected to behave like a watchdog, and government at every level, dependent for its existence on the opinions of those it governed, could expect to resent being watched and having its
(25) shortcomings, real or imaginary, exposed to the public view.

Reduced to such simple terms, the relationship of the presidents to the press since George Washington's first term is
(30) understandable only as an underlying

principle. But this basic concept has been increasingly complicated by the changing nature of the presidency, by the individual nature of presidents, by the rise of other
(35) media, especially television, and by the growing complexity of beliefs about the function of both press and government.

In surveying nearly two centuries of this relationship, it is wise to keep in mind an
(40) axiom of professional historians—that we should be careful not to view the past in terms of our own times, and make judgments accordingly. Certain parallels often become obvious, to be sure, but to assert what an
(45) individual president should or should not have done, by present standards, is to violate historical context. Historians occasionally castigate each other for this failing, and in the case of press and government, the
(50) danger becomes particularly great because the words themselves—"press" and "government," even "presidency"—have changed in meaning so much during the past two hundred years.

(55) It is part of American mythology that the nation was "cradled in liberty" and that the colonists, seeking religious freedom, immediately established a free society, but the facts are quite different. The danger of
(60) an uncontrolled press to those in power was well expressed by Sir William Berkeley, governor of Virginia, when he wrote home to his superiors in 1671: "I thank God there are no free schools nor printing, and I hope
(65) we shall not have these hundred years; for learning has brought disobedience, and heresy, and sects into the world, and printing has divulged them, and libels against the best government, God keep us from both."
(70) There are those in twentieth-century America who would say "Amen" to Berkeley's view of printing and "libels against the best government."

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PASSAGE 2

In their analysis of aggressive journalist
(75) behavior in a comparative study of press
conferences held by Presidents Eisenhower
and Reagan, Clayman and Heritage (2002)
developed an original encoding system
according to ten different features of
(80) question design. Their findings showed
significantly greater levels of aggression and
adversarial behavior by the press in dealings
with the more recent president. Clayman,
Elliot, Heritage & McDonald's updated study
(85) (2004) refined the coding process and used a
more continuous sample to test the validity
and reliability of the original study. Their
comparison of journalistic adversarialness
covered each president from Eisenhower to
(90) Clinton and supported original results that
show a long-term decline in deference to the
president. The continuous sample revealed
more volatility than the simpler work on
which it was based but is a further testament
(95) to the increased aggressiveness, sometimes
adversarial treatment prevalent in press
conferences regardless of partisanship or
personal idiosyncrasy.

These findings would suggest that
(100) the increasingly contentious, adversarial
relationship between the press and the
highest ranking executive official has
created a modern press conference where
the president must relinquish more agenda-
(105) setting control than in other communicative
processes. In each session, he subjects
himself to open questioning that is shown to
be significantly less deferential, more direct
and often more aggressive and hostile than
(110) ever before. This would seem an appropriate
justification for the dwindling numbers of
traditional solo press conferences in recent
administrations (Kumar, 2003b).

Table 1
Solo and Joint Press Conferences by President 1981–2004

President	Total	Solo	Joint	Joint Sessions as Percent of Total
Reagan*	46	46	0	00.0%
George H. W. Bush*	142	83	59	41.5%
Clinton*	193	62	131	67.9%
George W. Bush**	88	20	68	77.3%

*Cited in Kumar, 2003b
**Compiled from *Weekly Compilation of Presidential Documents*

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32. The main purpose of Passage 1 is to

(A) examine methods of evaluating the relationship between the press and the president.
(B) argue that the adversarial relationship between the press and the presidency has proven deleterious to both.
(C) present an overview of an inherently conflicted relationship that faces new challenges.
(D) consider a political dilemma created by the mutual antagonism between two major institutions.

33. According to the opening paragraph of Passage 1, all American presidents have experienced

(A) defects in the quality of their press coverage.
(B) goodwill from some reporters in the press corps.
(C) alternating periods of antagonism and harmony with the press.
(D) mutual animosity involving themselves and the press.

34. Which choice provides the best evidence for the answer to the previous question?

(A) Lines 7–10 ("The record . . . mistrust")
(B) Lines 11–14 ("This . . . may have")
(C) Lines 14–20 ("While . . . ruled")
(D) Lines 27–31 ("Reduced . . . principle")

35. As used in line 27, "reduced" most nearly means

(A) decreased.
(B) boiled down.
(C) marked down.
(D) demoted.

36. The authors of Passage 1 caution the reader about judging the actions of long-dead presidents because

(A) historical accounts, when investigated, have proven to be untrustworthy.
(B) contemporary authors have rewritten history to reflect current academic opinions.
(C) readers today cannot fully grasp the significance these actions had in their own time.
(D) history, at best, is an imprecise science.

37. Which choice provides the best evidence for the answer to the previous question?

(A) Lines 1–7 ("In the shifting . . . treated")
(B) Lines 20–26 ("The press . . . public view")
(C) Lines 27–37 ("Reduced . . . government")
(D) Lines 43–54 ("Certain parallels . . . years")

38. In the opening sentence of the final paragraph (lines 55–59) of Passage 1, the authors seek primarily to

(A) define a term.
(B) defend a widely held belief.
(C) correct a misconception.
(D) champion a cause.

39. As used in line 107, "open" most nearly means

(A) receptive.
(B) unrestricted.
(C) unconcealed.
(D) vulnerable.

40. Data in the graph about presidential solo and joint press conferences from 1981–2004 most strongly support which of the following statements?

(A) President Clinton held more solo press conferences than President George H. W. Bush did.

(B) Presidents Clinton and George W. Bush held a far higher percentage of joint press conferences than either of their predecessors did.

(C) President Reagan's failure to hold joint press conferences resulted from a reluctance to share the spotlight with other members of his administration.

(D) While President George H. W. Bush held far more press conferences than his son President George W. Bush did, both Presidents Bush held more joint sessions than solo sessions.

41. Which choice best describes the relationship between the two passages?

(A) Passage 2 denies the static nature of the phenomenon described in Passage 1.

(B) Passage 2 evaluates the conclusions drawn from assertions made in Passage 1.

(C) Passage 2 predicts the eventual healing of a breach reported in Passage 1.

(D) Passage 2 critiques the hypotheses proposed by researchers cited in Passage 1.

42. On which of the following points would the authors of both passages most likely agree?

(A) Those who criticize the press for its treatment of the president fail to understand the press's watchdog function.

(B) Members of the press corps are unlikely to prefer joint press conferences to solo sessions.

(C) The relationship between the press and the presidency is inherently adversarial, and likely to remain so.

(D) The president needs to regain agenda-setting control of traditional solo press conferences.

Questions 43–52 are based on the following passage.

The following passage is abridged from Rachel Ehrenberg's "The facts behind the frack" (Science News), an article on the controversies surrounding the hydraulic fracturing method of recovering natural gas from below the Earth's surface.

To call it a fractious debate is an understatement.

Hydraulic fracturing, or fracking,
Line wrenches open rock deep beneath the Earth's
(5) surface, freeing the natural gas that's trapped inside. Proponents argue that fracking-related gas recovery is a game changer, a bridge to the renewable energy landscape of the future. The gas, primarily methane, is
(10) cheap and relatively clean. Because America is brimful of the stuff, harvesting the fuel via fracking could provide the country with jobs and reduce its dependence on foreign sources of energy.

(15) But along with these promises have come alarming local incidents and national reports of blowouts, contamination and earthquakes. Fracking opponents contend that the process poisons air and drinking water and
(20) may make people sick. What's more, they argue, fracking leaks methane, a potent greenhouse gas that can blow up homes, worries highlighted in the controversial 2010 documentary *Gasland.*

(25) Fears that fracking companies are operating in a Wild West environment with little regulation have prompted political action. In June, the group Don't Frack Ohio led thousands of protesters on a march to
(30) the statehouse, where they declared their commitment to halting hydraulic fracturing in the state. Legislation banning the process has been considered but is now on hold

in California. New York—which sits atop a
(35) giant natural gas reserve—has a statewide fracking moratorium; pending policies would allow the process only where local officials support it.

Despite all this activity, not much of
(40) the fracking debate has brought scientific evidence into the fold. Yet scientists have been studying the risks posed by fracking operations. Research suggests methane leaks do happen. The millions of gallons
(45) of chemical-laden water used to fracture shale deep in the ground has spoiled land and waterways. There's also evidence linking natural gas recovery to earthquakes, but this problem seems to stem primarily
(50) from wastewater disposal rather than the fracturing process itself. While the dangers are real, most problems linked to fracking so far are not specific to the technology but come with many large-scale energy
(55) operations employing poor practices with little oversight, scientists contend. Whether the energy payoff can come with an acceptable level of risk remains an open question.

(60) Hydraulic fracturing operations have been linked to some small earthquakes, including a magnitude 2.3 quake near Blackpool, England, last year. But scientists agree such earthquakes are extremely rare,
(65) occurring when a well hits a seismic sweet spot, and are avoidable with monitoring. Of greater concern are earthquakes associated with the disposal of fracking fluid into wastewater wells. Injected fluid essentially
(70) greases the fault, a long-known effect. In the 1960s, a series of Denver earthquakes were linked to wastewater disposal at the Rocky Mountain arsenal, an Army site nearby. Wastewater disposal was also blamed for a

(75) magnitude 4.0 quake in Youngstown, Ohio, last New Year's Eve.

A study headed by William Ellsworth of the U.S. Geological Survey in Menlo Park, Calif., documents a dramatic increase in (80) earthquakes in the Midwest coinciding with the start of the fracking boom. From 1970 to 2000, the region experienced about 20 quakes per year measuring at or above magnitude 3.0. Between 2001 and 2008, there (85) were 29 such quakes per year. Then there were 50 in 2009, 87 in 2010 and 134 in 2011. "The change was really quite pronounced," says Ellsworth. "We do not think it's a purely natural phenomenon." However, the (90) earthquakes weren't happening near active drilling—they seemed to be clustered around wastewater wells.

It's hard to look back without pre-quake data and figure out what triggers a single (95) earthquake, notes Ellsworth. There are several pieces of the geology equation that, if toggled, can tip a fault from stable to unstable. A recent study examining seismic activity at wastewater injection wells in (100) Texas linked earthquakes with injections of more than 150,000 barrels of water per month. But not every case fits the pattern, suggesting the orientation of deep faults is important. Ellsworth advises that injection (105) at active faults be avoided. Drill sites should be considered for their geological stability, and seismic information should be collected. (Only about 3 percent of the 75,000-odd hydraulic fracturing setups in (110) the United States in 2009 were seismically monitored.) "There are many things we don't understand," says Ellsworth. "We're in ambulance-chasing mode where we're coming in after the fact."

Human-Induced Earthquakes

After decades of a steady earthquake rate (dotted line) in the central and eastern United States, activity began to rise in about 2009 and jumped to five times the normal rate by 2013, probably due to human activity.

Cumulative earthquakes in eastern and central United States (magnitude ≥ 3.0)
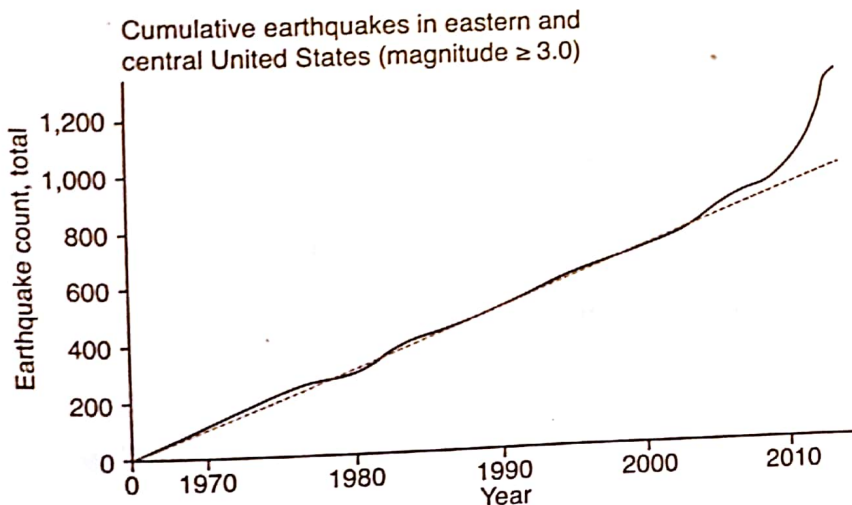
Source: W. L. Ellsworth/Science 2013

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43. In line 1, the author chooses the word "fractious" (contentious; heated) to create

   (A) a metaphor.
   (B) a play on words.
   (C) an exaggeration.
   (D) a counterargument.

44. To call fracking-related gas recovery "a game changer" (line 7) is to assert that fracking

   (A) has no foreseeable negative consequences.
   (B) will radically alter natural gas production.
   (C) is not taken seriously by its proponents.
   (D) will require active federal regulation.

45. Which choice provides the best evidence for the answer to the previous question?

   (A) Lines 9–14 ("The gas . . . energy")
   (B) Lines 15–20 ("But . . . sick")
   (C) Lines 20–24 ("What's more . . . *Gasland*")
   (D) Lines 51–59 ("While . . . question")

46. What function does the discussion of fracking legislation in lines 32–38 serve in the passage?

   (A) It describes specific responses to concerns raised in the previous paragraph.
   (B) It analyzes theoretical objections to a claim made in the previous paragraph.
   (C) It provides an unanticipated reaction to an explicit demand made in the previous paragraph.
   (D) It contradicts a working hypothesis proposed in the previous paragraph.

47. As used in line 58, "open" most nearly means

   (A) unresolved.
   (B) vulnerable.
   (C) accessible.
   (D) ajar.

48. The stance that the author takes throughout the passage is best described as that of

   (A) an advocate of technological innovations.
   (B) an opponent of pointless regulatory oversight.
   (C) a legislator concerned about potential danger.
   (D) an observer striving to present a balanced account.

49. Which choice provides the best evidence for the answer to the previous question?

   (A) Lines 25–28 ("Fears . . . political action")
   (B) Lines 32–38 ("Legislation . . . support it")
   (C) Lines 51–59 ("While . . . question")
   (D) Lines 93–95 ("It's hard . . . Ellsworth")

50. The graph based on Ellsworth's figures accentuates the

   (A) validity of his research team's methodology.
   (B) increased magnitude of each individual earthquake.
   (C) increasing frequency of earthquakes in the region.
   (D) amount of fracking fluid injected into wastewater wells.

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51. As used in line 87, "pronounced" most nearly means

(A) noticeable.
(B) declared.
(C) decided on.
(D) articulated.

52. It can be most reasonably inferred from the concluding paragraph that Ellsworth looks on current hypotheses about connections between the recent increases in earthquakes and the start of the fracking boom as

(A) corroborated by pre-quake data.
(B) based on insufficient knowledge.
(C) evidence of seismic activity.
(D) contradicted by his research findings.

STOP

If there is still time remaining, you may review your answers.

35 MINUTES, 44 QUESTIONS

Turn to Section 2 of your answer sheet to answer the questions in this section.

Directions: Questions follow each of the passages below. Some questions ask you how the passage might be changed to improve the expression of ideas. Other questions ask you how the passage might be altered to correct errors in grammar, usage, and punctuation. One or more graphics accompany some passages. You will be required to consider these graphics as you answer questions about editing the passage.

There are three types of questions. In the first type, a part of the passage is underlined. The second type is based on a certain part of the passage. The third type is based on the entire passage.

Read each passage. Then, choose the answer to each question that changes the passage so that it is consistent with the conventions of standard written English. One of the answer choices for many questions is "NO CHANGE." Choosing this answer means that you believe the best answer is to make no change in the passage.

Questions 1–11 are based on the following passage.

Out with the Old and the New

Modernism can be characterized by its complete rejection of 19th-century traditions and values of prudish and proper etiquette. F. Scott Fitzgerald's "Bernice Bobs Her Hair" was written in 1920 and reflects this ❶ embrace of conventional morality most effectively through the character of Marjorie Harvey. Marjorie, an immensely popular and desirable young woman, is plagued by Bernice, her dull cousin who fails to entertain ❷ or be entertained by Marjorie's many social environments. In a desperate attempt to make Bernice more popular and therefore, more bearable, Marjorie teaches Bernice to appear beautifully at ease with ❸ itself in order to gain social favor. Fitzgerald uses Bernice's

1. Which wording is most consistent with the paragraph as a whole?

   (A) NO CHANGE
   (B) ignorance
   (C) rebuff
   (D) significance

2. (A) NO CHANGE
   (B) and entertainment
   (C) with the entertaining of
   (D) of the entertaining for

3. (A) NO CHANGE
   (B) oneself
   (C) themselves
   (D) herself

transformation to embody Modernist ideals of moral relativism and ❹ the implementation of mockery of former Victorian standards of custom.

Marjorie, a quintessential modern girl, represents the destruction of conventional norms and former ideas of femininity. Young and beautiful, she is interested only in having a good time and being good company to the many suitors ❺ whom flock to her. Despite her good looks and family wealth, Bernice is disliked for her stifling and overly formal Victorian propriety. ❻ On the other hand, Bernice is old-fashioned, outdated, and unpopular.

The "new," modern woman is best denoted by her wit, carelessness, and lack of emotion. Where the dignified nature of Bernice is seen as snobbish and out of style, Marjorie's sardonic and indifferent manner is fresh and exciting. The stark contrast ❼ between the Victorian and Modernist eras is even depicted in the girls' taste in literature: Marjorie casts off Bernice's reference to *Little Women* in exchange for the more recent Oscar Wilde.

Still, Modernism isn't let off easy in Fitzgerald's well-liked short story. ❽ When Marjorie is preferred socially, she is flagrantly rude and always needing to be entertained. She instructs Bernice in social protocol in a ❾ few short sentences, causing the reader to question the frivolous hedonism that dominates the early 20th century. Once Bernice adopts her cousin's apathy, she easily falls into the world of dancing, dating,

4. (A) NO CHANGE
   (B) for the mocking of
   (C) to mock
   (D) mocking

5. (A) NO CHANGE
   (B) who
   (C) whose
   (D) who's

6. Where in this paragraph should the underlined sentence be placed?

   (A) where it is now
   (B) before the first sentence
   (C) before the second sentence
   (D) before the third sentence

7. (A) NO CHANGE
   (B) among
   (C) for
   (D) on

8. (A) NO CHANGE
   (B) While
   (C) Because
   (D) Since

9. (A) NO CHANGE
   (B) short few
   (C) few, short
   (D) short, few

and laughing. In fact, never being serious happens to come quite easy.

The equally ❿ kind-hearted natures of both of Fitzgerald's characters come crashing down when Marjorie tricks Bernice into getting her hair bobbed—a style so rebellious that it causes Bernice to faint. Bernice finds revenge in severing off a golden lock of Marjorie's hair while she sleeps. While using Bernice and Marjorie to model both eras, Fitzgerald finds flaws in ⓫ both: the old manner is a lifeless forgery, while the new approach is only relaxed on the surface.

10. Which choice would best be logically placed here to represent the characterizations of Marjorie and Bernice in the paragraph?

(A) NO CHANGE
(B) revolutionary dogmatism
(C) false facades
(D) frivolous piety

11. (A) NO CHANGE
(B) both, the old manner is a lifeless forgery while
(C) both—the old manner is a lifeless, forgery, while
(D) both; the old manner, is a lifeless forgery while

Questions 12–22 are based on the following passage and supplementary material.

Extra, Extra (Written in 2015)

If any field has drastically changed in the last two decades, it is journalism. Journalism includes the gathering and distribution of news through a variety of mediums, **⓬ building upon the long-standing professional excellence with which journalism is associated.** Whether via print, broadcast, or digital, journalists are responsible for keeping the public informed, and often play a vital role in allowing the general population to participate in the political process. Although the digital age has understandably discouraged popularity in some traditional forms of **⓭ news media the field itself is optimistic, not only** is the digital platform more than making up for the moderate declines in traditional news sources, **⓮ but also** research shows that Americans are spending more time consuming news than they have since the early 1990s. **⓯ The traditional dominance of newspapers has continued unabated.**

12. Which choice most specifically elaborates on the first part of this sentence?

   (A) NO CHANGE
   (B) growing its reach to include urban, suburban, and rural population centers.
   (C) which have recently expanded to incorporate smartphones, tablets, and blogs.
   (D) demonstrating that seeking the average public opinion is most objective.

13. (A) NO CHANGE
   (B) news media, the field itself is optimistic, not only
   (C) news media, the field itself is optimistic: not only
   (D) news media the field itself; is optimistic not only

14. (A) NO CHANGE
   (B) and
   (C) for
   (D) since

15. Which choice best concludes this paragraph and transitions to the topic of the next paragraph?

   (A) NO CHANGE
   (B) Journalism isn't dying; the way reporters do their job is changing.
   (C) Journalism is no longer the sort of career that globally minded people would chose.
   (D) With the steady demise of public interest in quality journalism, it is only a matter of time before journalism falls by the wayside.

Quite simply, the days of print-only newsrooms are past. Now, one doesn't wait until the 6 P.M. broadcast to hear what's happening around the world, **⓰ nor** does one grab the newspaper on Sunday morning for breaking news. The public expects minute-by-minute updates, and media companies meet this demand with 24-7 online newsreels. Journalists can no longer limit themselves to gathering stories or writing articles or speaking publicly—they must be able to do it all and then some. Even entry-level positions require candidates who have had media training and internship experience in addition to a formal education. Internships at most media outlets include everything from copy editing to blogging.

The tough competition and demanding prerequisites for the job market need not be deterrents. Leading journalism **⓱ department's are reassuring that their** students leave undergraduate with all the tools necessary for success. For instance, the University of Missouri at Columbia **⓲ —boasting the number one journalism department in the nation according to _The Huffington Post_—** offers more than 30 interest areas, incorporating an intensive liberal arts education along with hands-on experience in media labs and internships for academic credit. Ohio **⓳ University also having, a journalism department ranked in the top ten nationwide offers** three campus publications plus a broadcasting outlet for students to gain professional experience before graduation, not to mention OU's Institute for International Journalism, which offers opportunities for reporting abroad.

16. (A) NO CHANGE
    (B) because
    (C) for
    (D) while

17. (A) NO CHANGE
    (B) departments' are insuring that they're
    (C) departments are assuring there
    (D) departments are ensuring that their

18. Which choice best connects this sentence to the previous sentence?

    (A) NO CHANGE
    (B) —located in the geographic near-middle of the United States—
    (C) —a university that offers a variety of possible undergraduate majors and minors—
    (D) —ranked among the best universities for average starting salary among its graduates—

19. (A) NO CHANGE
    (B) University also having a journalism department ranked in the top ten nationwide offers
    (C) University, also having a journalism department, ranked in the top ten, nationwide, offers
    (D) University, also having a journalism department ranked in the top ten nationwide, offers
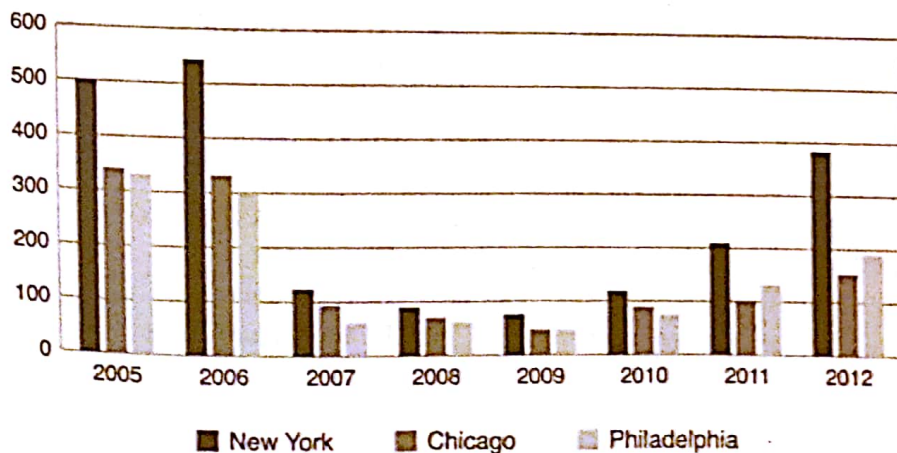
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Technology and its **㉒ endless affects on** all areas of the job market are tedious subjects for the student and young professional. One cannot consider a career field without hearing how formidable its outlook is and how quickly one could fail in an uncertain economy. Indeed, journalism students have been well informed **㉑ about the steadily increasing demand for journalists in the recent past**, but the truth stands that there will always be a demand for the news, and therefore, a need for journalists. The field **㉒ is adapting** and so are its constituents.

20. (A) NO CHANGE
(B) endless effects
(C) endlessly affects
(D) endlessly effects

21. Which choice offers the most accurate interpretation of the data in the chart?
(A) NO CHANGE
(B) about the gradual decline in jobs for journalists in the past decade,
(C) about the constant level of employment for journalists these past few years,
(D) about the job market fluctuations in recent years,

22. (A) NO CHANGE
(B) was adapting
(C) is adopting
(D) was adopting

Journalism-Related Job Openings

Legend: New York, Chicago, Philadelphia

Questions 23–33 are based on the following passage.

Parthenon

Of all the ancient, sacred, and truly splendid buildings to visit, the Parthenon may just be the most treasured of all. **㉓** A long time past, the Greeks built their apotheosis over a span of nine years atop the Acropolis of Athens as a tribute to Athena, the city's beloved patron goddess of war and reason. The temple itself was completed in 438 B.C., although decorative sculpting and engraving within the structure went on for several more years. Since then, the structure has served as **㉔** temple, treasury, church, and most recently, tourist attraction.

Pericles—leading politician in 5th century B.C.—recruited the sculptor Phidias to oversee two architects, Iktinos and Kallikrates, in the construction of the Parthenon to house a forty-foot high statue of Athena. **㉕** Honestly and judiciously, the ancient Greeks planned an exceptional monument with a base the size of half a football field and pillars over thirty feet tall. Athenians stored their most lavish possessions inside the Parthenon among a host of statues, sculptures, precious metals, and treasures taken in the conquest of the Persians. **㉖** Yet, the endeavor and all it stood for were short-lived: just seven years after the Parthenon was constructed, war broke out with Sparta. Sometime after the reign of Athens, in 5th century A.D., the statue of Athena was plundered and later destroyed.

Perhaps, even with Athena—the very core of Parthenon—missing, the temple **㉗** could of still served as a great, inclusive museum of Greek history, tracing the founding of Ancient Greece, Athenian democracy, and early western civilization; yet, the Parthenon would endure

23. Which choice would most specifically describe how long ago the Parthenon was constructed?

    (A) NO CHANGE
    (B) More than 2,500 years ago,
    (C) Many decades of ages past,
    (D) In days gone by,

24. (A) NO CHANGE
    (B) temple, treasury church, and most recently, tourist attraction.
    (C) temple treasury, church and most recently tourist attraction.
    (D) temple treasury church, and most recently tourist attraction.

25. What could best be used for the underlined portion to convey the high priority the Greeks placed on completing the Parthenon in a glorious fashion?

    (A) NO CHANGE
    (B) Sparing no expense,
    (C) With artistic patience,
    (D) Using architectural techniques,

26. (A) NO CHANGE
    (B) Additionally,
    (C) In conclusion,
    (D) As a result,

27. (A) NO CHANGE
    (B) might of
    (C) could have
    (D) should have been

many other foes. The Parthenon was first converted to a Christian church, which led to the removal of **㉘** its' "pagan gods." With the rise of the Ottoman Empire, the monument was used as a mosque until a Venetian attack on Athens destroyed large parts of the building and left its **㉙** archaeology deserted. By the 18th century, little was left of the Parthenon after decades of European pillaging.

㉚ In the contemporary world in which we reside, the Parthenon is one of the most popular tourist attractions in the world, enticing millions of people each year and warranting an ongoing restoration project currently in its third decade. Even in its antiquity, its subtle beauty and architectural refinement **㉛** is uncontested. Its miracle comes not from its magnitude, but from the curvatures between its platform and columns that offer an illusion of symmetry that exceeds its true dimensions, and in the elaborate engravings within its marble surfaces **㉜** that having to outlast centuries of calamity. Now, architects, engineers, and artists work to recreate the surprisingly balanced and unbelievably precise work of the Athenians. **㉝** How is it that today's architects are taking forty years to do what they did in less than ten?

28. (A) NO CHANGE
    (B) it's
    (C) it is
    (D) its

29. (A) NO CHANGE
    (B) components
    (C) particles
    (D) remnants

30. (A) NO CHANGE
    (B) In the world of today,
    (C) Contemptuously,
    (D) Today,

31. (A) NO CHANGE
    (B) are
    (C) was
    (D) were

32. (A) NO CHANGE
    (B) which has to outlast
    (C) that have outlasted
    (D) which had outlasted

33. Which of the following would be the most effective conclusion to the essay?

    (A) NO CHANGE
    (B) It is vital that we learn from the past in order to not repeat the mistakes of history.
    (C) Tourism is a growing business worldwide, as people seek out memorable experiences rather than to accumulate possessions.
    (D) The world continues to be haunted by the Venetian attack on the Parthenon, turning a brilliant accomplishment into utter ruins.

GO ON TO THE NEXT PAGE

Questions 34–44 are based on the following passage.

Where Have all the Cavemen Gone?

❹ All humans have their ultimate genetic roots in Africa. While our own ancestors were battling drought on the coasts of the African sub-continent, ❺ the icebound north of modern Eurasia experienced the spread of the evolutionarily distinct species *Homo neanderthalensis*, where the Neanderthals developed the tools of flint and bone that have today come to characterize the so-called Mousterian culture of the early Stone Age.

(1) Early hypotheses for their extinction centered, predictably, around the ❻ climate extreme change of the last Ice Age. (2) However, more recent studies of Neanderthal anatomy and artifacts suggest that they were remarkably well-equipped to deal with the fiercely cold and barren conditions, ❼ and even thrived within them for nearly 200,000 years. (3) To cope with the glacial conditions, Neanderthals became short in stature—no more than a meter and half tall—and developed short, broad extremities that would

34. Which choice would best function as the introductory thesis of the essay?

(A) NO CHANGE
(B) The defeat of the Neanderthal invaders can only be considered a triumph of human ingenuity.
(C) The disappearance of the Neanderthals is one of the great mysteries in the evolutionary success of modern humans.
(D) In order to cope with the repercussions of possible global climate change, we should look to the example of Neanderthal adaptation.

35. (A) NO CHANGE
(B) the evolutionarily distinct species *Homo neanderthalensis* had spread to the icebound north of modern Eurasia,
(C) the species *Homo neanderthalensis*, being evolutionarily distinct, found itself spread to modern Eurasia in the north icebound,
(D) the north icebound of modern Eurasia experience evolutionarily distinct species spread of the *Homo neanderthalensis*,

36. (A) NO CHANGE
(B) climate, extreme
(C) extreme climate
(D) extreme, climate

37. (A) NO CHANGE
(B) but
(C) for it was the case that they
(D) OMIT the underlined portion.

have increased the efficiency of circulation, and helped to preserve body heat. **❸❽**

Another popular theory posits that Neanderthals met their extinction through absorption. That is—supposing Neanderthals were *not* a distinct species, but rather a subspecies of *Homo sapiens*—some researchers believe that they disappeared after **❸❾** conflicts with humans when they arrived in Eurasia roughly 80,000 years ago. However, a sample of mitochondrial DNA surviving in the remains of a Neanderthal discovered in the Caucus Mountains demonstrates 3.5 percent genetic divergence from **❹⓿** contemporary *Homo sapiens*. While it is possible that some Neanderthals may have become culturally assimilated with our ancestors, it is highly unlikely that their DNA contributed to that of modern humans.

Currently, the most widely held theory to explain the extinction of the Neanderthals boils down quite simply to the processes of natural selection. While Neanderthals appear to have maintained a stable population during the Ice Age, **❹❶** a drastic genetic bottleneck was experienced by our African ancestors, leaving only the strongest and most intelligent to survive and carry on the species. When *Homo*

38. The writer would like to insert this sentence to provide further support to his argument in this paragraph.

"Further, there is strong evidence to suggest that later Neanderthals were capable of creating sophisticated and versatile garments from animal pelts designed to maintain core warmth without inducing perspiration."

Where would it best be placed?

(A) before sentence 1
(B) before sentence 2
(C) before sentence 3
(D) after sentence 3

39. Which choice is the most consistent elaboration on the first sentence of this paragraph?

(A) NO CHANGE
(B) interbreeding
(C) discoveries
(D) commerce

40. Which wording best conveys that the Neanderthals only have a slight genetic divergence from present-day humans?

(A) NO CHANGE
(B) punctual
(C) unique
(D) scientific

41. (A) NO CHANGE
(B) a drastic genetic bottleneck by our African ancestors was experienced.
(C) our African ancestors drastically experienced a bottleneck that was genetic.
(D) our African ancestors experienced a drastic genetic bottleneck.

MODEL TEST 1

neanderthalensis at last met *Homo sapiens*, it is probable that ㉔ they was outmatched, at the very least, in technology, creativity, and social efficacy. In the several thousand years that followed, competition for resources would have pushed Neanderthals farther and farther to the ㉕ oceans of Europe and Asia. The last known remnants of Neanderthal culture issue from the remote location of Gorham's Cave on the Gibraltar coast. By this time—roughly 27,000 years ago—*Homo neanderthalensis* had been displaced by its evolutionary cousin ㉖ to the very edge of the land nearly back into Africa itself where our common ancestors, first emerged millions of years prior.

42. (A) NO CHANGE
    (B) they were
    (C) the Neanderthals are
    (D) the Neanderthals were

43. (A) NO CHANGE
    (B) margins
    (C) debris
    (D) remains

44. (A) NO CHANGE
    (B) to the very edge, of the land nearly back into Africa itself, where our common ancestors
    (C) to the very edge of the land, nearly back into Africa itself, where our common ancestors
    (D) to the very edge of the land nearly, back into Africa itself where our common, ancestors

STOP

If there is still time remaining, you may review your answers.

MATH TEST (NO CALCULATOR)

25 MINUTES, 20 QUESTIONS

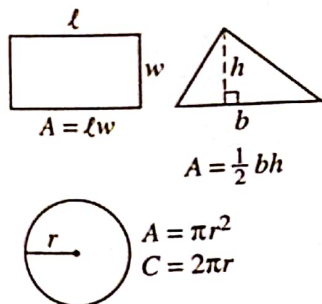Turn to Section 3 of your answer sheet to answer the questions in this section.

Directions: For questions 1–15, solve each problem and choose the best answer from the given choices. Fill in the corresponding circle on your answer sheet. For questions 16–20, solve each problem and enter your answer in the grid on your answer sheet.
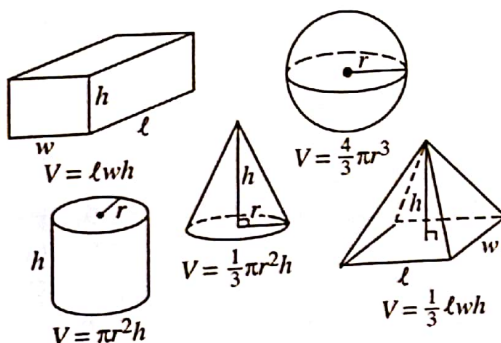
Notes:

- Calculators are **NOT PERMITTED** in this section.
- All variables and expressions represent real numbers unless indicated otherwise.
- All figures are drawn to scale unless indicated otherwise.
- All figures are in a plane unless indicated otherwise.
- Unless indicated otherwise, the domain of a given function is the set of all real numbers x for which the function has real values.

REFERENCE INFORMATION

Area Facts

$A = \ell w$

$A = \frac{1}{2} bh$

$A = \pi r^2$
$C = 2\pi r$

Volume Facts

$V = \ell wh$

$V = \pi r^2 h$

$V = \frac{4}{3}\pi r^3$

$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}\ell wh$

Triangle Facts

$a\sqrt{2}$ / $45°$ / a
$45°$
a

a / $60°$ / $2a$
$30°$
$a\sqrt{3}$

c / a
b
$a^2 + b^2 = c^2$

The arc of a circle contains 360°.
The arc of a circle contains 2π radians.
The sum of the measures of the angles in a triangle is 180°.

GO ON TO THE NEXT PAGE

MODEL TEST 1

1. At the beginning of January, John deposits A dollars into a non-interest-bearing bank account. If John withdraws d dollars from the account every month and makes no additional deposits, how much money, in dollars, will be in the account after m months?

   (A) $A - md$
   (B) $(A - m)d$
   (C) $A - \dfrac{m}{d}$
   (D) $A - \dfrac{d}{m}$

2. If $f(x) = x^2 - 11$, for what values of x is $f(x) < 25$?

   (A) $-6 < x$
   (B) $x < 6$
   (C) $x \le -6$ or $x \ge 6$
   (D) $-6 < x < 6$

3. At Joe's Pizzeria, small pizzas cost $7.50 and large pizzas cost $11.00. One day from 3:00 P.M. to 9:00 P.M., Joe sold 100 pizzas and took in $848. Solving which of the following systems of equations could be used to determine the number of small pizzas, S, and the number of large pizzas, L, that Joe sold during that 6-hour period?

   (A) $S + L = 848$
   $7.5S + 11L = 100$

   (B) $S + L = 100$
   $7.5S + 11L = \dfrac{848}{6}$

   (C) $S + L = 100$
   $7.5S + 11L = 848$

   (D) $S + L = 100$
   $7.5S + 11L = 848 \times 6$

4. Which of the following statements is true concerning the equation below?

   $$3(5 - 2x) = 6(2 - x) + 3$$

   (A) The equation has no solutions.
   (B) The equation has one positive solution.
   (C) The equation has one negative solution.
   (D) The equation has infinitely many solutions.

5. The chart below shows the value of an investment on January 1 of each year from 2005 to 2010. During which year was the percent increase in the value of the investment the greatest?

Year	Value
2005	$150
2006	$250
2007	$450
2008	$750
2009	$1,200
2010	$1,800

   (A) 2005
   (B) 2006
   (C) 2008
   (D) 2009

Minutes from the time the boys set out

6. Hank's and Bill's houses are 1 and 3 miles from their school, respectively. Each boy left his house on a bicycle at the same time and rode for 30 minutes. The graph above shows the distance, in miles, each boy was from the school during their rides. Based on this information, which of the following statements, if any, is *not* necessarily true?

(A) Hank is riding faster than Bill for the entire 30 minutes.
(B) The distance that Hank rode is greater than the distance that Bill rode.
(C) Hank and Bill's paths cross exactly once during their 30-minute rides.
(D) Each of the above statements must be true.

7. Which of the following is equivalent to $\dfrac{2x^2 - 8}{x^2 - 4x + 4}$?

(A) $\dfrac{2(x+2)}{x-2}$

(B) $\dfrac{2(x+4)}{x-4}$

(C) $\dfrac{2x+2}{x-2}$

(D) $\dfrac{6}{4x-4}$

8. If $m \neq 0$, $m \neq 1$, and $f(x) = mx + b$, then which of the following statements concerning the graphs whose equations are $y = f(x) + 3$ and $y = f(x + 3)$ must be true?

(A) The graphs don't intersect.
(B) The graphs intersect in one point.
(C) The graphs intersect in two points.
(D) The graphs intersect in more than two points.

9. For how many positive integers, x, does the function $f(x) = \dfrac{\sqrt{x-3}}{x^2 - 8x - 20}$ have no real values?

(A) 2
(B) 3
(C) 4
(D) Infinitely many

GO ON TO THE NEXT PAGE

10. If for all real numbers x, $h(5 - x) = x^2 + x + 1$, what is the value of $h(9)$?

    (A) 13
    (B) 21
    (C) 28
    (D) 91

11. A white cube has a volume of 27. If a red circle of radius 1 is painted on each face of the cube, what is the total area of the surface of the cube that is *not* red?

    (A) $27 - 3\pi$
    (B) $27 - 6\pi$
    (C) $54 - 6\pi$
    (D) $54 - 12\pi$

12. Tim's Tennis Camp is open only to teenagers—all campers must be between 13 and 19 years old, inclusive. Which of the following inequalities can be used to determine if a person who is y years old is eligible to attend the camp?

    (A) $|y - 13| \le 6$
    (B) $|y - 13| \le 19$
    (C) $|y - 19| \le 13$
    (D) $|y - 16| \le 3$
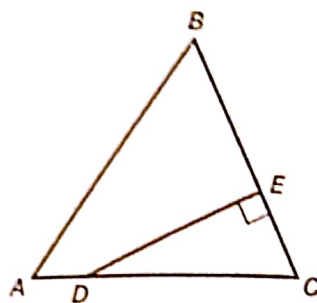
13. In the figure above, line segment $\overline{DE}$ is perpendicular to side $\overline{BC}$ of equilateral triangle ABC. If $AB = 12$ and $BE = 8$, what is the area of quadrilateral $ABED$?

    (A) $14\sqrt{3}$
    (B) $28\sqrt{3}$
    (C) $36\sqrt{3}$
    (D) $72\sqrt{3}$

14. The list price of a certain book is d dollars. Anne bought a copy of the book from an online dealer that offers a discount of 10% off the list price of all books and doesn't collect sales tax. Beth bought the same book at a bookstore, where the book was on sale for 15% off the list price. However, she had to pay 5% sales tax on his purchase. Which of the following statements is true?

    (A) Anne and Beth paid the same price for their books.
    (B) Anne paid more than Beth for the book.
    (C) Anne paid less than Beth for the book.
    (D) Who paid more for her book depends on d, the list price.

15. If the lines whose equations are $y = ax + b$ and $x = cy + d$ are parallel, which statement is true?

    (A) $a = -\dfrac{1}{c}$
    (B) $a = \dfrac{1}{c}$
    (C) $c = a$
    (D) $c = -a$

GO ON TO THE NEXT PAGE

MODEL TEST 1

16. $A(1, 1)$, $B(5, 3)$, and $C(5, 9)$ are three points in the xy-plane. If $\overline{AB}$ is a diameter of Circle 1 and $\overline{BC}$ is a diameter of Circle 2, what is the slope of the line that goes through the centers of the two circles?

17. If a and b are positive constants and if $a(x - y) = b(y - x)$, what is the value of the ratio $\dfrac{x}{y}$?

18. If c is a real number and if $1 + i$ is a solution of the equation $x^2 - 2x + c = 0$, what is the value of c?

19. If (a, b) and (c, d) are the two points of intersection of the line whose equation is $y = x$ and the parabola whose equation is $y = x^2 - 6x + 12$, what is the value of $a + b + c + d$?

20. If $h(5 - 2x) = \sqrt{x^2 + 3x + 5}$ for all real numbers x, what is the value of $h(3)$?

STOP

If there is still time remaining, you may review your answers.

MATH TEST (CALCULATOR)

55 MINUTES, 38 QUESTIONS

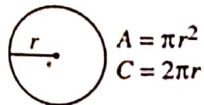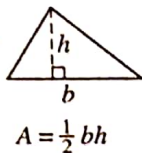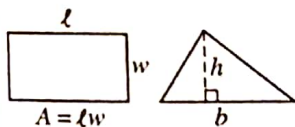Turn to Section 4 of your answer sheet to answer the questions in this section.

Directions: For questions 1–30, solve each problem and choose the best answer from the given choices. Fill in the corresponding circle on your answer sheet. For questions 31–38, solve each problem and enter your answer in the grid on your answer sheet.
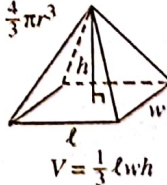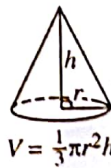
Notes:

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- All figures are in a plane unless indicated otherwise.
- Unless indicated otherwise, the domain of a given function is the set of all real numbers x for which the function has real values.

REFERENCE INFORMATION

Area Facts   **Volume Facts**   **Triangle Facts**

$A = \ell w$

$A = \frac{1}{2} bh$

$A = \pi r^2$

$C = 2\pi r$

$V = \ell wh$

$V = \frac{4}{3}\pi r^3$

$V = \frac{1}{3}\pi r^2 h$

$V = \pi r^2 h$

$V = \frac{1}{3}\ell wh$

$a^2 + b^2 = c^2$

The arc of a circle contains 360°.

The arc of a circle contains 2π radians.

The sum of the measures of the angles in a triangle is 180°.

1. If Wally's Widget Works is open exactly 20 days each month and produces 80 widgets each day it is open, how many years will it take to produce 96,000 widgets?

   (A) fewer than 5
   (B) 5
   (C) more than 5 but fewer than 10
   (D) 10

2. What is the volume, in cubic inches, of a cube whose total surface area is 216 square inches?

   (A) 18
   (B) 36
   (C) 216
   (D) 1,296

GO ON TO THE NEXT PAGE

3. If $2 - 3n \geq 5$, what is the greatest possible value of $2 + 3n$?

   (A) -1
   (B) 1
   (C) 4
   (D) 5

4. Which of the following statements concerning the equation $\dfrac{2x^2 - 3}{5 - x^2} = -2$ is true?

   (A) The equation has no solutions.
   (B) The equation has exactly one solution.
   (C) The equation has exactly two solutions.
   (D) The equation has infinitely many solutions.

5. If $f(x) = x^2 - 3x$ and $g(x) = f(3x)$, what is $g(-10)$?

   (A) 390
   (B) 490
   (C) 810
   (D) 990

Questions 6 and 7 refer to the following table.

Class	Number of Students	Number in Band
A	20	5
B	30	7
C	23	5
D	27	6
E	25	6

6. What is the average (arithmetic mean) number of students per class?

   (A) 24
   (B) 24.5
   (C) 25
   (D) 25.5

7. Which class has the highest percent of students in the band?

   (A) A
   (B) B
   (C) D
   (D) E

8. In a class, 20 children were sharing equally the cost of a present for their teacher. When 4 of the children decided not to contribute, each of the other children had to pay $1.50 more. How much, in dollars, did the present cost?

   (A) 50
   (B) 80
   (C) 100
   (D) 120

$x^2 + y^2 = 90$
$y = -x^2$
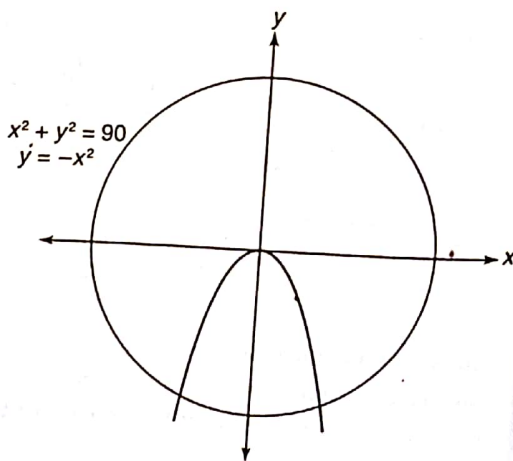
9. A system of two equations and their graphs are shown above. If (a, b) and (c, d) are the points of intersection of the circle and the parabola, what is the value of $a + b + c + d$?

   (A) -18
   (B) -6
   (C) 6
   (D) 18
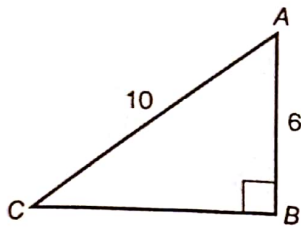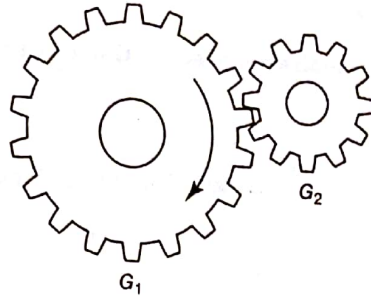
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10. In the figure above, what is the value of the cosine of angle C?

(A) 0.4
(B) 0.5
(C) 0.6
(D) 0.8

11. For Jen's birthday, Wes bought her a ring, a bouquet of flowers, and a box of candy, for which he spent a total of $528. If the flowers cost three times as much as the candy, and the ring cost ten times as much as the flowers and candy combined, how much did he pay for the flowers?

(A) $12
(B) $24
(C) $30
(D) $36

Note: Figure not drawn to scale.

12. The diagram above depicts two gears, G_1 and G_2. Gear G_1, which has 48 teeth, turns clockwise at a rate of 60 rotations per second. If gear G_2 has 36 teeth, which of the following statements is true?

(A) Gear G_2 turns clockwise at a rate of 45 rotations per second.
(B) Gear G_2 turns clockwise at a rate of 80 rotations per second.
(C) Gear G_2 turns counterclockwise at a rate of 45 rotations per second.
(D) Gear G_2 turns counterclockwise at a rate of 80 rotations per second.

Questions 13–15 are based on the information in the following graphs.

Lottery Ticket Sales – Type of Game and Use of Proceeds: 2009

Type of Game
Total ticket sales: $35.5 billion

Proceeds
Total: $12.0 billion
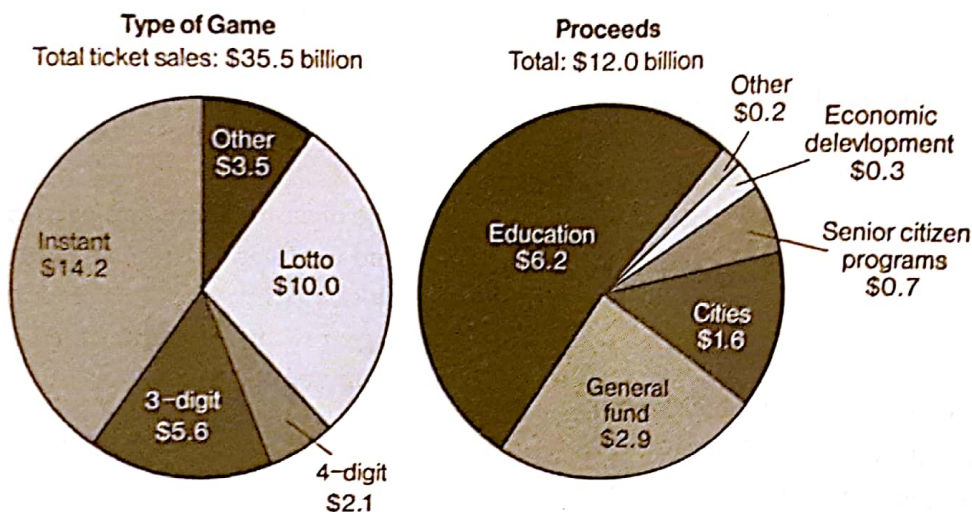
All figures are in billions of dollars.

13. The revenue from lottery ticket sales is divided between prize money and the various uses shown in the graph labeled "Proceeds." In 2009, approximately what percent of the money spent on tickets was returned to the purchasers in the form of prize money?

(A) 23.5%
(B) 50%
(C) 66%
(D) 74%

14. Approximately what percent of the proceeds that went to the states' General fund would have to be given to the Senior citizen program so that the proceeds for the Senior citizen program and the Cities would be equal?

(A) 0.9%
(B) 9%
(C) 31%
(D) 48%

15. Assume that in 2010 the sales of Lotto were discontinued, and the dollar value of the sales of all other games increased by 10% compared to 2009. If a new circle graph was created to reflect the Lottery Ticket Sales in 2010, which of the following would be closest to the degree measure of the central angle of the sector representing Instant games?

(A) 100°
(B) 150°
(C) 180°
(D) 200°

GO ON TO THE NEXT PAGE

16. Each week, Alice's gross salary is $9.00 an hour for the first 40 hours she works and $15.00 an hour for each hour she works in excess of 40 hours. Her net pay is her gross pay less the following deductions: a flat fee of $20 for her contribution to her health insurance; 8% of her gross salary for payroll taxes, and 15% of her gross pay for withholding taxes. Which of the following expressions represents Alice's net pay in a week that she works x hours where $x > 40$?

(A) $0.23(15x - 240) - 20$

(B) $0.23(15x - 220)$

(C) $0.77(15x - 240) - 20$

(D) $0.77(15x - 220)$

17. If $i = \sqrt{-1}$, which of the following is equal to $(1 + i)^3$?

(A) $-2 + 2i$

(B) $2 - 2i$

(C) 4

(D) $4 + 4i$

18. If the x-intercepts of the graph of $y = 4x^2 - 8x + 3$ are a and b, what is the value of $a + b$?

(A) 0.5

(B) 1

(C) 1.5

(D) 2

Questions 19–20 are based on the information in the following graph.

Total Sales of Coast Corporation in 2000: $1,000,000

Brand A 40%

Brand F 32%

Brand B 5%

Brand C 12%

Brand D 7%

Brand E 4%
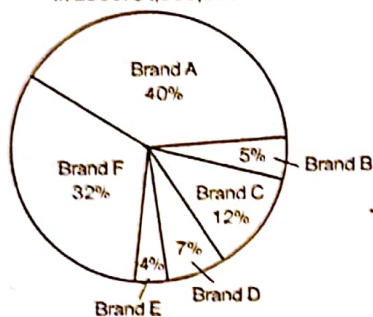
19. If the above circle graph were drawn to scale, then which of the following is closest to the difference in the degree measurements of the central angle of the sector representing Brand C and the central angle of the sector representing Brand D?

(A) 5°

(B) 12°

(C) 18°

(D) 25°

20. The total sales of Coast Corporation in 2005 were 50% higher than in 2000. If the dollar value of the sales of Brand A was 25% higher in 2005 than in 2000, then the sales of Brand A accounted for what percentage of total sales in 2005?

(A) 20%

(B) 25%

(C) $33\frac{1}{3}\%$

(D) 50%

21. Store 1 is a full-service retail store that charges regular prices. Store 2 is a self-service factory-outlet store that sells all items at a reduced price. In January 2014, each store sold three brands of DVD players. The number of DVD players sold and their prices are shown in the following tables.

Number of DVD Players Sold

	Store 1	Store 2
Brand A	10	30
Brand B	20	40
Brand C	20	20

Prices of DVD Players

	Brand A	Brand B	Brand C
Store 1	$80	$100	$150
Store 2	$50	$80	$120

What was the difference between Store 1 and Store 2 in the dollar values of the total sales of the three brands of DVD players?

(A) 80
(B) 140
(C) 330
(D) 1,300

Questions 22 and 23 refer to the figure below, which represents a solid piece of wood being used in the construction of a house. All of the dimensions are in feet.
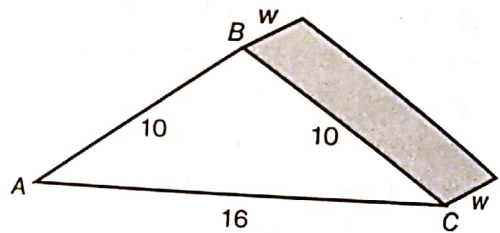
22. What is the area, in square feet, of the triangular face of the solid?

(A) 24
(B) 48
(C) 50
(D) 80

23. If the density of the wood is 3 pounds per cubic foot and if the weight of the solid is 360 pounds, what is the width, w, in feet, of the solid?

(A) 5.0
(B) 2.5
(C) 2.4
(D) 1.5
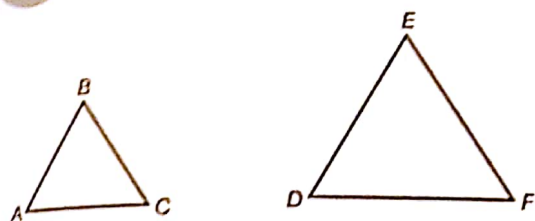
Note: Figure not drawn to scale.

24. In the figure above, both triangles are equilateral. If the area of $\triangle ABC$ is 6 and the area of $\triangle DEF$ is 10, to the nearest hundredth what is the ratio of AB to DE?

(A) 0.36
(B) 0.60
(C) 0.75
(D) 0.77

25. If $g(x) = (\sin x + \cos x)^2$, what is $g\left(\dfrac{\pi}{3}\right)$?

(A) 1
(B) 1.366
(C) 1.866
(D) 2

Questions 26–28 are based on the two graphs below.

Size of average farm (in acres)

Number of farms (in millions)
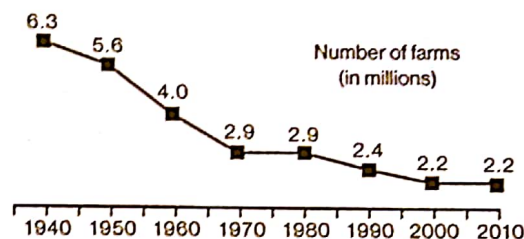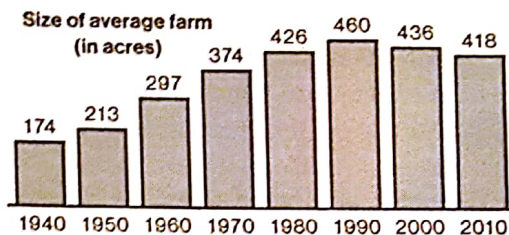
26. In which year was the total acreage of farmland in the United States the smallest?

(A) 1940
(B) 1970
(C) 2000
(D) 2010

27. In 2010, the states with the most total acres of farmland were Texas, Montana, Kansas, Nevada, and New Mexico. The acreage in each state (measured in millions of acres) was 130, 61, 46, 46, and 43, respectively. Those five states accounted for approximately what percent of the total farm acreage in the country?

(A) 15%
(B) 25%
(C) 35%
(D) 45%

GO ON TO THE NEXT PAGE

28. If future projections are that the number of farms in the United States will decrease by 5% from 2010 to 2030 and that the average size of farms will decrease from 2010 to 2030 by the same percent as the decrease from 1990 to 2010, which of the following is closest to the total number of acres of farmland, in millions of acres, in the United States in 2030?

(A) 750
(B) 800
(C) 850
(D) 900

29. If $i^2 = -1$, what is the value of $i^{75} - (-i)^{75}$?

(A) $-2i$
(B) $2i$
(C) -2
(D) 0

30. In parallelogram $ABCD$, each side measures 10. If $m\angle A = 45°$, what is the area of the parallelogram?

(A) 50
(B) 64.6
(C) 70.7
(D) 78.2

31. On a particular map of Long Island, one inch represents a distance of 20 miles. One day, Maurice drove from Hauppauge to Riverhead, which are 1.25 inches apart on that map, at an average speed of 40 miles per hour. How many minutes did his drive take?

32. Michelle participated in a 26-mile marathon that proceeded along a straight road. For the first 20 miles, she ran at a constant pace. At some point she passed a friend who was standing on the side of the road and who was cheering her on. Exactly 54 minutes and 36 seconds later, Michelle passed the 12-mile marker, and 31 minutes and 30 seconds after that, she passed the 15-mile marker. How far, in miles, was it from the starting line to the point where her friend was standing?

Base your answer to <u>Question 33</u> on the information in the following chart that shows the number of employees at Acme Air-Conditioning in three age groups and the average monthly salary of the workers in each group.

Age Group	Number of Employees	Average Monthly Salary
Under 35	12	$3,100
35–50	24	$3,800
Over 50	14	$4,200

33. What is the average (arithmetic mean) monthly salary, in dollars, for all the employees?

34. To use a certain cash machine, you need a Personal Identification Code (PIC). If each PIC consists of two letters followed by one of the digits from 1 to 9 (such as AQ7 or BB3) or one letter followed by two digits (such as Q37 or J88), how many different PICSs can be assigned?

GO ON TO TH

35. The base of pyramid 1 is a rectangle whose length is 3 and whose width is 2. The base of pyramid 2 is a square whose sides are 3. If the volumes of the pyramids are equal, what is the ratio of the height of pyramid 1 to the height of pyramid 2?

Use the following information in answering Questions 37 and 38.

Every day to go to work, Ed drives the 6.3 miles between Exits 17 and 18 on Route 91, always at a constant rate of 60 miles per hour. At 60 miles per hour, Ed's car can go 24.3 miles per gallon of gasoline; at 70 miles per hour, Ed's car can only go 20.8 miles per gallon of gasoline.

36. On October 20, 2015, one United States dollar was worth 0.88 euros and one Canadian dollar was worth 0.68 euros. On that date, to the nearest whole number, what is the number of Canadian dollars that could be purchased for 100 United States dollars?

37. How much less time, in seconds, would it take Ed to drive those 6.3 miles at 70 miles per hour instead of 60 miles per hour?

38. Last year, Ed drove the 6.3 miles from Exit 17 to Exit 18 a total of 240 times (always at 60 miles per hour). If during the year he paid an average of $3.50 per gallon for gasoline, how much more would it have cost him if he had driven at 70 miles per hour each day? (Express your answer to the nearest dollar, and grid it in without the dollar sign.)

STOP

If there is still time remaining, you may review your answers.

ANSWERS EXPLAINED

Section 1: Reading Test

1. **(C)** Substitute the answer choices in the original sentence. The sergeant is a person who might have been a deputy sheriff before he joined the army—that is, in his civil or *nonmilitary* life.

2. **(A)** Paragraph 1 presents a general picture of the man on the bridge, the executioners and the officer standing nearby, the sentinels at the far ends of the bridge. Cinematically, it is like *a wide-angle shot* of the whole panorama. Paragraph 2 takes a closer look at the man, examining his clothes, his face, his expression. It is as if the camera has moved in for *a close-up* shot.

3. **(B)** You can use the process of elimination to answer this question. Was the man awaiting hanging *innocent of any criminal intent*? No. He was willing to go along with the idea that all was fair in love and war, and would willingly perform a criminal act (assaulting a sentinel and burning down a bridge). Choice (A) is incorrect. Was the man awaiting hanging an *unlikely candidate for execution*? Possibly. Keep choice (B) in mind as you consider the other choices. Was the man awaiting hanging *a victim of mistaken identity*? No. He was caught in the act of attempting to burn down the bridge. Choice (C) is incorrect. Was the man awaiting hanging *purposely assuming a harmless demeanor*? Nothing in the passage suggests that he was putting on the appearance of being harmless. Choice (D) is incorrect. Only choice (B) is left. It is the correct answer.

4. **(C)** To have one's neck "in the hemp" is to have one's neck in a noose, a rope made out of hemp. The author's comment that the man "had a kindly expression that one would hardly have expected in one whose neck was in the hemp" suggests that he is *an unlikely candidate for execution* and that some unusual circumstances must have brought him to this fate.

5. **(B)** In calling the military code "liberal" because it doesn't exclude members of the upper classes from being executed, the author is being highly *ironic*. Generally, people would like regulations to be interpreted liberally to permit them to do the things they want. Here, the liberal military code is permitting the man to be hanged. Clearly, the gentleman facing execution would have preferred the code to be less liberal in this case.

6. **(A)** Farquhar agrees readily with the saying that all is fair in love and war. This implies he is willing to use *underhanded* or unfair *methods to support his* [the Southern] *cause*.

7. **(B)** Look at the context in which the word *consistent* occurs. "(N)o adventure [was] too perilous for him to undertake if [it was] *consistent* with the character of a civilian who was at heart a soldier." Farquhar has no objection to performing humble errands or undertaking dangerous tasks as long as these tasks are appropriate to someone who sees himself as a sort of "undercover soldier," a secret agent of the Confederacy. Anything he does must be consistent or *compatible* with his image of himself in this role.

8. **(A)** The fact that Mrs. Farquhar is married to a man "ardently devoted to the Southern cause," together with her readiness to fetch water for a Confederate soldier, suggests some degree of sympathy on her part for the Confederate cause. Choice (B) is incorrect. Mrs. Farquhar's action, in hospitably fetching water "with her own white hands,"

contradicts the idea that she is too proud to perform menial tasks. Choices (C) and (D) are also incorrect. There is nothing in the passage to suggest either of them.

9. **(B)** The assertion that Mrs. Farquhar "was only too happy" to fetch water for a soldier wearing the grey uniform of the Confederate army provides strong evidence that she is sympathetic to the Confederate cause.

10. **(B)** Farquhar wishes to prevent the Yankee advance. To do so, he must somehow damage the railroad, its bridges, its tunnels, or its trains. The soldier tells him that some highly flammable driftwood is piled up at the base of the wooden railroad bridge. Clearly, it would make sense for Farquhar to try to set fire to the driftwood in an attempt to burn down the bridge.

11. **(C)** The scout is a Yankee soldier disguised as a member of the enemy. By coming to the Farquhars' plantation in Confederate disguise, he is able to learn they are sympathetic to the enemy. By telling Farquhar of the work on the bridge, stressing both the lack of guards and the abundance of fuel, he is tempting Farquhar into an attack on the bridge (and into an ambush). The scout's job is to locate potential enemies and draw them out from cover. The concluding sentence thus establishes that Farquhar has been entrapped into taking an unwise action, an action that will lead to his execution at Owl Creek bridge.

12. **(B)** President Roosevelt mentions two types of people who came to America seeking freedom: "some of high degree, but mostly plain people." The people of high degree were members of the upper classes, those set apart by aristocratic birth or social position; the others were plain, ordinary people.

13. **(D)** Roosevelt describes the American spirit as "the product of centuries." In other words, the hope of freedom and the love of liberty go back for centuries; America's democratic ideal has deep-seated (firmly established) historical roots.

14. **(B)** Choice (B) clearly supports the contention that the American belief in freedom "has deep-seated historical roots." It pointedly asserts that the "democratic aspiration is no mere recent phase in human history" and goes on to mention the Magna Carta or Great Charter of 1215 as a specific example of a historic document that embodies the spirit of democracy.

15. **(B)** Look at the context in which these documents are mentioned. "Its vitality was written into our own Mayflower Compact, into the Declaration of Independence, into the Constitution of the United States, into the Gettysburg Address." To what does the phrase "Its vitality" refer? The answer appears two paragraphs earlier, in the opening sentence "The democratic aspiration is no mere recent phase in human history." The democratic aspiration is Roosevelt's theme, the subject he is discussing. According to Roosevelt, the vitality and strength of democratic aspiration were written into America's founding documents. Thus, he clearly is citing these documents as examples of expressions of the democratic aspiration.

16. **(A)** In lines 36–39, Roosevelt asserts that Americans "have moved forward constantly and consistently toward an ideal which in itself has gained stature and clarity with each generation." It is his optimistic contention that we have been coming closer and closer to reaching that ideal and that the democratic spirit has grown stronger. However, he acknowledges that "we still have far to go" before we reach that ideal: the existence of

both "undeserved poverty" and "self-serving wealth" stands in the way of democracy. In other words, *economic injustices must be addressed before democracy can prevail.*

17. **(A)** In his 1789 First Inaugural Address, Washington was directing his words to his contemporaries. In other words, he was *addressing* his words to them, speaking to them in a formal way. To Roosevelt, Washington's words sounded prophetic, as if he *addressed* his words to the people of 1941.

18. **(C)** Repetition is a common, yet effective literary device that strengthens the power of the point being made. One website of popular literary terms describes the effect of repetition as follows: "The aura that is created by the usage of repetition cannot be achieved through any other device. It has the ability of making a simple sentence sound like a dramatic one. It enhances the beauty of a sentence and stresses on the point of main significance." Thus, the main effect of the repetition of the phrase "It speaks to us" is to create a *dramatic tone, emphasizing the point being made and adding to its emotional impact.*

19. **(C)** What experiment was "intrusted to the hands of the American people"? Consider the context. Washington was writing an address that he was to deliver on his inauguration as president of the United States, a new nation founded upon democratic principles. The experiment entrusted to the American people was the radical experiment of *democratic government.*

20. **(D)** Washington's "experiment intrusted to the hands of the American people" is the republican model of government, whose preservation he urges. It is this same model of government that Roosevelt urges Americans to defend when he asserts that "our strong purpose is to protect and to perpetuate the integrity of democracy."

21. **(D)** As we know from the introduction to the passage, Roosevelt delivered his Third Inaugural Address in January of 1941, at a time when Britain and its allies were hard pressed by Hitler's forces but the United States had not yet gone to war. Nonetheless, it was clear that democracy was under attack and that America was facing "great perils never before encountered." The passage's final paragraphs emphasize the need to preserve the sacred fire of liberty. The president exhorts his listeners "to protect and to perpetuate the integrity of democracy." Thus, it is reasonable to conclude that a major goal of Roosevelt in making this speech was to *inspire the American people to defend the cause of freedom in dangerous times.*

22. **(D)** Step by step, the author traces the course of a surgical procedure, from the initial grasping of the scalpel through the opening incision to the eventual sensory exploration of the internal organs. In doing so, he is *describing a process.* Choice (A) is incorrect. Although in the course of the passage the author occasionally defines a term (for example, the term *fascia*), the passage, taken as a whole, describes the process of surgery; it does not define a term. Choice (B) is incorrect. The passage does not provide an example of a particular method of surgery; instead, it describes the process of surgery. Choice (C) is incorrect. This is not a lesson, instructing novice surgeons in the steps they should take to perform a successful abdominal surgery; it is a vivid description of the process of surgery.

23. **(C)** As the surgeon draws the knife across the skin, it leaves a thin *line of blood* in its wake (path or track passed over by a moving object). Choices (A) and (B) are incorrect;

nothing in the opening paragraph supports either choice. Choice (D) is incorrect. The darting knife is *followed* by the fine wake of red; the knife blade is not the wake of red.

24. **(C)** The darting knife is followed by a wake of red. If the meaning of the simile is still unclear at this point, the subsequent sentence, in which the parted flesh reveals yellow blobs of fat below, is a clue that the "fine wake of red" is a bloody incision made by the knife. Choices (A) and (B) are incorrect. They describe the way to hold the knife, not the effect of the knife as it cuts its way through the patient's skin. Choice (D) is incorrect. It has nothing to do with the knife's wake or trail of red.

25. **(B)** To part the flesh is to *split* apart or separate the skin, cutting it apart with the knife. Choice (A) is incorrect. Although in some contexts "parts" means *leaves*, as in "parting from someone at the train station," that is not how it's used here. Choice (C) is incorrect. Although in some contexts "parts" means *surrenders* ("parting with hard-earned cash"), that is not how it is used here. Choice (D) is incorrect. Although in some contexts "parts" means *distributes* ("parting an estate into shares"), that is not how it's used here.

26. **(B)** The simile "like children absorbed in a game" indicates that, in this context, "engaged" means *engrossed* or deeply involved. Choice (A) is incorrect. Although in some contexts "engaged" means *betrothed* or pledged to marry, that is not how it is used here. Choice (C) is incorrect. Although in some contexts "engaged" means *hired* ("engaged as a contractor"), that is not how it is used here. Choice (D) is incorrect. Although in some contexts "engaged" means *embattled* ("engaged forces"), that is not how it is used here.

27. **(D)** Primitive drawings of buffalo and other wild beasts still exist in *caves* in which *prehistoric* humans dwelled. Thus, one might expect to find them in a cavity described as "a primitive place." Choice (A) is incorrect. In "a primitive place," one might expect to find primitive drawings; one wouldn't necessarily expect to find them in an art gallery. Choices (B) and (C) are incorrect. Nothing in the passage suggests that one might expect to find *drawings* of buffalo in either a zoological display or a Western film.

28. **(B)** The colors of the internal organs are secret because, until the peritoneum is opened and the world's light illuminates the abdominal cavity, the internal organs cannot be seen. In other words, the colors of the internal organs *normally are hidden from sight.*

29. **(C)** The author looks on his work as a surgeon as if it were a priestly vocation. The first hint of this comes in lines 32–34: "the litany of monosyllables with which one prays his way down and in: *clamp, sponge, suture, tie, cut.*" The one-word requests that the surgeon makes for a clamp or a sponge are like a litany, a form of prayer made up of a series of invocations or petitions that are usually led by the clergy. The surgeon "prays his way down and in." Clearly, the author is making use of priestly or *religious imagery.* Choice (A) is incorrect. Although the author likens the abdominal cavity to a cavern, he primarily describes the surgery in religious terms. Choice (B) is incorrect. The author never contrasts abdominal surgery with other types of surgery. Choice (D) is incorrect. The author never evokes or suggests the patient's emotions; if anything, he evokes the surgeon's emotions.

30. **(D)** In these two sentences, the author makes explicit his sense of surgery as a religious rite, an impression he continues to develop in the subsequent paragraph ("the priestliness of my profession has ever been impressed on me").

31. **(C)** Consider the various descriptive passages in which the author explores the formerly hidden organs and tissues now exposed to view through surgical intervention.

"The peritoneum, pink and gleaming and membranous, bulges into the wound." "An arc of the liver shines high and on the right, like a dark sun. It laps over the pink sweep of the stomach, from whose lower border the gauzy omentum is draped, and through which veil one sees, sinuous, slow as just-fed snakes, the indolent coils of the intestine." Peritoneum, liver, stomach, omentum, intestine: the author names them, evokes their appearance in a brief descriptive phrase ("peritoneum, pink and gleaming and membranous," "gauzy omentum," "indolent coils of the intestine"). However, he does not bother to define these anatomical terms. Instead, he apparently assumes that his readers will *be familiar with the organs and tissues* to which he refers. Choice (A) is incorrect. The author freely goes into vivid detail about surgical procedures. He would be unlikely to be as free in his imagery if he assumed that his readers had qualms about reading descriptions of surgery. Choice (B) is incorrect. The author carefully describes how to hold a scalpel; he would not do so if he assumed his readers were already adept at handling surgical tools. Choice (D) is incorrect. Nothing in the passage suggests that the author assumes his readers have undergone surgery.

32. **(C)** Throughout Passage 1, the author constantly emphasizes the lengthy time period his book will cover. In the passage's opening sentence he refers to "the shifting relationship between the press and the presidency *over nearly two centuries*"; later he refers to "the relationship of the presidents to the press *since George Washington's first term.*" The author is "surveying nearly two centuries of this relationship." In other words, he is presenting *an overview* of a relationship. What sort of relationship is it? It is one of "mutual . . . recriminations and mistrust." There has been one main constant in it, "the dissatisfaction of one with the other." In other words, it is *an inherently conflicted relationship.* Not only that, but this relationship "has been increasingly complicated by the changing nature of the presidency, by the individual nature of presidents, by the rise of other media, especially television, and by the growing complexity of beliefs about the function of both press and government." The inherently conflicted relationship clearly *faces new challenges* and will continue to do so as our institutions and technology continue to change. The correct answer is choice (C).

33. **(D)** The first paragraph of the passage says that the administration of every president has ended with "recriminations and mistrust." Presidents, like everyone else, hate to be criticized in public. Therefore, they all have experienced *animosity involving themselves and the press.* Choice (C) is incorrect. The first paragraph states that, while the initial stage of the relationship between the press and the president may seem harmonious ("beginning with mutual protestations of good will"), the relationship ends in antagonism. The paragraph never suggests that periods of antagonism and harmony alternate.

34. **(A)** If the record of *every* administration has begun with the press and the presidency claiming to feel goodwill toward one another and has ended with them blaming and mistrusting one another, then clearly *all* American presidents have experienced *mutual animosity* (ill will) *involving themselves and the press.*

35. **(B)** To be reduced to simple terms is to be simplified or *boiled down* to its essential, basic nature. Choices (A), (C), and (D) are incorrect. Although reduced can mean *decreased* ("reduced speed"), *marked down* ("reduced prices"), or *demoted* ("reduced in rank"), it is not how the word is used here.

36. **(C)** The author advises the reader to (lines 41–42) "be careful not to view the past in terms of our own times." This advice is an axiom (a statement or proposition regarded as being established, accepted, or self-evidently true) of professional historians. As a professional historian, he gives the reader this advice because *readers today cannot fully grasp the significance these actions had in their own time.*

37. **(D)** To use present standards to judge the actions of past presidents "is to violate historical context." *Because* the words "press," "government," and "presidency" have changed in meaning, because our lives today differ so greatly from the lives of people in earlier times, we cannot fully understand the significance of presidential actions two centuries ago.

38. **(C)** The opening sentence of the final paragraph concludes with the clause "but the facts are quite different." Many Americans believe that the colonists immediately established a free society. The author says that this belief is incorrect. Thus, he is trying to *correct a misconception* or mistaken idea.

39. **(B)** The open questioning to which the author refers (line 107) is the *unrestricted*, no holds barred questioning that the president faces in modern solo press conferences. Choices (A), (C), and (D) are incorrect. Although "open" can mean *receptive* ("open to suggestions"), *unconcealed* ("open carry"), or *vulnerable* ("open to abuse"), that is not how it is used here.

40. **(B)** Use the process of elimination to answer this question. Did President Clinton hold more solo press conferences than President George H. W. Bush did? No. President Clinton held 62 solo press conferences; President George H. W. Bush held 83 solo press conferences. Choice (A) is incorrect. Did Presidents Clinton and George W. Bush hold a far higher percentage of joint press conferences than either of their predecessors did? This seems to be correct. President Clinton's percentage of joint press conferences was 67.9%; President George W. Bush's percentage of joint press conferences was 77.3%. Neither of their predecessors came even close. Choice (B) is most likely the correct answer. Quickly scan the remaining choices to see whether you can find a better answer than choice (B). Choice (C) asks you to draw a conclusion that is unsupported by the data in the graph. True, the graph provides data showing President Reagan held no joint press conferences; however, it provides no information to indicate why he did this. Choice (C) is incorrect. Choice (D) is also incorrect. Unlike his son, President George H. W. Bush held fewer joint press conferences than solo sessions.

41. **(A)** Passage 1 *describes a phenomenon.* This phenomenon is the dissatisfaction of the press and the president with each other. Passage 1 describes it as a constant, that is, an unchanging factor. Passage 2, however, focuses on changes in this relationship. It does not describe the situation as *static.* Instead, it emphasizes the "increasingly contentious, adversarial" nature of the relationship and suggests that this increased aggressiveness from the press may have brought about the shift from solo press conferences, during which the president is more open to direct hostility, to joint press conferences, in which he has more control of the situation. Thus, in focusing on the increases in press aggressiveness and on the changes in the structure of presidential press conferences, *Passage 2 denies the static nature of the phenomenon described in Passage 1.*

42. **(C)** Both authors make a point of the adversarial nature of the relationship between the press and the president. This inherent antagonism is at the heart of the relationship and is likely to influence the actions of both the press and the president for years to come.

43. **(B)** Choice (B) is correct. To describe the debate over fracking or hydraulic fracturing as "fractious" is to make *a play on* the words "fractious" and "fracturing." The author chooses the adjective "fractious" because it begins like "fracturing." The similarity in sound between the two words strengthens the sentence's effect. In contrast, consider the effect of this slight change on the opening sentence: "To call it a heated debate is an understatement." Lacking the word play, the revised sentence feels a bit flat. Choice (A) is incorrect. A metaphor is a figure of speech in which a term or phrase is applied to something to which it is not literally applicable in order to suggest a resemblance, as in "My boss is such a bear today." Choice (C) is incorrect. It is no exaggeration to say that the debate over fracking has become heated or *fractious*. Hydraulic fracturing is a controversial subject, and the discussion about it is contentious. Choice (D) is incorrect. A counterargument is an argument put forward to oppose an idea or theory developed in another argument. It has nothing to do with the author's word choice here.

44. **(B)** Choice (B) is correct. A game changer is an event, idea, or procedure that brings about a significant shift in the current way of doing something. By calling fracking-related gas recovery a game changer, fracking's supporters are asserting that fracking is going to *radically alter natural gas production.* Choice (A) is incorrect. In calling fracking a game changer, its proponents do not assert that fracking has no foreseeable negative consequences. Instead, they assert that its positive benefits (reduced dependence on foreign sources of energy, new jobs, relatively clean energy, etc.) strongly outweigh its possible drawbacks. Choice (C) is incorrect. In calling fracking a game changer, its proponents are not asserting that they fail to take it seriously. Choice (D) is incorrect. Although later portions of the passage mention a need for regulation, fracking's proponents say nothing about any need for *active federal regulation.*

45. **(A)** Choice (A) is correct. In lines 6–14, the author lists the following points made by fracking's supporters:

    1. Compared to natural gas recovered by drilling oil wells, natural gas recovered through fracking is inexpensive (it "is cheap").
    2. Compared to natural gas recovered by drilling oil wells, natural gas recovered through fracking is relatively free from pollutants or unpleasant substances (it is "relatively clean").
    3. The United States contains an abundance of natural gas that can be recovered through fracking. ("America is brimful of the stuff.")

    To have access through fracking to an abundant supply of inexpensive, relatively clean natural gas would *change* our methods of *natural gas production radically.* It would change the entire oil industry. Indeed, it is doing so. None of the remaining choices provide evidence in support of the assertion that fracking is a game changer.

46. **(A)** In lines 15–24, the author relates the public's fears about the dangers of fracking. Media reports of fracking-triggered earthquakes and fracking-caused environmental contamination fuel these fears. In the paragraph immediately following, the author depicts the reaction these fears have produced in the political arena. She mentions protests and legislative attempts to halt or ban fracking in several states. Her discussion of fracking legislation thus *describes specific responses* (marches, moratoriums, policy changes) *to concerns raised in the previous paragraph.*

47. **(A)** Choice (A) is correct. An open question is a matter that has not yet been decided, an issue that remains *unresolved*. Choice (B) is incorrect. Although "open" can mean *vulnerable*, as in the welfare system's being "open to abuse," that is not the sense in which it is used here. Choice (C) is incorrect. Although "open" can mean *accessible*, as in a school program's being "open to all students," that is not the sense in which it is used here. Choice (D) is incorrect. Although "open" can mean *ajar*, as in a door's being "left open," that is not the sense in which it is used here.

48. **(D)** Use the process of elimination to answer this question. Choice (A) is incorrect. Nothing in the passage suggests that its author advocates or supports technological innovations such as fracking; she merely reports the opinions of fracking's advocates. Choice (B) is incorrect. Nothing in the passage suggests that its author either opposes or supports regulatory oversight, whether pointless or not; she merely describes legislative attempts to regulate fracking. Choice (C) is incorrect. Nothing in the passage suggests that its author is a concerned legislator; she merely recounts the actions taken by legislators regarding fracking. Only choice (D) is left. It is the correct answer. The author is *an observer striving* to be objective and *to present a balanced account*.

    Remember to read the italicized introduction. Often it contains useful information. Here, the italicized introduction indicates that the passage comes from a popular science magazine, *Science News*. Such magazines have the task of presenting current research findings in an objective, unbiased manner, weighing both sides of an argument rather than arguing the merits of a particular claim.

49. **(C)** The author acknowledges that the dangers of fracking are real. She also acknowledges that the potential energy payoff is real as well. She is striving to present both sides of the argument objectively.

50. **(C)** The solid line on the graph vividly depicts a sudden, marked jump in the number and frequency of earthquakes from about 2009. This accentuates or emphasizes the *increasing frequency of earthquakes in the region*. Choice (B) is incorrect. The graph plots the increased frequency of earthquakes, not their increased magnitude. Choices (A) and (D) are incorrect. Nothing in the passage supports either answer.

51. **(A)** In stating that the change in the frequency and number of earthquakes was pronounced, Ellsworth is asserting that it was marked or particularly *noticeable*. Choices (B), (C), and (D) are incorrect. Although "pronounced" can mean *declared* ("pronounced dead"), *decided on* ("pronounced on innocence or guilt"), or *articulated* ("correctly pronounced words"), that is not how it is used here.

52. **(C)** Ellsworth indicates that researchers lack pre-quake data (lines 93–95). He advises researchers to collect seismic information about current and potential drilling sites. He concludes the paragraph by stating explicitly that "(t)here are many things we don't understand." All these comments in the passage's concluding paragraph suggest that Ellsworth looks on current hypotheses about connections between the recent increases in earthquakes and the start of the fracking boom as *based on insufficient knowledge*. Geologists simply don't know enough about what actually occurs during fracking to be able to properly test their hypotheses about fracking's possible effects on the increasing frequency of earthquakes.

Section 2: Writing and Language

1. **(C)** The first sentence of the paragraph states that Modernism is characterized by the "complete rejection" of traditions and values, which is consistent with a "rebuff" of conventional morality. Moreover, the remainder of the paragraph mentions moral relativism, which further solidifies the notion of a "rebuff" of mainstream values. Choice (A) is not correct because it is the opposite of an embrace. Choice (B) is not right because it can be reasonably inferred that Fitzgerald must have understood conventional morality since he skillfully wrote about matters concerning it. Choice (D) is incorrect because its connotation is too positive.

2. **(A)** The writer uses an interesting turn of phrase to state that Bernice does not listen to (entertain) or find amusing (be entertained by) Marjorie's social activities. Choice (B) does not work because a transitional word would be needed after "entertainment." Choices (C) and (D) result in nonsensical meanings.

3. **(D)** The underlined portion refers to the female Bernice, so "herself" is appropriate. The other options are not consistent with a third-person singular female.

4. **(C)** "To mock" is parallel with the earlier "to embody" in the sentence and concisely expresses the intended idea. Choices (A) and (B) are too wordy. Choice (D) is not parallel to the earlier phrasing.

5. **(B)** "Who" is correct since it stands for a subject that is human. Choice (A) is used in reference to objects. Choice (C) shows possession. Choice (D) means "who is."

6. **(D)** This sentence needs to come before the third sentence, which starts with "Despite her good looks. . . ." This sentence provides a transition between a description of Marjorie and a contrasting description of Bernice. The other placements are illogical as they would not allow for a clear transition between the descriptions of the two characters.

7. **(A)** Two eras are being compared, so "between" is the best choice. Choice (B) is wrong because "among" is used for a comparison of three or more things. "Contrast for," which is choice (C), and "Contrast on," which is choice (D), are not idiomatically correct.

8. **(B)** "While" is the only option that provides a contrast within the sentence between how Marjorie is preferred socially and her rudeness.

9. **(A)** When adjectives have to be ordered a certain way to provide a logical meaning, there should be no commas separating them. In this case, it only makes sense to say "few short sentences," not "short few sentences," making choice (A) the only viable option. Choices (B) and (D) change the meaning, and choice (C) has an unnecessary comma.

10. **(C)** The last sentence of the paragraph makes this choice the most clear, stating that both Bernice and Marjorie are quite superficial. So characterizing them as having "false facades" is most logical. With their vengeful dramatics, they are far from being "kind-hearted" as in choice (A). Choice (B) is incorrect since they are not revolutionary ideologues but, instead, more decadent. Choice (D) is not the right answer because being frivolous and pious is contradictory.

11. **(A)** In choice (A), the colon comes after a complete sentence right before the flaws are clarified and the comma comes before the transitional "while." Choice (B) results in a

run-on sentence. Choice (C) has an unnecessary comma after "lifeless." Choice (D) has an unnecessary comma after "manner."

12. **(C)** The first part of the sentence states that journalism gathers and distributes news in a wide variety of ways, and choice (C) gives specific examples of the technology that does this. Choices (A), (B), and (D) are irrelevant to the first part of the sentence.

13. **(C)** This choice places a comma after the introductory dependent clause ending in "media" and puts a colon before a clarification of how the field is optimistic. Choice (A) lacks a necessary comma after "media" and leads to a run-on sentence. Choice (B) leads to a run-on. Choice (D) puts a semicolon between a subject and a verb, which should not be separated.

14. **(A)** "But also" follows "not only" when making a statement like "not only this but also that." None of the other options works with this idiomatic phrasing.

15. **(B)** The current paragraph emphasizes that journalism has undergone major changes, while the following paragraph delves more deeply into concrete explanations of these changes. So choice (B) makes the most sense because it provides both a conclusion to the current paragraph and a transition into the topic of the next. Choices (A) and (C) contradict the information presented in the next paragraph. Choice (D) speaks more to the quality of journalism than to its overall popularity.

16. **(A)** The sentence is stating two things that *do not* happen, so saying "doesn't" in conjunction with "nor" makes sense. Choice (B) shows cause and effect. Choice (C) shows a direct connection between two ideas. Choice (D) shows contrast.

17. **(D)** This choice correctly does not have an apostrophe after "departments" because this word is functioning as the subject, not as a possessive adjective. Choices (A) and (B) incorrectly have apostrophes after "departments." Choice (D) is also correct because "ensuring" means to "make sure," which fits the context. "Assure" means to "reassure," and "insure" has to do with financial transactions.

18. **(A)** The previous sentence refers to "leading journalism departments," so a sentence about the number one journalism department in the country is a logical connection. The other choices may very well give interesting and factual information about this school, but they are not directly connected to the previous sentence.

19. **(D)** This choice correctly places commas around the parenthetical phrase. Choice (A) has a comma at an awkward point, choice (B) lacks the necessary pauses, and choice (C) is too choppy.

20. **(B)** The adjective "endless" is needed to modify the noun "effects." Also, "affect" is generally a verb, and "effect" is generally a noun. The incorrect options either use the adverb "endlessly" and/or use the verb "affect."

21. **(D)** According to the graph, the number of journalism-related job openings has gone up, then down, and then up again in recent years. This variation is best described as a "fluctuation." Choice (A) is incorrect because since the passage was written in 2015, there has not been a steady increase in demand for journalists in recent years, given the big drop from 2006 to 2009. Choice (B) is not right because in recent years, the number of jobs available increased. Choice (C) is not correct because the level of employment has gone up and down, not remained steady.

22. **(A)** To "adapt" is to make something suitable, and to "adopt" is to make something one's own. In this case, the field of journalism is making gradual changes in order to adjust to technological advances, so "adapt" makes sense. Choices (C) and (D) are therefore incorrect. The paragraph is in the present tense, so "is adapting" works (choice (A)) and "was adapting" (choice (B)) does not.

23. **(B)** Giving an approximation of the years is the most precise option. Choices (A), (C), and (D) are too vague.

24. **(A)** This choice gives necessary breaks between all of the listed items and also has a break after the clarifying phrase "most recently." Choices (B), (C), and (D) all change the original meaning because of their comma placements or lack thereof.

25. **(B)** To convey giving a high priority to making the Parthenon glorious, the phrase "sparing no expense" is the best choice. It indicates that the Greeks were willing to put as many economic resources as needed into finishing the Parthenon in a beautiful manner. Honesty and judiciousness, choice (A), do not necessarily relate to making the Parthenon glorious. Although "artistic patience" and the use of "architectural techniques" (choices (C) and (D)) could be loosely related to completing the Parthenon in the glorious fashion, these do not convey that finishing it was a high priority.

26. **(A)** This is the only option that expresses the needed contrast between the previous sentence and the current one since there is a contrast between the glorious construction of the Parthenon and the fact that the glory was very short-lived. The other options do not express the needed contrast.

27. **(C)** "Could've" sounds like "could of," but it is short for "could have." The use of the word "of" in this context is therefore incorrect, making choices (A) and (B) wrong. Choice (C) correctly expresses the verb "have." Choice (D) makes the sentence say "should have been still served," which is nonsensical.

28. **(D)** "Its" correctly refers to the singular Parthenon's possession of "pagan gods." The word "Its'" is always incorrect (choice (A)). Both choice (B) and choice (C) mean "it is."

29. **(D)** "Remnants" means "surviving pieces or traces of something," so logically these refer to the parts of the Parthenon that remained after its destruction. Choice (A) refers to the study of such remains, not the remains themselves. Choices (B) and (C) do not give a precise description of what these are.

30. **(D)** This choice concisely expresses the intended idea. Choices (A) and (B) are too wordy. Choice (C) likely wants to say something along the lines of "contemporary," but the word given actually means "with contempt."

31. **(B)** "Beauty" and "refinement" create a compound subject, which requires the plural "are." In addition, the paragraph is in the present tense, so the verb must be in the present tense. Choices (C) and (D) are in the past tense, and choice (A) is singular.

32. **(C)** The fact that these engravings have lasted for a long time is an essential part of their description, so "that" is needed instead of "which." Choice (C) also uses the proper tense. Choice (A) uses the incorrect verb tense. Choices (B) and (D) use "which," which works for nonessential characteristics of described objects.

33. **(A)** The essay focuses throughout on the impressive feat of the Parthenon's construction, so choice (A) gives a direct connection to this general theme. Choices (B) and (C) are too vague. Choice (D) focuses on only a small part of the passage.

34. **(C)** By examining the topic sentences of the paragraphs, you can see that the essay is presenting various theories about what happened to the Neanderthals. Choice (C) is therefore the most fitting option to introduce the essay's argument. Choice (A) is vague, and choice (B) is disconnected from the essay's argument. Choice (D) contradicts the essay's argument since the Neanderthals were not ultimately successful in adapting.

35. **(B)** Mention of the Neanderthals at the beginning of the underlined portion is necessary to make a logical comparison with "our own ancestors." Choices (A) and (D) make illogical comparisons since they compare geographic regions to ancestors. Choice (C) has confusing word order at the end, placing "icebound" such that it literally means that the Neanderthals were icebound. Choice (B) puts things in a logical order and makes a logical comparison of people to Neanderthals.

36. **(C)** It is necessary to have the words in the order "extreme climate" to express the correct meaning. Since the words must be in this order, no comma is needed to separate them. If the adjectives can be reversed, then a comma between them is necessary (e.g., "the big, tall mountain").

37. **(A)** The last part of this sentence gives more support to the claim in the first part of the sentence, making "and" appropriate. Choice (B) shows contrast, choice (C) is too wordy, and choice (D) removes a needed transition.

38. **(D)** This sentence is best placed at the end of the paragraph since it has the initial transition "further," which indicates that it is building on the previous argument. Moreover, it is logical to have this after sentence 3 since this sentence gives information in support of the idea that Neanderthals had excellent body heat-generating ability. The clothing cited in the sentence builds on this genetic advantage. Choice (A) makes no sense because this sentence cannot function as an introduction. Choice (B) interrupts a logical transition between sentences 1 and 2. Choice (C) inverts the logical sequence of the inserted sentence building upon sentence 3.

39. **(B)** The first sentence of the paragraph states "absorption" may have been the cause of Neanderthal extinction. Therefore, "interbreeding" most logically expresses how this absorption could have taken place. Choice (A) would have resulted in Neanderthal extermination. Choices (C) and (D) do not give the strong explanation that "interbreeding" would.

40. **(A)** "Contemporary" is the only option that clarifies that these are present-day humans to whom the Neanderthals are compared.

41. **(D)** This choice concisely expresses the idea using logical word order. Choices (A) and (B) use passive voice. Choice (C) jumbles the word order such that the meaning is confused.

42. **(D)** Without a clarification of the pronoun, it could be referring to *Homo neanderthalensis* or to *Homo sapiens*. Therefore, choices (A) and (B) are too vague. This took place in the past, so choice (D) is correct. The present tense in choice (C) is wrong.

43. **(B)** "Margins" is the most logical wording, since Neanderthals would have been pushed to the outer reaches of these geographic areas. Choice (A) does not make sense since there are not oceans in Europe and Asia. Choices (C) and (D) do not make sense since human-like species could not live on "debris" or "remains."

44. **(C)** This choice correctly places the clarifying phrase, "nearly back into Africa itself," out of the way using commas. Choice (A) breaks up the phrase "ancestors first emerged." Choice (B) breaks up the phrase "edge of the land." Choice (D) breaks up the phrase "nearly back to Africa."

Section 3: Math Test (No Calculator)

1. **(A)** If John withdraws d dollars every month, the total amount he withdraws in m months is md dollars, and the amount remaining in the account is $A - md$ dollars.

   **Plug in easy-to-use numbers. Assume John's initial deposit is $100 and that he withdraws $10 a month. After 6 months, he will have withdrawn $60 and still have $40 in the account. Which answer choice is equal to 40 when $A = 100$, $d = 10$, and $m = 6$? Only choice (A) works.

2. **(D)** $f(x) < 25 \Rightarrow x^2 - 11 < 25 \Rightarrow x^2 < 36 \Rightarrow -6 < x < 6$.

3. **(C)** Since S represents the number of small pizzas sold during that 6-hour period and L represents the number of large pizzas sold during that same period, $S + L$ is the total number of pizzas sold. So $S + L$ must equal 100. Since each small pizza costs 7.5 dollars and each large pizza costs 11 dollars, $7.5S + 11L$ is the total number of dollars Joe took in. So this expression must equal 848. The two equations are $S + L = 100$ and $7.5S + 11L = 848$.

4. **(D)** Note that the left side and the right side of the given equation are equivalent:

   $$3(5 - 2x) = 15 - 6x \quad \text{and} \quad 6(2 - x) + 3 = 12 - 6x + 3 = 15 - 6x$$

   Since every real number is a solution of the equation $15 - 6x = 15 - 6x$, **the equation has infinitely many solutions.**

   **A solution to the equation $3(5 - 2x) = 6(2 - x) + 3$ would be the x-coordinate of the point of intersection of the straight lines $y = 3(5 - 2x)$ and $y = 6(2 - x) + 3$. Since these lines are the same line (they both have the equation $y = 15 - 6x$), *every* point on one line is a point on the other.

5. **(B)** The percent increase in a quantity is $\dfrac{\text{actual increase}}{\text{original}} \times 100\%$ (KEY FACT C5). For *each* year calculate the actual increase and divide. For example, in 2005 the increase was $100 (from $150 to $250), so the percent increase was $\dfrac{100}{150} \times 100\% = 66.66\%$. In **2006** the increase was $\dfrac{200}{250} \times 100\% = 80\%$. Check the other choices; this is the greatest.

6. **(C)**

- The slope of each line represents each boy's speed. Since the slope of Hank's line is greater than the slope of Bill's line, Hank is always riding faster than Bill. Choice (A) must be true.
- Since Hank and Bill rode for the same amount of time and since Hank was riding faster, Hank covered a greater distance than Bill. Choice (B) is true.
- After 15 minutes, each boy is the same distance (4 miles) from the school. However, they are not necessarily anywhere near each other. It is possible that Hank's house is 1 mile south of the school and that Hank rode for 30 minutes due south, whereas Bill's house might be 3 miles north of the school and Bill rode due north. After 15 minutes, they could each be 4 miles from the school but be several miles apart from one another. Choice (C) is not necessarily true.

7. **(A)** $\dfrac{2x^2-8}{x^2-4x+4} = \dfrac{2(x^2-4)}{(x-2)(x-2)} = \dfrac{2\cancel{(x-2)}(x+2)}{\cancel{(x-2)}(x-2)} = \dfrac{2(x+2)}{(x-2)}$

**Use TACTIC 6: Plug in a number for x. For example, if $x = 3$:

$$\dfrac{2x^2-8}{x^2-4x+4} \text{ is } \dfrac{2(3^2)-8}{3^2-4(3)+4} = \dfrac{18-8}{9-12+4} = \dfrac{10}{1} = 10$$

Only choice (A) is 10 when $x = 3$: $\dfrac{2(3+2)}{3-2} = \dfrac{2(5)}{1} = 10$.

8. **(A)** $y = f(x) + 3 = mx + b + 3$ and $y = f(x+3) = m(x+3) + b = mx + 3m + b$. So both graphs are straight lines whose slopes are m. Therefore, the graphs are either a pair of parallel lines (if their y-intercepts are different) or the same line (if their y-intercepts are equal). The y-intercepts are $b + 3$ and $3m + b$, which are equal only if $3m = 3$. However, it is given that $m \neq 1$, so the intercepts are not equal. The lines are parallel, so **the graphs do not intersect.**

9. **(B)** The function $f(x) = \dfrac{\sqrt{x-3}}{x^2-8x-20}$ is undefined whenever the expression under the square root sign is negative and whenever the denominator is equal to 0.

- $x - 3 < 0$ whenever $x < 3$. There are 2 positive integers that satisfy this inequality: 1 and 2.
- Since $x^2 - 8x - 20 = (x - 10)(x + 2)$, this expression is equal to 0 only when $x = 10$ and $x = -2$. So there is only 1 positive integer that makes the denominator 0.

In total, there are **3** positive integers for which $f(x)$ has no real values.

10. **(A)** If $9 = 5 - x$, then $x = -4$. So $h(9) = h(5 - (-4)) = (-4)^2 + (-4) + 1 = 16 - 4 + 1 = 13$.

11. **(C)** Since the volume of the white cube is 27 cubic inches, each edge is 3 inches. Then the area of each face is 9, and the total surface of the cube is $6 \times 9 = 54$. Each face has a red circle whose radius is 1, so the area of each circle is $\pi(1^2) = \pi$. Finally, the total red area is 6π, and the total surface area that is NOT red is **$54 - 6\pi$**.

12. **(D)** In questions such as these, first find the midpoint of the eligible values. Here, a value for y is acceptable only if $13 \le y \le 19$; the midpoint of this interval is 16. All of the acceptable ages are within 3 years of 16—anywhere from 3 years less than 16 to 3 years greater than 16. The inequality that expresses this is $|y - 16| \le 3$.

13. **(B)**
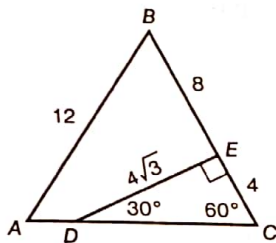
- Since triangle ABC is equilateral, $BC = AB = 12$, and so $EC = 12 - 8 = 4$.

- Since $\overline{DE}$ is perpendicular to $\overline{BC}$, $m\angle E = 90°$. Since triangle ABC is equilateral, $m\angle C = 60°$. So triangle DEC is a 30-60-90 triangle and $DE = 4\sqrt{3}$.

- Since the formula for the area of an equilateral triangle is $A = \dfrac{s^2 \times \sqrt{3}}{4}$, the area of triangle ABC is $\dfrac{12^2\sqrt{3}}{4} = \dfrac{144\sqrt{3}}{4} = 36\sqrt{3}$.

- The area of triangle DEC is $\dfrac{1}{2}(4)(4\sqrt{3}) = 8\sqrt{3}$.

- So the area of quadrilateral $ABED = 36\sqrt{3} - 8\sqrt{3} = 28\sqrt{3}$.

14. **(B)** It should be clear that the answer does *not* depend on d. So the easiest thing to do, as in all problems involving percents, is to assume that the list price of the book is $100. Then Anne paid $90 after receiving a $10 discount ($10 being 10% of $100). Beth, on the other hand, received a $15 discount. So she paid $85 for her copy of the book plus a sales tax of 5% of $85, which is $0.05 \times \$85 = \$4.25$. So Beth's total cost was $89.25. Anne paid 75 cents more than Beth.

15. **(B)** The slope of the line whose equation is $y = ax + b$ is a. To find the slope of the line whose equation is $x = cy + d$, first solve for y:

$$x = cy + d \Rightarrow cy = x - d \Rightarrow y = \frac{1}{c}x - \frac{d}{c}$$

Since the slope of the line is the coefficient of x, the slope is $\dfrac{1}{c}$. Since parallel lines have equal slopes, $a = \dfrac{1}{c}$.

16. **2** The centers of the two circles are the midpoints of the two diameters.

- The midpoint of $\overline{AB}$ is $\left(\dfrac{1+5}{2}, \dfrac{1+3}{2}\right) = (3, 2)$.

- The midpoint of $\overline{BC}$ is $\left(\dfrac{5+5}{2}, \dfrac{3+9}{2}\right) = (5, 6)$.

- The slope of the line that passes through (3, 2) and (5, 6) is $= \dfrac{6-2}{5-3} = \dfrac{4}{2} = 2$.

17. **1** $a(x - y) = b(y - x) \Rightarrow ax - ay = by - bx \Rightarrow ax + bx = by + ay \Rightarrow x(a + b) = y(a + b) \Rightarrow x = y$.

So the ratio $\dfrac{x}{y} = 1$.

18. **2** If $1 + i$ is a solution of the equation $x^2 - 2x + c = 0$, then

$$(1 + i)^2 - 2(1 + i) + c = 0 \Rightarrow (1 + 2i + i^2) - (2 + 2i) + c = 0 \Rightarrow \cancel{X} + \cancel{2i} - \cancel{X} - 2 - \cancel{2i} + c = 0$$
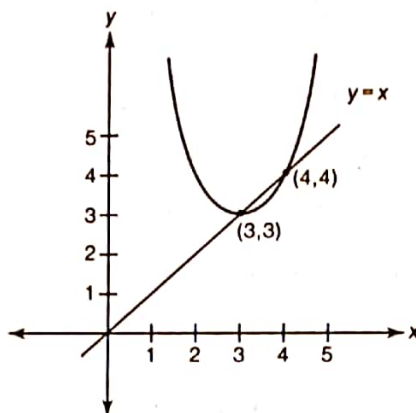
So $-2 + c = 0$, and $c = 2$.

19. **14** Replacing y by x in the equation $y = x^2 - 6x + 12$ gives:

$$x = x^2 - 6x + 12 \Rightarrow x^2 - 7x + 12 = 0 \Rightarrow$$

$$(x - 3)(x - 4) = 0 \Rightarrow x = 3 \text{ or } x = 4$$

Since $y = x$, $(a, b) = (3, 3)$ and $(c, d) = (4, 4)$. So $a + b + c + d = 14$.

20. **3** If $3 = 5 - 2x$, then $2x = 2$ and $x = 1$.

So $h(3) = h(5 - 2(1)) = \sqrt{(1)^2 + 3(1) + 5} = \sqrt{9} = 3$.

Section 4: Math Test (Calculator)

1. **(B)** Wally produces 80 widgets per day $\times$ 20 days per month $\times$ 12 months per year = 19,200 widgets per year; $96,000 \div 19,200 = 5$.

2. **(C)** If the total surface area of the cube is 216, then the area of each of the 6 faces is $216 \div 6 = 36$. Since each face is a square of area 36, each edge is 6. Finally, the volume of the cube is $6^3 = 216$.

3. **(A)** $2 - 3n \geq 5 \Rightarrow -3n \geq 3$. Dividing both sides of this inequality by -3, and remembering to reverse the direction of the inequality gives $n \leq -1$. Therefore, $3n \leq -3$, and $2 + 3n \leq 2 + (-3) = -1$.

4. **(A)** If $\dfrac{2x^2 - 3}{5 - x^2} = -2$, then $2x^2 - 3 = -2(5 - x^2) = -10 + 2x^2$. Subtracting $2x^2$ from both sides of this equation gives $-3 = -10$, which of course is false. So the **equation has no solutions.**

5. **(D)** $g(-10) = f(3(-10)) = f(-30) = (-30)^2 - 3(-30) = 900 - (-90) = 900 + 90 = 990$

   $**g(x) = f(3x) = (3x)^2 - 3(3x) = 9x^2 - 9x$

   Then $g(-10) = 9(-10)^2 - 9(-10) = 900 + 90 = 990$.

6. **(C)** The average is just the sum of the number of students in the five classes (125) divided by 5: $125 \div 5 = 25$.

7. **(A)** In class A, one-fourth, or 25% (5 of 20), of the students are in the band. In each of the other classes, the number in the band is *less than* one-fourth of the class.

8. **(D)** Let x be the amount, in dollars, that each of the 20 children was going to contribute, then $20x$ represents the cost of the present. When 4 children dropped out, the remaining 16 each had to pay $(x + 1.50)$ dollars, so

$$16(x + 1.5) = 20x \Rightarrow 16x + 24 = 20x \Rightarrow 24 = 4x \Rightarrow x = 6$$

So the cost of the present was $20 \times 6 =$ **120** dollars.

**Use TACTIC 5: backsolve. Try choice (C), 100. If the present cost $100, then each of the 20 children would have to pay $5. When 4 dropped out, the remaining 16 would have to pay $100 ÷ 16 = $6.25 apiece, an increase of $1.25. Since the actual increase was $1.50, the gift was more expensive. Eliminate (A), (B), and (C). The answer must be (D).

9. **(A)** Since $y = -x^2$, $x^2 = -y$. Replacing x^2 by $-y$ in the equation of the circle, we get:

$$-y + y^2 = 90 \Rightarrow y^2 - y - 90 = 0 \Rightarrow (y - 10)(y + 9) = 0 \Rightarrow y = 10 \text{ or } y = -9$$

A quick glance at the graphs shows that y cannot possibly be equal to 10, so y must equal −9. If you didn't think to check the graphs, plugging in 10 for y into either equation leads to a contradiction. Since x^2 can't be negative, $-x^2$ can't be positive. Also if $x^2 + 10^2 = 90$, then x^2 would be negative.

Then $x^2 + (-9)^2 = 90 \Rightarrow x^2 + 81 = 90 \Rightarrow x^2 = 9 \Rightarrow x = 3 \text{ or } x = -3$. So $(a, b) = (-3, -9)$ and $(c, d) = (3, -9)$.

Finally, $a + b + c + d = -3 + -9 + 3 + -9 = $ **−18**.

10. **(D)** Since triangle ABC is a right triangle, we can use the Pythagorean theorem to find BC: $6^2 + (BC)^2 = 10^2 \Rightarrow (BC)^2 = 100 - 36 = 64 \Rightarrow BC = 8$.

(Of course, if you immediately realize that triangle ABC is a 6-8-10 right triangle, then you don't have to use the Pythagorean theorem.)

So $\cos C = \dfrac{\text{adjacent}}{\text{hypotenuse}} = \dfrac{8}{10} = 0.8$.

11. **(D)** Let c represent the cost, in dollars, of the candy. Then $3c$ is the cost of the flowers, and $10(c + 3c) = 10(4c) = 40c$ is the cost of the ring. So,

$$528 = 40c + 3c + c = 44c \Rightarrow c = 528 \div 44 = 12$$

Therefore, the candy cost $12, the flowers cost **$36**, and the ring cost $480.

12. **(D)** It should be clear from the diagram that gear G_2 turns in a **counterclockwise** direction. As tooth A pushes against tooth C followed by tooth B pushing against tooth D, the teeth on gear G_2 are turning in the opposite direction as those on gear G_1.
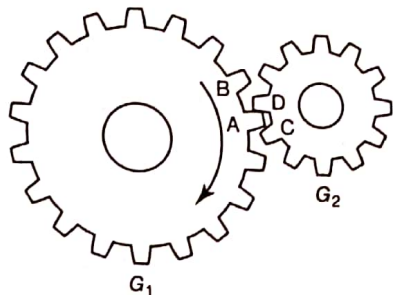
It should also be clear that the fewer the teeth on a gear, the faster it goes. In fact, the number of teeth is inversely proportional to the number of rotations per second:

number of teeth on G_1 × number of rotations per second of G_1 =
number of teeth on G_2 × number of rotations per second of G_2

So if r represents the number of rotations per second of G_2, we have

$$48 \times 60 = 36r \Rightarrow 2{,}880 = 36r \Rightarrow r = 2{,}880 \div 36 = 80$$

13. **(C)** The difference between the total ticket sales ($35.5 billion) and the total distribution of the proceeds $12.0 billion) was the amount returned to the purchasers of lottery tickets in the form of prize money: $35.5 billion – $12.0 billion = $23.5 billion. Divide 23.5 by 35.5 to see that approximately **66%** of the ticket sales was allocated to prize money.

14. **(C)** In order for the amount received by Senior citizens programs to be the same as the amount received by the Cities, an additional $0.9 billion would have to be allocated to the Senior citizen programs: $0.9 billion is approximately **31%** of the $2.9 billion currently going to the General fund.

15. **(D)** in 2009, the total sales for all games other than Lotto in billions of dollars was 35.5 – 10.0 = 25.5. In 2010, each of the remaining games experienced a 10% increase in sales, so the total sales in 2010 was 25.5 + 10%(25.5) = 25.5 + 2.55 = 28.05. In 2010, the sales of the Instant games was 10% higher than in 2009: 14.2 + 1.42 = 15.62. So in 2010,

the percent of the total sales attributed to Instant games was $\frac{15.62}{28.05} = .557 = 55.7\%$.

Finally, the measure of the central angle for the sector representing Instant games is 55.7% of 360° = **200°**.

16. **(C)** Alice's gross pay in dollars is:

$$40 \times 9 + (x - 40) \times 15 = 360 + 15x - 600 = 15x - 240$$

23% of her gross pay (8% for payroll taxes and 15% for withholding taxes) is deducted from her gross pay. So her net pay is 77% of her gross pay (100% – 23%) minus a $20 contribution for her health insurance premium:

$$0.77(15x - 240) - 20$$

17. **(A)** $(1 + i)^3 = [(1 + i)(1 + i)](1 + i) = [1 + 2i + i^2](1 + i) = [1 + 2i - 1](1 + i) = [2i](1 + i) = 2i + 2i^2 = 2i - 2 = -2 + 2i$

18. **(D)** If the graph of a function crosses the x-axis at n, then $(n, 0)$ is a point on the graph. So $(a, 0)$ and $(b, 0)$ are points on the graph. Therefore, a and b are the solutions of the equation $4x^2 - 8x + 3 = 0$. There are a few ways to solve this equation.

- First solution: Factor $4x^2 - 8x + 3 = (2x - 3)(2x - 1)$. So,

$$2x - 3 = 0 \text{ or } 2x - 1 = 0 \Rightarrow x = \frac{3}{2} \text{ or } x = \frac{1}{2}$$

So a and b are $\frac{3}{2}$ and $\frac{1}{2}$, and $a + b = \frac{3}{2} + \frac{1}{2} = 2$.

- Second solution: Use the quadratic formula on the equation $4x^2 - 8x + 3 = 0$.

$$x = \frac{8 \pm \sqrt{(-8)^2 - 4(4)(3)}}{2(4)} = \frac{8 \pm \sqrt{64 - 48}}{8} = \frac{8 \pm \sqrt{16}}{8} = \frac{8 \pm 4}{8}$$

So $x = \frac{12}{8} = \frac{3}{2}$ or $x = \frac{4}{8} = \frac{1}{2}$.

- Third solution: Use a graphing calculator. Graph $y = 4x^2 - 8x + 3$, and see where the graph crosses the x-axis.

19. **(C)** The central angle of the sector representing Brand C is 12% of 360°:

$$(0.12) \times 360° = 43.2°$$

The central angle of the sector representing Brand D is 7% of 360°:

$$(0.7) \times 360° = 25.2°$$

Finally, $43.2° - 25.2° = \mathbf{18°}$.

**Note this can be done in one step by noticing that the percentage difference between Brands C and D is 5%, and 5% of 360 is $(0.05) \times 360 = 18$.

20. **(C)** Since total sales in 2000 were $1,000,000, in 2005 sales were $1,500,000 (a 50% increase).

In 2000, sales of Brand A were $400,000 (40% of $1,000,000).

In 2005, sales of Brand A were $500,000 (25% or $\frac{1}{4}$ more than in 2000).

Finally, $500,000 is $\frac{1}{3}$ or $\mathbf{33\frac{1}{3}}$% of $1,500,000.

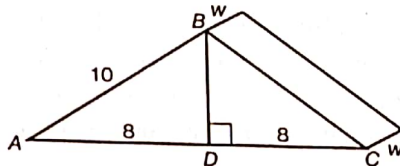21. **(D)** Store 2 sold 30 DVD players at $50, 40 at $80, and 20 at $120.

Store 2: $(30 \times \$50) + (40 \times \$80) + (20 \times \$120) = \$7,100$

Store 1 sold 10 DVD players at $80, 20 at $100, and 20 at $150.

Store 1: $(10 \times \$80) + (20 \times \$100) + (20 \times \$150) = \$5,800$

Finally, $\$7,100 - \$5,800 = \mathbf{\$1,300}$.

22. **(B)** The face of the solid is an isosceles triangle whose base is 16. To find its area, draw in altitude $\overline{BD}$ in the diagram below.

Since the altitude to the base of an isosceles triangle is also a median, $AD = DC = 8$. So triangle ABD is a 6-8-10 right triangle. (If you don't immediately recognize that, use the Pythagorean theorem: $10^2 = 8^2 + (BD)^2 \Rightarrow (BD)^2 = 100 - 64 = 36 \Rightarrow BD = 6$.) The area of triangle ABC is

$$\frac{1}{2} bh = \frac{1}{2}(16)(6) = \mathbf{48}$$

23. **(B)** The solid is a prism whose triangular face has an area of 48 square feet (see the solution to question 22) and whose width is w. So the volume of the solid is $48w$ cubic feet, and its weight is

$$(48w \text{ cubic feet}) \times (3 \text{ pounds per cubic foot}) = 144w \text{ pounds}$$

Then $144w = 360 \Rightarrow w = 360 \div 144 = \mathbf{2.5}$.

24. **(D)** Since they have the same angles, by KEY FACT J16 all equilateral triangles are similar. If k is the ratio of the sides of two similar triangles, then by KEY FACT J18 the ratio of their areas is k^2. Here the ratio of the areas is 6:10, or 0.6, so $k^2 = 0.6$ and $k = \sqrt{0.6} = \mathbf{0.77}$.

25. **(C)** Here are two ways to answer this question.

- You can just put your calculator into radian mode and evaluate:

$$\left(\sin \frac{\pi}{3} + \cos \frac{\pi}{3}\right)^2 = (0.866 + 0.5)^2 = 1.366^2 = \mathbf{1.866}$$

- Leave your calculator in degree mode and convert $\frac{\pi}{3}$ radians to degrees:

$$\frac{\pi}{3} \text{ radians} = \frac{180}{3} = 60 \text{ degrees}$$

$$(\sin 60° + \cos 60°)^2 = (0.866 + 0.5)^2 = 1.366^2 = \mathbf{1.866}$$

26. **(D)** For each of the given years, the total acreage of farmland can be calculated by multiplying the number of farms by the average size of a farm. There is no way to answer this question, without doing the calculation for each year.

- 1940: 6.3 million farms × 174 acres per farm = 1,096 million acres
- 1970: 2.9 million farms × 374 acres per farm = 1,085 million acres
- 2000: 2.2 million farms × 436 acres per farm = 959 million acres
- 2010: 2.2 million farms × 418 acres per farm = 919 million acres

27. **(C)** Find the sum: $130 + 61 + 46 + 46 + 43 = 326$. The sum of the farm acreages for the five states is 326 million acres. In the solution to the previous question, we saw that the total farm acreage in the country in 2010 was 919 million acres, and $326 \div 919 = 0.3547$ or approximately **35%**.

28. **(B)** It is projected that from 2010 to 2030, the number of farms will decrease by 5%. Since 5% of 2.2 million is 110,000, the number of farms in 2030 will be approximately $2,200,000 - 110,000 = 2,090,000 = 2.09$ million. From 1990 to 2010, the average size of a farm decreased by 42 acres from 460 acres to 418 acres, and $42 \div 460 = 0.091 = 9.1\%$. If from 2010 to 2030 the average size of a farm again decreases by 9.1%, there will be a decrease of $0.091 \times 418 = 38$ acres, bringing the average size to $418 - 38 = 380$ acres. Finally, the total farm acreage in 2030 in millions of acres is projected to be about $2.09 \times 380 = 794 \approx \mathbf{800}$.

29. **(A)** Since the powers of i repeat cyclically in cycles of 4, i^{75} is equal to i^r, where r is the remainder when 75 is divided by 4. Since $75 \div 4 = 18.75$, the quotient is 18. Then $18 \times 4 = 72$ and $75 - 72 = 3$. So the remainder is 3.

Therefore $i^{75} = i^3$ and $(-i)^{75} = (-1)^{75}(i)^{75} = (-1)(i)^3 = -i^3$.

Since $i^3 = -i$, then $-i^3 = i$.

Finally, $i^{75} - (-i)^{75} = i^3 - (-i^3) = -i - i = -2i$.

30. **(C)** The formula for the area of a parallelogram is $A = bh$. Sketch the parallelogram and draw the height.
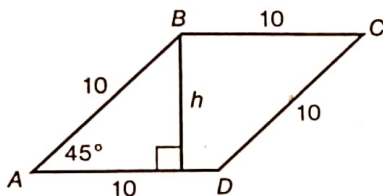
To find h, use the sine ratio:

$\sin 45° = \dfrac{h}{10} \Rightarrow h = 10 \sin 45° = 10(0.707) = 7.07$

An alternative method of finding h is to use the fact that in a 45-45-90 right triangle, the length of each leg is equal to the length of the hypotenuse divided by $\sqrt{2}$: $h = \dfrac{10}{\sqrt{2}} = 7.07$.

Either way, $h = 7.07$ and the area of the parallelogram is:

$$A = bh = 10(7.07) = \textbf{70.7}$$

31. **37.5** First set up a proportion to determine the distance between Hauppauge and Riverhead:

$$\frac{1 \text{ inch}}{20 \text{ miles}} = \frac{1.25 \text{ inches}}{x \text{ miles}}$$

So $x = (1.25)(20) = 25$. Traveling at 40 miles per hour, it takes $\dfrac{25}{40} = \dfrac{5}{8}$ of an hour to drive 25 miles. Finally, $\dfrac{5}{8}$ of an hour is equal to $\dfrac{5}{8}$ (60 minutes) = **37.5** minutes.

32. **6.8** Since Michelle took 31.5 minutes to run the 3 miles from the 12-mile marker to the 15-mile marker, she was running at the constant rate of 1 mile every 10.5 minutes ($31.5 \div 3 = 10.5$). Michelle took 54.6 minutes (36 seconds = $36 \div 60 = 0.6$ minutes) to run from where her friend was standing to the 12-mile marker. So that distance was 54.6 minutes $\div$ 10.5 minutes per mile = 5.2 miles.

Her friend was 5.2 miles from the 12-mile marker, and so was $12 - 5.2 = \textbf{6.8}$ miles from the starting line.

33. **3744** Use a weighted average:

$$\frac{12(3,100)+24(3,800)+14(4,200)}{(12+24+14)} = \frac{187,200}{50} = 3,744$$

34. **8190** There are $26 \times 26 \times 9 = 6,084$ PICs with two letters and one digit, and there are $26 \times 9 \times 9 = 2,106$ PICs with one letter and two digits, for a total of $6,084 + 2,106 = 8,190$.

35. $\frac{3}{2}$ **or 1.5** The formula for the volume of a pyramid with a rectangular base is $V = \frac{1}{3}lwh$, where l and w are the length and width of the rectangle, and where h is the height of the pyramid. (Remember that this fact is given to you on the first page of each math section.)

The base of pyramid 1 is a 2 by 3 rectangle whose area is $(2)(3) = 6$.

The base of pyramid 2 is a square of side 3 whose area is $3^2 = 9$. If h_1 and h_2 represent the two heights, then:

$$\frac{1}{3}(6)h_1 = \frac{1}{3}(9)h_2 \Rightarrow 2h_1 = 3h_2 \Rightarrow \frac{h_1}{h_2} = \frac{3}{2}$$

36. **129** Let c, d, and e represent the value of one Canadian dollar, one U.S. dollar, and one euro, respectively. Since $c = .68e$, we have that $e = \frac{c}{.68}$. Then we have:

$$d = .88e = .88\left(\frac{c}{.68}\right) \Rightarrow d = \left(\frac{.88}{.68}\right)c = 1.294c$$

So, one U.S. dollar could have purchased 1.294 Canadian dollars, and 100 U.S. dollars could have purchased 129.40, or approximately **129** Canadian dollars.

37. **54**

- 60 miles per hour = 60 miles per 60 minutes = 1 mile per 1 minute. Driving at 60 miles per hour, Ed takes 6.3 minutes to drive those 6.3 miles.

- 70 miles per hour = 70 miles per 60 minutes = $\frac{7}{6}$ mile per 1 minute. Driving at 70 miles per hour, Ed would take $6.3 \div \frac{7}{6} = 6.3 \times \frac{6}{7} = 0.9 \times 6 = 5.4$ minutes to drive those 6.3 miles.

- So Ed would take $6.3 - 5.4 = 0.9$ minutes less to drive those 6.3 miles at 70 miles per hour.

- Finally, 0.9 minutes = 0.9×60 seconds = **54** seconds.

38. **37**

- 6.3 miles per day $\times$ 240 days = 1,512 miles.

- At 60 miles per hour, Ed used $1,512 \div 24.3 = 62.222$ gallons of gasoline, which cost $62.222 \times \$3.50 = \$217.78$.

- At 70 miles per hour, Ed would have used $1,512 \div 20.8 = 72.692$ gallons of gasoline, which would have cost $72.692 \times \$3.50 = \$254.42$.

- So traveling at 70 miles per hour instead of 60 miles per hour would have cost Ed $\$254.42 - \$217.78 = \$36.64$ more, which to the nearest dollar is **$37**.

SCORE ANALYSIS

Reading and Writing Test

Section 1: Reading   _____ = _____ (A)

                     # correct   raw score

Section 2: Writing   _____ = _____ (B)

                     # correct   raw score

To find your Reading and Writing test scores, consult the chart below: find the ranges in which your raw scores lie and read across to find the ranges of your test scores.

_____ + _____ = _____ (C)

range of reading   range of writing   range of reading + writing

  test scores   test scores   test scores

To find the range of your Reading and Writing Scaled Score, multiply (C) by 10.

Test Scores for the Reading and Writing Sections

Reading Raw Score	Writing Raw Score	Test Score
44–52	39–44	35–40
36–43	33–38	31–34
30–35	28–32	28–30
24–29	22–27	24–27
19–23	17–21	21–23
14–18	13–16	19–20
9–13	9–12	16–18
5–8	5–8	13–15
less than 5	less than 5	10–12

Math Test

Section 3:   _____ = _____ (D)

            # correct   raw score

Section 4:   _____ = _____ (E)

            # correct   raw score

Total Math raw score: (D) + (E) = _____

To find your Math Scaled Score, consult the chart below: find the range in which your raw score lies and read across to find the range for your scaled score.

Scaled Scores for the Math Test

Raw Score	Scaled Score	Raw Score	Scaled Score
50–58	700–800	20–25	450–490
44–49	650–690	15–19	400–440
38–43	600–640	11–14	350–390
32–37	550–590	7–10	300–340
26–32	500–540	less than 7	200–290

ANSWER SHEET
Model Test 2

Section 1: Reading

1. Ⓐ Ⓑ Ⓒ Ⓓ
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51. Ⓐ Ⓑ Ⓒ Ⓓ
52. Ⓐ Ⓑ Ⓒ Ⓓ

Section 2: Writing and Language

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44. Ⓐ Ⓑ Ⓒ Ⓓ

ANSWER SHEET
Model Test 2

Section 3: Math (No Calculator)

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ANSWER SHEET
Model Test 2

Section 4: Math (Calculator)

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READING TEST

65 MINUTES, 52 QUESTIONS

Turn to Section 1 of your answer sheet to answer the questions in this section.

> **Directions:** Following each of the passages (or pairs of passages) below are questions about the passage (or passages). Read each passage carefully. Then, select the best answer for each question based on what is stated in the passage (or passages) and in any graphics that may accompany the passage.

Questions 1–11 are based on the following passage.

The following passage is taken from Jane Austen's novel Persuasion. *In this excerpt we meet Sir Walter Elliot, father of the heroine.*

Vanity was the beginning and end of Sir Walter Elliot's character: vanity of person and of situation. He had been remarkably
Line handsome in his youth, and at fifty-four was
(5) still a very fine man. Few women could think more of their personal appearance than he did, nor could the valet of any new-made lord be more delighted with the place he held in society. He considered the blessing of beauty
(10) as inferior only to the blessing of a baronetcy; and the Sir Walter Elliot, who united these gifts, was the constant object of his warmest respect and devotion.

His good looks and his rank had one
(15) fair claim on his attachment, since to them he must have owed a wife of very superior character to anything deserved by his own. Lady Elliot had been an excellent woman, sensible and amiable, whose judgment
(20) and conduct, if they might be pardoned the youthful infatuation which made her Lady Elliot, had never required indulgence afterwards. She had humored, or softened, or concealed his failings, and promoted
(25) his real respectability for seventeen years;

and though not the very happiest being in the world herself, had found enough in her duties, her friends, and her children, to attach her to life, and make it no matter of
(30) indifference to her when she was called on to quit them. Three girls, the two eldest sixteen and fourteen, was an awful legacy for a mother to bequeath, an awful charge rather, to confide to the authority and guidance of a
(35) conceited, silly father. She had, however, one very intimate friend, a sensible, deserving woman, who had been brought, by strong attachment to herself, to settle close by her, in the village of Kellynch; and on her
(40) kindness and advice Lady Elliot mainly relied for the best help and maintenance of the good principles and instruction which she had been anxiously giving her daughters.

This friend and Sir Walter did not marry,
(45) whatever might have been anticipated on that head by their acquaintance. Thirteen years had passed away since Lady Elliot's death, and they were still near neighbors and intimate friends, and one remained a
(50) widower, the other a widow.

That Lady Russell, of steady age and character, and extremely well provided for, should have no thought of a second marriage, needs no apology to the public,
(55) which is rather apt to be unreasonably discontented when a woman *does* marry again, than when she does *not;* but Sir

GO ON TO THE NEXT PAGE

Walter's continuing in singleness requires
explanation. Be it known, then, that Sir
(60) Walter, like a good father (having met
with one or two disappointments in very
unreasonable applications), prided himself
on remaining single for his dear daughters'
sake. For one daughter, his eldest, he would
(65) really have given up anything which he
had not been very much tempted to do.
Elizabeth had succeeded at sixteen to all
that was possible of her mother's rights and
consequence; and being very handsome, and
(70) very like himself, her influence had always
been great, and they had gone on together
most happily. His two other children were
of very inferior value. Mary had acquired
a little artificial importance by becoming
(75) Mrs. Charles Musgrove; but Anne, with an
elegance of mind and sweetness of character,
which must have placed her high with any
people of real understanding, was nobody
with either father or sister; her word had no
(80) weight, her convenience was always to give
way—she was only Anne.

1. The main purpose of the passage is to

(A) provide an overview of the
interrelationships of the members of a
family.
(B) point out some unfortunate personality
defects in a main character.
(C) explain the relationship between a main
character and his amiable wife.
(D) describe a main character and a major
change in his life.

2. As used in line 3, "situation" most nearly
means

(A) position of employment.
(B) physical surroundings.
(C) state of affairs.
(D) social standing.

3. Which choice best summarizes the first two
paragraphs of the passage (lines 1–43)?

(A) Even though the loss of his admirable
wife devastates a character, he perseveres
in caring for their young children.
(B) A vain and foolish character is left to care
for three daughters after the death of his
sensible wife.
(C) After seventeen years, a character who
can no longer endure being married to a
conceited fool abandons her family.
(D) Largely prompted by a character's good
looks, an otherwise intelligent woman
enters into a misalliance.

4. The narrator speaks well of Lady Elliot for all
of the following reasons EXCEPT

(A) her concealment of Sir Walter's
shortcomings.
(B) her choice of an intimate friend.
(C) her guidance of her three daughters.
(D) her judgment in falling in love with Sir
Walter.

5. Which choice provides the best evidence for
the answer to the previous question?

(A) Lines 5–9 ("Few women ... society")
(B) Lines 18–23 ("Lady ... afterwards")
(C) Lines 23–31 ("She had ... them")
(D) Lines 31–35 ("Three ... father")

6. It can most reasonably be inferred that over the years Lady Elliot was less than happy because of

(A) her lack of personal beauty.
(B) her separation from her most intimate friend.
(C) the disparity between her character and that of her husband.
(D) her inability to teach good principles to her young daughters.

7. As used in line 33, "charge" most nearly means

(A) accusation.
(B) responsibility.
(C) official instruction.
(D) headlong rush.

8. The narrator indicates that Lady Elliot's emotions regarding her approaching death were complicated by her

(A) pious submissiveness to her fate.
(B) anxieties over her daughters' prospects.
(C) resentment of her husband's potential remarriage.
(D) reluctance to face the realities of her situation.

9. Which choice provides the best evidence for the answer to the previous question?

(A) Lines 23–31 ("She . . . quit them")
(B) Lines 31–35 ("Three . . . father")
(C) Lines 35–43 ("She . . . daughters")
(D) Lines 44–50 ("This friend . . . widow")

10. The phrase "make it no matter of indifference to her when she was called on to quit them" (lines 29–31) is an example of

(A) ironic understatement.
(B) effusive sentiment.
(C) metaphorical expression.
(D) personification.

11. The "applications" made by Sir Walter (line 62) were most likely

(A) professional.
(B) insincere.
(C) marital.
(D) paternal.

MODEL TEST 2

GO ON TO THE NEXT PAGE

Questions 12–22 are based on the following passage.

The following passage is taken from a book of popular history written in 1991.

The advantage of associating the birth of democracy with the Mayflower Compact is that it is easy to do so. The public loves a
Line simple explanation, and none is simpler than
(5) the belief that on November 11, 1620—the day the compact was approved—a cornerstone of American democracy was laid. Certainly it makes it easier on schoolchildren. Marking the start of democracy in 1620 relieves
(10) students of the responsibility of knowing what happened in the hundred some years before, from the arrival of the Santa Maria to the landing of the Mayflower.

The compact, to be sure, demonstrated
(15) the Englishman's striking capacity for self-government. And in affirming the principle of majority rule, the Pilgrims showed how far they had come from the days when the king's whim was law, and nobody dared say
(20) otherwise.

But the emphasis on the compact is misplaced. Scholarly research in the last half-century indicates that the compact had nothing to do with the development
(25) of self-government in America. In truth, the Mayflower Compact was no more a cornerstone of American democracy than the Pilgrim hut was the foundation of American architecture. As Samuel Eliot Morrison so
(30) emphatically put it, American democracy "was not born in the cabin of the Mayflower."

The Pilgrims indeed are miscast as the heroes of American democracy. They spurned democracy and would have been
(35) shocked to see themselves held up as its defenders. George Willison, regarded as one of the most careful students of the Pilgrims, states that "the merest glance at the history of Plymouth" shows that they were not
(40) democrats.

The mythmakers would have us believe that even if the Pilgrims themselves weren't democratic, the Mayflower Compact itself was. But in fact the compact was expressly
(45) designed to curb freedom, not promote it. The Pilgrim governor and historian, William Bradford, from whom we have gotten nearly all of the information there is about the Pilgrims, frankly conceded as much. Bradford
(50) wrote that the purpose of the compact was to control renegades aboard the Mayflower who were threatening to go their own way when the ship reached land. Because the Pilgrims had decided to settle in an area
(55) outside the jurisdiction of their royal patent, some aboard the Mayflower had hinted that upon landing they would "use their owne libertie, for none had power to command them." Under the terms of the compact, they
(60) couldn't; the compact required all who lived in the colony to "promise all due submission and obedience" to it.

Furthermore, despite the compact's mention of majority rule, the Pilgrim fathers
(65) had no intention of turning over the colony's government to the people. Plymouth was to be ruled by the elite. And the elite wasn't bashful in the least about advancing its claims to superiority. When the Mayflower
(70) Compact was signed, the elite signed first. The second rank consisted of the "goodmen." At the bottom of the list came four servants' names. No women or children signed.

Whether the compact was or was not
(75) actually hostile to the democratic spirit, it was deemed sufficiently hostile that during the Revolution, the Tories put it to use as "propaganda for the crown." The

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monarchists made much of the fact that
(80) the Pilgrims had chosen to establish an
English-style government that placed power
in the hands of a governor, not a cleric, and
a governor who owed his allegiance not to
the people or to a church but to "our dread
(85) Sovereign Lord King James." No one thought
it significant that the authorities had adopted
the principle of majority rule. Tory historian
George Chalmers, in a work published in
1780, claimed the central meaning of the
(90) compact was the Pilgrims' recognition of the
necessity of royal authority. This may have
been not only a convenient argument, but a
true one. It is at least as plausible as the belief
that the compact stood for democracy.

Mayflower Passengers

First Rank ("The Elite") — Landed/Professional

Second Rank ("Goodmen") — Farmers

Servants

Male Adult

Male Minor

Female Adult

Female Minor

5 10 15 20 25 30 35 40
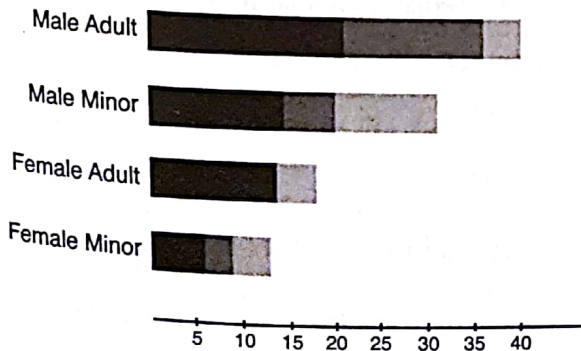
12. The author's attitude toward the general public can best be described as

(A) sympathetic.
(B) condescending.
(C) perplexed.
(D) hostile.

13. The purpose of the first paragraph (lines 1–13) is to

(A) present an elaborate speculation.
(B) develop a chronological summary.
(C) capture the reader's attention.
(D) provide a working hypothesis.

14. As used in line 8, "Marking" most nearly means

(A) assessing.
(B) forming.
(C) designating.
(D) manifesting.

15. In stating that "[t]he compact, to be sure, demonstrated the Englishman's striking capacity for self-government," the author

(A) concedes a point.
(B) invokes an expert.
(C) offers a rationale.
(D) rejects an assumption.

16. The Pilgrims' attitude toward the concept of democracy can best be described as

(A) complete rejection.
(B) qualified endorsement.
(C) marked approbation.
(D) objective neutrality.

MODEL TEST 2

17. As used in line 35, "held up" most nearly means

(A) delayed.
(B) cited.
(C) waylaid.
(D) carried.

18. According to the passage, the compact's primary purpose was to

(A) establish legal authority within the colony.
(B) banish non-Pilgrims from the settlement.
(C) eradicate heretical thinking among the settlers.
(D) protect each individual's civil rights.

19. Which choice provides the best evidence for the answer to the previous question?

(A) Lines 41–44 ("The mythmakers . . . itself was")
(B) Lines 44–49 ("But in fact . . . as much")
(C) Lines 53–62 ("Because the Pilgrims . . . to it")
(D) Lines 63–67 ("Furthermore . . . elite")

20. In the passage, the details about the signers of the Mayflower Compact are used to emphasize

(A) the Pilgrims' respect for the social hierarchy.
(B) the inclusion of servants among those signing.
(C) the great variety of social classes aboard.
(D) the lack of any provision for minority rule.

21. Which choice provides the best evidence for the answer to the previous question?

(A) Lines 46–49 ("The Pilgrim . . . much")
(B) Lines 59–62 ("Under . . . it")
(C) Lines 63–66 ("Furthermore . . . people")
(D) Lines 69–73 ("When . . . signed") .

22. Which category of passenger is least represented on the accompanying graph?

(A) Male adult servants
(B) Female adult farmers
(C) Male minor farmers
(D) Female minor farmers

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Questions 23–32 are based on the following passage.

The following passage is based on Emily Underwood's "Sleep: The Brain's Housekeeper?", published in Science *magazine in 2013.*

Every night since we first evolved, humans have made what might be considered a baffling, dangerous mistake. Despite the
Line once-prevalent threat of being eaten by
(5) predators and the loss of valuable time for gathering food, accumulating wealth, or reproducing, we go to sleep. Scientists have long speculated and argued about why we devote roughly a third of our lives to sleep,
(10) but with little concrete data to support any particular theory. Now, new evidence has refreshed a long-held hypothesis: During sleep, the brain cleans itself.

Most physiologists agree that sleep serves
(15) many different purposes, ranging from memory consolidation to the regulation of metabolism and the immune system. While the purposes of biological functions such as breathing and eating are easy to
(20) understand, scientists have never agreed on any such original purpose for sleeping. A new study by Maiken Nedergaard provides what sleep researcher Charles Czeisler calls the "first direct experimental evidence
(25) at the molecular level" for what could be sleep's basic purpose: It clears the brain of toxic metabolic byproducts. The new work confirms a long-standing hypothesis that sleep promotes recovery—something
(30) is paid back or cleaned out. It builds on Nedergaard's recent discovery of a network of microscopic, fluid-filled channels that clear toxins from the brain, much as the lymphatic system clears out metabolic waste
(35) products from the rest of the body. Instead of carrying lymph, this system transports waste-laden cerebrospinal fluid (CSF). Before the discovery of this "glymphatic" system, as Nedergaard has dubbed it, the brain's only
(40) known method for disposing of cellular waste was breaking it down and recycling it within individual cells, she says.

The earlier study showed that glia, the brain's non-neuronal cells, control the
(45) flow of CSF through channels in their cell membranes. "If we delete the channels in glial cells, the flow almost stops," Nedergaard says. Because the transport of fluid across cell membranes requires a lot of energy,
(50) Nedergaard and her team had a hunch that the brain would not be able both to clean the brain and to process sensory information at the same time. Therefore, they decided to test whether the activity of the glymphatic
(55) system changed during sleep. Lulu Xie, the new study's first author, spent the next two years training mice to relax and fall asleep on a two-photon microscope, which can image the movement of dye through living tissue.
(60) Once Xie was sure the mice were asleep by checking their EEG (electroencephalogram) brain activity, she injected a green dye into their CSF through a catheter-like device in their necks. After half an hour, she awakened
(65) them by touching their tails and injected a red dye that the two-photon microscope could easily distinguish from the green. By tracking the movements of red and green dye throughout the brain, the team found that
(70) large amounts of CSF flowed into the brain during sleep, but not during the waking state, Nedergaard reports.

A comparison of the volume of space between nerve cells while the mice were
(75) awake and asleep revealed that the glial channels carrying CSF expanded by 60% when the mice were asleep. The team also

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injected labeled β amyloid proteins into the brains of sleeping mice and wakeful mice (80) and found that during sleep, CSF cleared away this "dirt" outside of the cells twice as quickly—"like a dishwasher," Nedergaard says. Such proteins can aggregate as pathogenic plaques outside cells and are (85) associated with Alzheimer's disease, she says.

Many neurological diseases—from Alzheimer's disease to stroke and dementia—are associated with sleep disturbances. The study suggests that lack of sleep could have (90) a causal role, by allowing the byproducts to build up and cause brain damage.

New scientific results often raise new questions, and this study of sleep is no exception to the rule. Does the need to (95) remove waste products actively regulate sleep? In other words, does the buildup of metabolic byproducts make us sleepy? Is this cleaning function of sleep shared across species? No one role of sleep rules out all (100) others, and sleep presumably has many functions, just as the weekend is variously for shopping, socializing, and cleaning the house. It is possible that different species have evolved different functions of sleep to (105) suit their different habitats.

23. The main purpose of the passage is to

(A) explain why humans sleep more than other mammals.
(B) prove that sleep is in fact beneficial to human beings.
(C) discuss recent experiments regarding brain activity during sleep.
(D) clarify the workings of the lymphatic system.

24. It may most reasonably be inferred from the passage that one function of the lymphatic system is the

(A) relay of sensory information.
(B) regulation of temperature.
(C) transport of cerebrospinal fluid.
(D) drainage of waste.

25. Which choice provides the best evidence for the answer to the previous question?

(A) Lines 21–27 ("A new . . . byproducts")
(B) Lines 27–30 ("The new . . . cleaned out")
(C) Lines 30–35 ("It builds . . . body")
(D) Lines 37–42 ("Before . . . says")

26. The new experiment described indicates that the purpose of sleep is to

(A) build up pathogenic plaques outside cells.
(B) replenish the body's energy stores.
(C) clean the brain and provide other unknown benefits.
(D) reduce the buildup of electrical signals.

27. As used in line 29, "promotes" most nearly means

    (A) exchanges a pawn.
    (B) raises in rank.
    (C) fosters.
    (D) publicizes.

28. Why did the scientists consider the fact that glial channels expanded by 60 percent a significant result?

    (A) It suggested that the brain expanded during sleep.
    (B) It suggested that the flow of cerebrospinal fluid increased during sleep.
    (C) It suggested that other organs expanded simultaneously in similar fashion.
    (D) It suggested a peak in the processing of sensory information.

29. As used in line 67, "distinguish" most nearly means

    (A) characterize.
    (B) tell apart.
    (C) make prominent.
    (D) discern.

30. Which statement about the function of Xie's injection of two different colored dyes into the mice's cerebrospinal fluid is best supported by the passage?

    (A) It enabled the researchers to differentiate between different types of molecules in the cerebrospinal fluid.
    (B) It enabled the researchers to differentiate cerebrospinal fluid that entered the brain during a sleeping state from cerebrospinal fluid that entered the brain during a wakeful state.
    (C) It enabled the researchers to differentiate between cerebrospinal fluid and lymph.
    (D) It enabled the researchers to differentiate between fluids that cleared out waste products from the lymphatic system and fluids that cleared out waste products from the glymphatic system.

31. Which choice provides the best evidence for the answer to the previous question?

    (A) Lines 55–59 ("Lulu Xie ... living tissue")
    (B) Lines 64–67 ("After half an hour ... green")
    (C) Lines 67–72 ("By tracking ... reports")
    (D) Lines 73–77 ("A comparison ... asleep")

32. The reference to common weekend activities in lines 101–103 ("the weekend ... cleaning the house") primarily serves to

    (A) emphasize the importance of leisure time for mental and physical health.
    (B) determine which activities provide the most benefits.
    (C) illustrate by analogy the likely diversity of the roles played by sleep.
    (D) demonstrate the fundamental similarity between recreation and sleep.

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Questions 33–42 are based on the following passages.

The first passage is taken from Sojourner Truth's 1851 speech before the Women's Convention in Akron, Ohio. The second passage is adapted from a speech made by Frederick Douglass in 1888, some 23 years after the end of the Civil War.

PASSAGE 1

Well, children, where there is so much racket there must be something out of kilter. I think that 'twixt the negroes of the South
Line and the women at the North, all talking about
(5) rights, the white men will be in a fix pretty soon. But what's all this here talking about?

That man over there says that women need to be helped into carriages, and lifted over ditches, and to have the best place
(10) everywhere. Nobody ever helps me into carriages, or over mud-puddles, or gives me any best place! And ain't I a woman? Look at me! Look at my arm! I have ploughed and planted, and gathered into barns, and no
(15) man could head me! And ain't I a woman? I could work as much and eat as much as a man—when I could get it—and bear the lash as well! And ain't I a woman? I have borne thirteen children, and seen most all sold
(20) off to slavery, and when I cried out with my mother's grief, none but Jesus heard me! And ain't I a woman?

Then they talk about this thing in the head; what's this they call it? [Member of
(25) audience whispers, "intellect."] That's it, honey. What's that got to do with women's rights or negroes' rights? If my cup won't hold but a pint, and yours holds a quart, wouldn't you be mean not to let me have my little half
(30) measure full?

Then that little man in black there, he says women can't have as much rights as men, 'cause Christ wasn't a woman! Where did your Christ come from? Where did your
(35) Christ come from? From God and a woman! Man had nothing to do with Him.

If the first woman God ever made was strong enough to turn the world upside down all alone, these women together ought to be
(40) able to turn it back, and get it right side up again! And now they is asking to do it, the men better let them.

Obliged to you for hearing me, and now old Sojourner ain't got nothing more to say.

PASSAGE 2

(45) Long years ago Henry Clay said, on the floor of the American Senate, "I know there is a visionary dogma that man cannot hold property in man," and, with a brow of defiance, he said, "That is property which
(50) the law makes property. Two hundred years of legislation has sanctioned and sanctified Negro slaves as property." But neither the power of time nor the might of legislation has been able to keep life in that stupendous
(55) barbarism. The universality of man's rule over woman is another factor in the resistance to the woman-suffrage movement. We are pointed to the fact that men have not only always ruled over women, but that they do so
(60) rule everywhere, and they easily think that a thing that is done everywhere must be right. Though the fallacy of this reasoning is too transparent to need refutation, it still exerts a powerful influence. Even our good Brother
(65) Jasper yet believes, with the ancient Church, that the sun "do move," notwithstanding all the astronomers of the world are against him. One year ago I stood on the Pincio in Rome and witnessed the unveiling of the statue

(70) of Galileo. . . . One or two priests passed the
statue with averted eyes, but the great truths
of the solar system were not angry at the
sight, and the same will be true when woman
shall be clothed, as she will yet be, with all
(75) the rights of American citizenship. . . .
[W]hatever the future may have in store for
us, one thing is certain—this new revolution
in human thought will never go backward.
When a great truth once gets abroad in the
(80) world, no power on earth can imprison it, or
prescribe its limits, or suppress it. It is bound
to go on till it becomes the thought of the
world. Such a truth is woman's right to equal
liberty with man.

33. The author of Passage 1 demonstrates that
women are not frail and in need of protection
by

(A) using the example of Northern women
who have fought for the right to vote.
(B) emphasizing the importance of their role
as mothers.
(C) pointing out that women undergo the
rigors of childbearing.
(D) describing her work and treatment as a
slave.

34. Which choice provides the best evidence for
the answer to the previous question?

(A) Lines 3–6 ("I think . . . pretty soon")
(B) Lines 12–18 ("Look at . . . as well")
(C) Lines 27–30 ("If my cup . . . measure full")
(D) Lines 37–41 ("If the first . . . up again")

35. As used in line 5, "fix" most nearly means

(A) repair.
(B) rut.
(C) battle.
(D) predicament.

36. The author of Passage 2 predicts that women
will ultimately achieve equal rights because

(A) the truth cannot be held back.
(B) the Church supports it.
(C) they are American citizens.
(D) people adapt to revolutionary ideas.

37. Which choice provides the best evidence for
the answer to the previous question?

(A) Lines 55–57 ("The universality . . .
movement")
(B) Lines 62–64 ("Though the . . . influence")
(C) Lines 70–75 ("One or two . . . citizenship")
(D) Lines 79–81 ("When a great . . . suppress
it")

38. As used in line 51, "sanctioned" most nearly
means

(A) authorized.
(B) penalized.
(C) prohibited.
(D) praised.

39. The reference to "the unveiling of the statue
of Galileo" in Rome (lines 69–70) serves
mainly to

(A) introduce the scientific basis for the
equality of women.
(B) demonstrate that truth always triumphs
despite powerful opposition.
(C) argue that women's rights are an
important issue around the world.
(D) prove that the teachings of the Church
are not always correct.

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40. Which choice best states the relationship between the two passages?

    (A) Passage 2 attacks the political position that Passage 1 strongly advocates.

    (B) Passage 2 argues that the political position advocated in Passage 1 will inevitably succeed.

    (C) Passage 2 supports the political position that Passage 1 strongly advocates but cautions against moving too quickly.

    (D) Passage 2 demonstrates that the political position advocated in Passage 1 has gained increased support.

41. How would the author of Passage 2 most likely react to the arguments of "that man over there," referred to in line 8, Passage 1?

    (A) He would agree with the man's arguments about women's need for support and protection.

    (B) He would disagree with the man, but also not fully agree with the author of Passage 1.

    (C) He would disagree with and be angered by the man's arguments.

    (D) He would liken the man's arguments to those of the Church when it rejected Galileo's observation that the Earth revolves around the sun.

42. Where does Passage 2 answer what happened as a result of "the negroes of the South . . . talking about rights" (lines 3–5)?

    (A) Lines 50–52 ("Two hundred . . . property")

    (B) Lines 52–55 ("But neither . . . barbarism")

    (C) Lines 62–64 ("Though the . . . influence")

    (D) Lines 76–78 ("[W]hatever . . . backward")

Questions 43–52 are based on the following passage.

The following passage is taken from "Dinosaur metabolism neither hot nor cold, but just right," an article by Michael Balter that appeared in the 13 June 2014 issue of Science.

Call it the Goldilocks solution. Paleontologists have struggled for 50 years to determine whether dinosaurs were cold-
Line blooded ectotherms like today's reptiles,
(5) making little effort to control their body temperatures, or warm-blooded endotherms, like most modern mammals and birds, which keep their body temperatures at a constant, relatively high set point. The answer
(10) greatly influences our view of dinosaurs, as endotherms tend to be more active and faster growing.
    A recent study concludes that dinosaur blood ran neither cold nor hot but something
(15) in between. Examining growth and metabolic rates of nearly 400 living and extinct animals, the researchers conclude that dinosaurs, like a handful of modern creatures including tuna and the echidna, belonged to an
(20) intermediate group that can raise their body temperature but don't keep it at a specific level. The researchers christen these creatures mesotherms.
    Establishing a new metabolic category is
(25) "audacious," admits lead author John Grady, an evolutionary biologist at the University of New Mexico, Albuquerque. And some still think dinosaurs were "just fast-growing ectotherms," as vertebrate physiologist
(30) Frank Paladino of Indiana University–Purdue University Fort Wayne insists. But paleobiologist Gregory Erickson of Florida State University in Tallahassee calls the paper
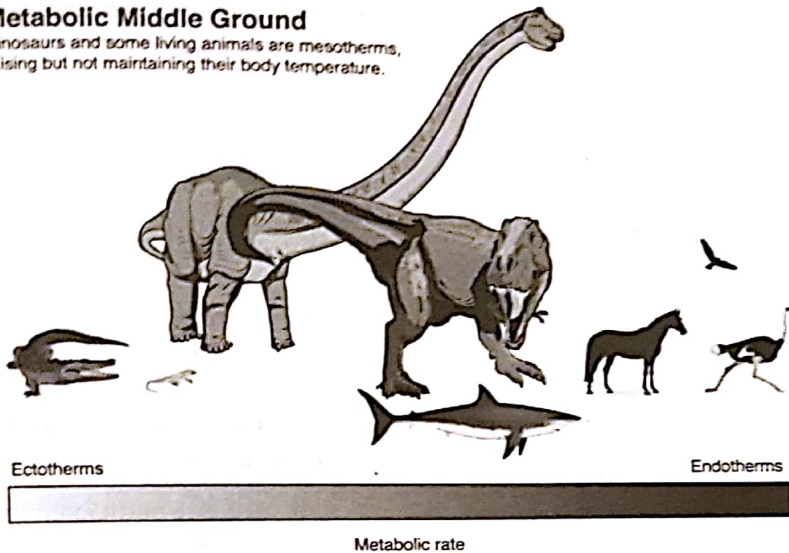
Metabolic Middle Ground
Dinosaurs and some living animals are mesotherms,
raising but not maintaining their body temperature.

Ectotherms   Endotherms

Metabolic rate

"a remarkably integrative, landmark study"
(35) that transforms our view of the great beasts.

For the first 150 years after their discovery,
dinosaurs were considered ectotherms like
today's reptiles. Ectothermy makes some
sense: "It requires much less energy from
(40) the environment," explains Roger Seymour,
a zoologist at the University of Adelaide in
Australia. But it has drawbacks, too: "The
animal cannot feed in cold conditions
and has a much more limited capacity for
(45) sustained, powerful activity, even if warmed
by the sun," he says.

Beginning in the late 1960s, researchers
put forward the then-heretical idea of
dinosaurs as endotherms, and evidence for
(50) this has accumulated. Annual growth rings in
dinosaur bones suggest fast, energy-hungry
developmental rates. Birdlike air sacs may
have boosted their respiratory efficiency,
suggesting rapid movements. And isotopic
(55) data from fossils suggest higher body
temperatures (*Science*, 22 July 2011, p. 443).

Giant endotherms pose their own puzzles,
however, such as the huge quantities of food
needed to sustain them. An endothermic

(60) Tyrannosaurus rex "would probably have
starved to death," Grady says.

He and his colleagues tackled the problem
by examining the relationship between an
animal's growth rate—how fast it becomes
(65) a full-sized adult—and its resting metabolic
rate (RMR), a measure of energy expenditure.
Earlier studies, based on limited data, had
suggested that growth rates scale with
metabolic rates. That is, the more energy an
(70) animal can expend, the faster it can grow
and the bigger it can get. The team pulled
together updated data on 381 living and
extinct vertebrates, including 21 species of
dinosaurs, and developed mathematical
(75) equations that predict the relationship
between metabolic rate, growth rate, and
body size in living animals.

These equations show that ectotherms
and endotherms fall into distinct clusters
(80) when growth rate is plotted against metabolic
rate. High-energy endotherms grow fast
and have high metabolic rates, whereas
ectotherms have low values of both. Those
two categories include most living species,
(85) but the team found that a handful, such as

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fast-swimming sharks, tuna, reptiles such as large sea turtles, and a few odd mammals like the echidna, fall into an in-between state: mesothermy. These animals use their (90) metabolism to raise their body temperatures, but do not "defend" a set temperature.

Using their equations, the team calculated dinosaur RMRs, plugging in reliable published data on these extinct animals. (95) Dino growth rates can be estimated because rings of bone, which give a measure of age, were laid down annually, and body size can be estimated from bone size. The results placed dinosaurs squarely among (100) the mesotherms. The earliest birds—direct descendants of dinosaurs— plotted as mesotherms, too.

Grady and colleagues think mesothermy may have allowed dinosaurs to grow (105) large and active with lower energy costs. Geochemist Robert Eagle of the California Institute of Technology in Pasadena agrees: "In a world that was generally hotter than today, it wasn't really necessary to be a full (110) endotherm." Previous studies have suggested that during the Mesozoic, even mammalian endotherms kept their bodies at a lower set point than they do today, he says.

· Grady suggests that mesothermy might (115) even help explain why dinosaurs ruled the Earth: They could easily outcompete other reptiles, which were lethargic ectotherms. And by getting big quickly, they occupied the large-animal niches, and prevented the (120) small, energy-hungry endothermic mammals from getting bigger themselves. Until, of course, the fateful asteroid struck, and dinosaurs vanished.

43. The primary purpose of the chart accompanying the passage is to illustrate that

(A) tyrannosaurs were carnivores that preyed on mammals and birds.
(B) ostriches are birds that have lost the ability to fly.
(C) alligators have a lower metabolic rate than sharks.
(D) in metabolic rate dinosaurs are most akin to sharks.

44. The passage is written from the perspective of someone who is

(A) an active participant in evolutionary biology research.
(B) a supporter of the long-held theory that dinosaurs were ectotherms.
(C) well-informed about competing theories regarding dinosaur metabolism.
(D) skilled at developing mathematical equations.

45. In the opening sentence, the author makes

(A) an allusion to a familiar tale.
(B) a contrast with a literary archetype.
(C) an exaggeration about a theory's significance.
(D) an exception to a rule.

46. By admitting that the action of establishing a new metabolic category is "audacious," study author Grady is

(A) denying the action's validity.
(B) acknowledging its radical nature.
(C) confessing an error in methodology.
(D) refuting a hypothesis.

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47. What function do the fourth and fifth paragraphs (lines 36–56) serve in the passage as a whole?

   (A) They acknowledge that a theory described by the author of the passage has some limitations.
   (B) They give an overview of previous theories about the body temperature and activity level of dinosaurs.
   (C) They advocate the abandonment of a long-established assumption about the nature of dinosaur metabolism.
   (D) They illustrate the difficulty of reaching any conclusions about the physiology of prehistoric reptiles.

48. It is reasonable to conclude that the main goal of the scientists conducting the research described in the passage is to

   (A) learn the history of classifying dinosaurs as cold-blooded or warm-blooded.
   (B) explore possible ways to predict the body temperatures of mammals and birds.
   (C) characterize dinosaurs according to their metabolic and growth rates.
   (D) determine the role that dinosaur metabolism played in their extinction.

49. Which choice provides the best evidence for the answer to the previous question?

   (A) Lines 13–22 ("A recent . . . level")
   (B) Lines 24–27 ("Establishing . . . Albuquerque")
   (C) Lines 36–38 ("For the first . . . reptiles")
   (D) Lines 106–110 ("Geochemist . . . endotherm'")

50. As used in line 68, "scale" most nearly means

   (A) flake.
   (B) reduce.
   (C) ascend.
   (D) correlate.

51. As used in line 97, "laid down" most nearly means

   (A) rested.
   (B) deposited.
   (C) sacrificed.
   (D) formulated.

52. In line 91, the quotes around the word "defend" indicate that

   (A) the word is being used for ironic effect.
   (B) it has been quoted from an authoritative source.
   (C) the author would prefer a different word in its place.
   (D) the word is being used in an unusual sense.

STOP

If there is still time remaining, you may review your answers.

WRITING AND LANGUAGE TEST

35 MINUTES, 44 QUESTIONS

Turn to Section 2 of your answer sheet to answer the questions in this section.

> **Directions:** Questions follow each of the passages below. Some questions ask you how the passage might be changed to improve the expression of ideas. Other questions ask you how the passage might be altered to correct errors in grammar, usage, and punctuation. One or more graphics accompany some passages. You will be required to consider these graphics as you answer questions about editing the passage.
>
> There are three types of questions. In the first type, a part of the passage is underlined. The second type is based on a certain part of the passage. The third type is based on the entire passage.
>
> Read each passage. Then, choose the answer to each question that changes the passage so that it is consistent with the conventions of standard written English. One of the answer choices for many questions is "NO CHANGE." Choosing this answer means that you believe the best answer is to make no change in the passage.

Questions 1–11 are based on the following passage and supplementary material.

Chiroptera

❶ As insignificant animals, bats make up a quarter of mammal species worldwide. They are the only mammals capable of true flight; their webbed forelimbs—which anatomically resemble the human hand—can sustain flight unlike the "gliding" of squirrels and opossums. ❷ Although often considered pests themselves, most bats feed on insects and share a large part of natural pest control. The remaining percentage of bat species, whose diet doesn't consist of insects, are frugivores, carnivores, or hematophagous. It is the latter bloodsuckers who attract the most attention. The ecological roles of bats ❸ do not end with pest control. They are also responsible for pollinating and

1. Which choice best expresses that bats are not quite the most widespread mammalian species?
   - (A) NO CHANGE
   - (B) Representing 12 percent of mammals,
   - (C) Second only to rodents,
   - (D) Far more populous than humans,

2. (A) NO CHANGE
   - (B) Because they are
   - (C) However
   - (D) For this very reason, they are

3. (A) NO CHANGE
   - (B) does
   - (C) don't
   - (D) do's

dispersing fruit seeds. In fact, some tropical plants rely solely on bats for reproduction.

Bats are of the order Chiroptera and divided into two suborders: Microchiroptera and Megachiroptera. **❹ The smallest bats are known to have bodies approximately one inch long.** And some are known to live up to 30 years. Echolocation is the highly sophisticated sense of hearing in which sound waves bounce off objects and emit echoes that microbats use to detect obstacles. It is this **❺ object** that allows the nocturnal microbat to sense where an object is, how big or small that object may be, and even how fast that object is moving. In contrast, megabats have well-developed eyesight and more advanced characteristics in their brains. They often inhabit warm climates and live socially in colonies.

Recently, bat populations have been threatened by the deadly white-nose syndrome. Since the winter of 2007–2008, millions of bats have died as a result of this white fungus that spreads into the ears, muzzle, and wings of hibernating bats. Some estimates show a **❻ 10 percent increase** in the brown bat population in United States since the initial spread of the disease through the end of 2010. While the full consequences of such a large population reduction are yet unknown, **❼ and** it is clear that farmers will feel the **❽ affect** with their best pest controllers now all but absent. Scientists at Michigan Technological University are working hard to prevent further spread of the disease. Using chemical fingerprinting, these scientists are tracing the **❾ bats** hibernation sites and movements to detect what areas

4. (A) NO CHANGE
   (B) The smallest bats are known, to have bodies approximately one inch long.
   (C) The smallest bats are known, to have bodies, approximately one inch long.
   (D) The smallest, bats are known to have bodies approximately one inch long.

5. (A) NO CHANGE
   (B) material
   (C) phenomenon
   (D) thing

6. Which choice is best supported by the information in the accompanying graph?

   (A) NO CHANGE
   (B) 15 percent decline
   (C) 40 percent decline
   (D) 65 percent decline

7. (A) NO CHANGE
   (B) but
   (C) or
   (D) OMIT the underlined portion.

8. (A) NO CHANGE
   (B) effect
   (C) affectedness
   (D) effectively

9. (A) NO CHANGE
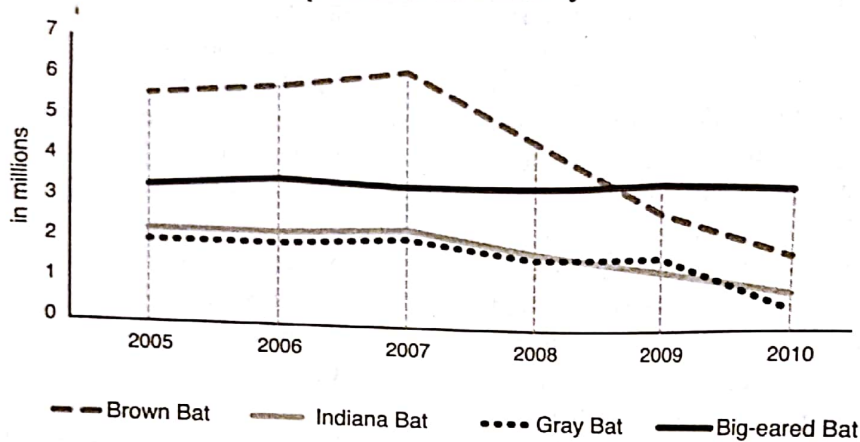   (B) bat's
   (C) bat is
   (D) bats'

GO ON TO THE NEXT PAGE

Bat Population in Pennsylvania

Note: The population numbers are tallied at the *end* of each year.

are infected and how the syndrome is being transmitted. Their research is particularly significant with the disease spreading to the ⑩ brown bats of Tennessee—a species that is already on the endangered list. Interestingly, some species have altered their mating and living habits to help protect themselves, and it is through observation of these adaptations that researchers ⑪ so preservationists can make the necessary interventions.

10. Based on the latter part of the sentence and the information in the graph, which bats most likely fit this description?

(A) NO CHANGE
(B) Indiana
(C) gray
(D) big-eared

11. Which choice is most logically inserted at this point in the sentence?

(A) have decided how the species are thriving
(B) are learning which species are in the most danger
(C) are finding the preferred cultural associations of bats
(D) may locate major bat predators

MODEL TEST 2

Questions 12–22 are based on the following passage.

The Tyrannical and the Taciturn

The so-called "marriage group" from Geoffrey Chaucer's *The Canterbury Tales* consists of five stories, in each of which marriage is ❶ not— as tradition would dictate, the resolution, but instead functions as a central narrative conflict. Generally, the dysfunctional aspects of each married pair ❸ are supported by specific textual quotations: an unbalanced distribution of power and ineffective communication between the espoused.

Perhaps nowhere ❹ is this timeless marital troubles better illustrated than in the second narrative of the suite, "The Clerk's Tale." ❺ In the story of "The Clerk's Tale," we find the greatest power imbalance of any of Chaucer's unhappy couples. A Marquis of Lombardy, Lord Walter, fears that marriage will mean the surrender of his personal freedom, stating ❻ "I me rejoysed of my liberte / That seelde tyme is founde in marriage." To ensure that his "liberte" is uncompromised by wedlock, he does not choose for his bride a noblewoman of equal birth but, instead, the daughter of his poorest subject, Griselda.

12. (A) NO CHANGE
   (B) not—as tradition would dictate—the resolution, but
   (C) not as tradition would dictate, the resolution, but
   (D) not, as tradition would dictate—the resolution, but

13. Which of the following would most logically connect to what comes next in the sentence?

   (A) NO CHANGE
   (B) could be said to derive from two critical failings:
   (C) are ironic given the dominant themes in the work:
   (D) contribute to a resolution between the protagonist and antagonist:

14. (A) NO CHANGE
   (B) is these
   (C) are those
   (D) are them

15. (A) NO CHANGE
   (B) In this medieval narrative found in *The Canterbury Tales*,
   (C) Here
   (D) Therefore

16. The author is considering removing the quotation marks in the underlined portion. Should she do so?

   (A) Yes. The underlined portion represents the internal monologue of the narrator.
   (B) Yes. The underlined portion is written in the medieval style, which is consistent with the style of the rest of the essay.
   (C) No. The quotation marks serve to demonstrate the narrator's possession of specific thoughts.
   (D) No. The quotation marks serve to set aside a statement by a character.

GO ON TO THE NEXT PAGE

The disparity of partnership in the marriage inevitably leads Walter to abuse his power. Soon after the couple's first child is born, Walter begins "testing" his wife's devotion through a series of truly mean-spirited pranks, including a false order for the execution of their two children and **⑰** a renouncement of their marriage. Griselda consents to each demand precisely as she promised on their wedding day, and one begins to imagine that the Marquis is not so much testing his wife's devotion **⑱** so they are exploring the extent to which his power reaches.

Conversely, Griselda contributes to the complications **⑲** through her unwillingness to communicate openly with Walter. In Griselda's final test, wherein she is cast out of the castle and replaced by a younger woman of higher birthright, Griselda asks **⑳** that Walter not send her away naked, once again emphasizing her intent to preserve the dignity of the bodies that fall victim to his wishes. This exchange is notable in that it is the first time Griselda directly asserts her desires to Walter, and although she desists as soon as he raises an objection, she allows herself, finally, at **㉑** what she believes, to be the end of their marriage, to communicate to him what she feels to be right and honorable.

In any case, Griselda's concern for the physical body **㉒** becomes somewhat ironic given the tale's conclusion, particularly its invocation of the myth of Echo and Narcissus. Just as Echo could not speak of her own accord but only reflect the words of others, Griselda's inability to communicate with Walter beyond reflection of his immediate will causes her, in some sense, to lose even her physical body as a character, reduced to merely the echo of his desires.

17. (A) NO CHANGE
    (B) a marriage of their renouncing.
    (C) of their marriage, a renouncing.
    (D) with the renouncement of their marital vows.

18. (A) NO CHANGE
    (B) when they were
    (C) so he was
    (D) as he is

19. (A) NO CHANGE
    (B) as
    (C) since
    (D) to

20. Which choice best communicates Griselda's limited request?

    (A) NO CHANGE
    (B) so that
    (C) only that
    (D) from that

21. (A) NO CHANGE
    (B) what she believes to be the end of their marriage to communicate to him what
    (C) what she believes—to be the end of their marriage, to communicate to him what
    (D) what she believes to be the end of their marriage, to communicate to him what

22. (A) NO CHANGE
    (B) became
    (C) had become
    (D) have become

Questions 23–33 are based on the following passage and supplementary material.

A, B, C—1, 2, 3

Few jobs are as important as that of teachers. A society's quality of life often depends on its economic growth, which is directly affected by its **㉓** <u>workforce, which, of course, is educated by its</u> school teachers. Take a moment to imagine the ten most influential people in your life— chances are, at least one of them is a teacher or an instructor you have presently or have had in the past. **㉔** <u>From English class during first period to mathematics as the final period,</u> teachers are those constant guardians molding you into the person you will become, pushing you to do **㉕** <u>your best and critiquing you when you're</u> falling short of your potential. Many students realize too late that relationships with their teachers, and later with their professors, should be fostered into life-long connections.

㉖ <u>However,</u> what is it that's so special about being a teacher? It begins with the decision to devote your life to the education of others. Most teachers have, at some point, entertained the idea of a career that requires less personal investment and pays better than **㉗** <u>an average of approximately $45,000 per year</u> in many cities; yet, when asked, few would take back their decision. The most probable explanation is that

23. (A) NO CHANGE
    (B) workforce which, of course, are educated by its
    (C) workforce, which, of course is educated by its'
    (D) workforce, which of course is educated by it's

24. Which choice would most logically emphasize the wide span of time during which teachers have a direct influence over students?

    (A) NO CHANGE
    (B) From the opening of the school doors to their closing at day's end,
    (C) From schools in the United States to schools located in faraway countries,
    (D) From elementary to middle to high school and beyond,

25. (A) NO CHANGE
    (B) you're best and criticizing you when your
    (C) your best and criticizing one when one's
    (D) you're best and critiquing you when you're

26. (A) NO CHANGE
    (B) So,
    (C) But,
    (D) Further,

27. Which choice offers the most accurate interpretation of the data in the chart that accompanies this passage?

    (A) NO CHANGE
    (B) an average of approximately $50,000 per year
    (C) an average of approximately $55,000 per year
    (D) an average of approximately $60,000 per year

GO ON TO THE NEXT PAGE

despite the negatives, the field of teaching is uniquely rewarding and exceptionally worthwhile. A ㉘ <u>teachers'</u> workday starts and ends with the training and shaping of the next generation; and for many, there's no better way to invest their own training ㉙ <u>compared</u> in the opening of young minds.

Nonetheless, becoming a teacher takes much more than a kind heart and a good dose of patience. All school teachers need to have a bachelor's degree—most commonly in education, but sometimes in the subject that the teacher wishes to teach—and it is increasingly common for teachers to obtain a master's degree. ㉚ <u>Obscuringly,</u> after degree completion, teachers need to acquire a teaching certificate, or a license to teach—most often, this licensing is achieved via teacher-education programs where ㉛ <u>perspective</u> teachers student-teach under more experienced instructors. Many schools prefer that their teachers continue to learn, train, and attend field-related events throughout their employment.

28. (A) NO CHANGE
    (B) teacher's
    (C) teachers
    (D) teacher has a

29. (A) NO CHANGE
    (B) than
    (C) then
    (D) related

30. (A) NO CHANGE
    (B) Given,
    (C) Furthermore,
    (D) Professionally,

31. (A) NO CHANGE
    (B) prospective
    (C) prospecting
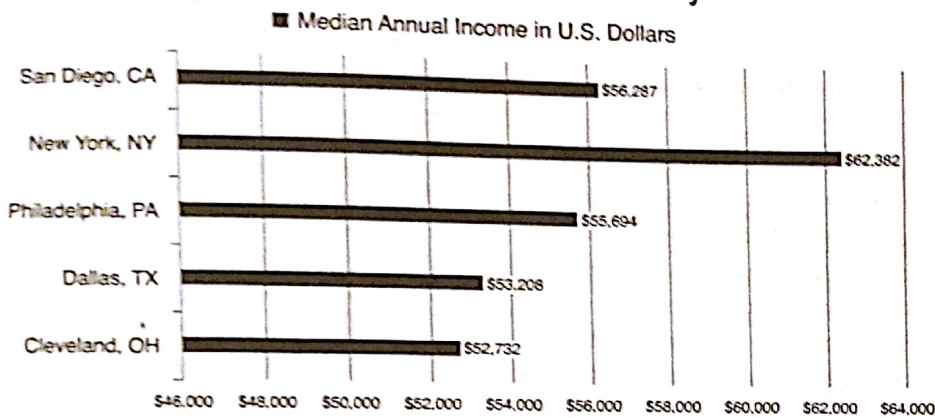   (D) previewing

Public School Teacher Salary

■ Median Annual Income in U.S. Dollars

City	Salary
San Diego, CA	$56,287
New York, NY	$62,382
Philadelphia, PA	$55,694
Dallas, TX	$53,208
Cleveland, OH	$52,732

$46,000 $48,000 $50,000 $52,000 $54,000 $56,000 $58,000 $60,000 $62,000 $64,000

Even then, the job is far from cookie-cutter. Most teachers are expected to be knowledgeable in psychology and counseling in order to provide other support for students. Licensure requirements and salaries can vary based on geography; **32** salaries in many urban school districts can vary by as much as approximately $4,000 based on the city's location. Additionally, if you choose to teach at the secondary level, it is best to be ready to answer questions about college, career planning, and young adult issues. One thing is **33** for sure, a good teacher is there because he or she wants to be.

32. Which choice offers the most accurate interpretation of the data in the chart?

(A) NO CHANGE
(B) salaries in many urban school districts can vary by as much as approximately $7,000 based on the city's location.
(C) salaries in many urban school districts can vary by as much as approximately $10,000 based on the city's location.
(D) salaries in many urban school districts can vary by as much as approximately $13,000 based on the city's location.

33. (A) NO CHANGE
(B) for sure: a good
(C) for sure a good
(D) for a

GO ON TO THE NEXT PAGE

Questions 34–44 are based on the following passage.

Murder Most Fowl

Al Capone, speakeasies, the Saint Valentine's Day Massacre—most of us have at least heard of Chicago's ❸❹ transparent affairs throughout the United States' thirteen-year "noble experiment" with prohibition. But while prohibition was repealed in 1933, another, less renowned noble experiment was inaugurated in Chicago in 2006—a citywide ban on the sale of foie gras, or fatty duck liver. Like veal, foie gras has often been a target of animal rights groups such as PETA ❸❺ because ducks traditionally undergo a technique called "gavage" in order to fatten the liver artificially. ❸❻ Gavage involves, the force-feeding of corn, to ducks through a funnel. Sponsors of the ban cited the raising of foie gras as a particularly heinous act of commercialized animal cruelty— one that overshadows the treatment of chickens, pigs, cows, and other animals raised for slaughter. The ban was passed by ❸❼ Chicago's City Council in an omnibus bill despite the opposition of the city's mayor.

Foie gras is considered a very traditional and desirable ingredient in ❸❽ French cooking, not surprisingly. Chicago's many respected French-style chefs were outraged by the council's decision. Other chefs throughout the city expressed similar

34. Which word is most applicable to the types of "affairs" listed at the beginning of the sentence?

    (A) NO CHANGE
    (B) ancient
    (C) alcoholic
    (D) dubious

35. (A) NO CHANGE
    (B) while
    (C) although
    (D) and

36. (A) NO CHANGE
    (B) Gavage involves the, force-feeding of corn to ducks through a funnel.
    (C) Gavage involves the force-feeding of corn to ducks through a funnel.
    (D) Gavage involves the force-feeding, of corn to ducks through a funnel.

37. (A) NO CHANGE
    (B) Chicagos City Council
    (C) Chicagos' Cities Council
    (D) Chicagos Cities Council

38. (A) NO CHANGE
    (B) French cooking; not surprisingly, Chicago's many
    (C) French cooking: not surprisingly Chicagos many
    (D) French cooking not surprisingly, Chicago's many

dismay at what they perceived as everything from artistic censorship to the Orwellian tyranny of an authoritarian state. Restaurant patrons, for the most part, **㊴** <u>were appalled at the City Council's encroachment on personal dietary choices.</u> In fact, many restaurants reported a tremendous spike in foie gras sales in the months between when the bill was passed and the date on which it took effect.

㊵ <u>What's more,</u> after the ban became active—much like in the old days of prohibition—enterprising Chicagoan restaurateurs, diners, and chefs found ways around the legislation. Some restaurants, such as Har-De-Har-Har and Copperblue, simply continued to sell foie gras, claiming the **㊶** <u>enormous</u> livers were sourced either from chickens or from naturally fed ducks. Bin 36 offered a salad of figs, honey, and apricots at what appeared to be the exorbitant price of thirty **㊷** <u>dollars—until one realized the salad</u> included a "complimentary" serving of foie gras. Bin 36, being the most cavalier of the culinary rebels, was investigated by the Health Department, who nonetheless declined to issue a citation. Following that decision, attempts to enforce the ban essentially **㊸** <u>vivified,</u> and any restaurant in Chicago wishing to serve foie gras could do so without a serious fear of reprisal.

Two years after the ban was passed, it was repealed. Chefs hailed the action as a victory **㊹** <u>to</u> personal freedom. Many animal rights advocates decried it as surrender to wealthy special interest groups. Mayor Richard Daley reflected on the council's decision to ban foie gras in the first place as "the silliest thing they've ever done."

39. Which choice best expresses that restaurant patrons had the opposite attitude about the foie gras ban than the chefs described in the previous sentence?

(A) NO CHANGE
(B) considered moving away from this oppressive society.
(C) just wondered what all the fuss was about.
(D) felt that artists should be able to paint whatever they would like.

40. (A) NO CHANGE
(B) Conversely,
(C) However,
(D) In contrast,

41. Which wording gives the most logical and vivid description based on the context of the sentence?

(A) NO CHANGE
(B) suspiciously large and luscious
(C) grotesquely unappetizing
(D) poultry

42. (A) NO CHANGE
(B) dollars, until one, realized the salad
(C) dollars: until one realized, the salad
(D) dollars; until one realized the salad

43. (A) NO CHANGE
(B) congealed,
(C) checked,
(D) froze,

44. (A) NO CHANGE
(B) since
(C) for
(D) on

STOP

If there is still time remaining, you may review your answers.

MATH TEST (NO CALCULATOR)

25 MINUTES, 20 QUESTIONS

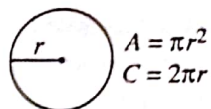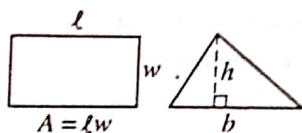Turn to Section 3 of your answer sheet to answer the questions in this section.

Directions: For questions 1–15, solve each problem and choose the best answer from the given choices. Fill in the corresponding circle on your answer sheet. For questions 16–20, solve each problem and enter your answer in the grid on your answer sheet.
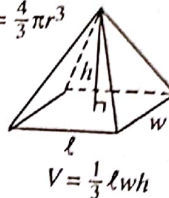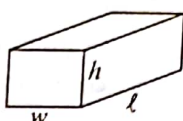
Notes:

- Calculators are **NOT PERMITTED** in this section.
- All variables and expressions represent real numbers unless indicated otherwise.
- All figures are drawn to scale unless indicated otherwise.
- All figures are in a plane unless indicated otherwise.
- Unless indicated otherwise, the domain of a given function is the set of all real numbers x for which the function has real values.

REFERENCE INFORMATION

Area Facts

$A = \ell w$

$A = \frac{1}{2} bh$

$A = \pi r^2$
$C = 2\pi r$

Volume Facts

$V = \ell w h$

$V = \pi r^2 h$

$V = \frac{4}{3} \pi r^3$

$V = \frac{1}{3} \pi r^2 h$

$V = \frac{1}{3} \ell w h$

Triangle Facts

$a^2 + b^2 = c^2$

The arc of a circle contains 360°.
The arc of a circle contains 2π radians.
The sum of the measures of the angles in a triangle is 180°.

Year	1990	1991	1992	1993	1994	1995
Number of tournaments	4	5	10	6	9	12

1. The chart above shows the number of tennis tournaments that Adam entered each year from 1990 through 1995. In what year did he enter 50% more tournaments than the year before.

   (A) 1991
   (B) 1992
   (C) 1994
   (D) 1995

2. Which of the following statements is true concerning the equation below?

   $5(x+1) + 3 = 3(x+3)$

   (A) The equation has no solutions.
   (B) The equation has one positive solution.
   (C) The equation has one negative solution.
   (D) The equation has infinitely many solutions.

3. What is the slope of the line whose equation is $3x + 4y = 24$?

   (A) $-\frac{4}{3}$
   (B) $-\frac{3}{4}$
   (C) $\frac{3}{4}$
   (D) $\frac{4}{3}$

4. A, B, and C are three cities in New York State. The distance between A and B is m miles, and the distance between B and C is n miles. If on a map of New York, A and B are c centimeters apart, on that map how many centimeters apart are B and C?

   (A) $\frac{cn}{m}$
   (B) $\frac{cm}{n}$
   (C) $\frac{mn}{c}$
   (D) $\frac{c}{mn}$

5. At North Central University, students need at least 120 credits to graduate. Most courses are three credits, but all lab sciences courses, as well as some advanced courses that require more work, are four credits. Which of the following inequalities represents a possible number of three-credit courses, x, and four-credit courses, y, that a student could take to have enough credits to graduate?

   (A) $\frac{3}{x} + \frac{4}{y} > 120$
   (B) $\frac{3}{x} + \frac{4}{y} \geq 120$
   (C) $3x + 4y > 120$
   (D) $3x + 4y \geq 120$

6. If at Lake Hollow High School the ratio of boys to girls in the French club is 2:3 and the ratio of boys to girls in the Spanish club is 3:5, which of the following statements must be true?

(A) The number of girls in the French club is equal to the number of boys in the Spanish club.

(B) The number of boys in the Spanish club is greater than the number of boys in the French club.

(C) The percent of Spanish club members who are girls is greater than the percent of French club members who are girls.

(D) If new members join the French club (and no old members leave) and if the ratio of boys to girls among those new members is 3:2, then the club will have an equal number of boys and girls.

7. John and his sister Mary each drove the same route from their uncle's house in Boston to their home in New York, a distance of 200 miles. For the entire trip, John averaged 25 miles per gallon of gasoline and Mary averaged 20 miles per gallon. How far, in miles, was Mary from their home when she had used exactly as much gasoline as John had for his entire trip?

(A) 20
(B) 40
(C) 80
(D) 160

8. If the lines whose equations are $2x + 3y = 4$ and $y = 2x$ intersect at the point (a, b), what is the value of $a + b$?

(A) 1
(B) 1.5
(C) 2
(D) 2.5

9. Container I is a rectangular solid whose base is a square 4 inches on a side, and container II is a cylinder whose base is a circle with a diameter of 4 inches. The height of each container is 5 inches. How much more water, in cubic inches, will container I hold than container II?

(A) $4(4 - \pi)$
(B) $20(4 - \pi)$
(C) $80(\pi - 1)$
(D) $80(1 - \pi)$

MODEL TEST 2

10. Pam is a potter who sells the vases she creates to Carl, who then sells them in his crafts boutique for 60% more than he pays Pam for them. To attract customers into his store over the July 4th weekend, Carl runs a special sale on Pam's vases, selling them for 20% less than he pays her for them. A customer who buys one of these vases during the sale is receiving a discount of what percent off Carl's normal selling price?
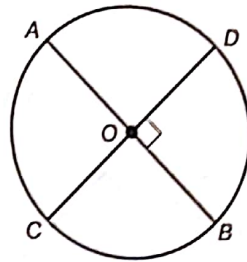
(A) 25%
(B) 48%
(C) 50%
(D) 80%

$$y = x^2 + 1$$
$$y = -x^2 + 3$$

11. If (a, b) and (c, d) are solutions of the system of equations above, what is the value of $a + b + c + d$?

(A) 1
(B) 2
(C) 3
(D) 4

12. In Circle O above with radius r, $\overline{AB}$ and $\overline{CD}$ are a pair of perpendicular diameters. If the area and perimeter of square $ADBC$ (not shown) are a square inches and b inches, respectively, and if $a = b$, what is the length, in inches, of r?

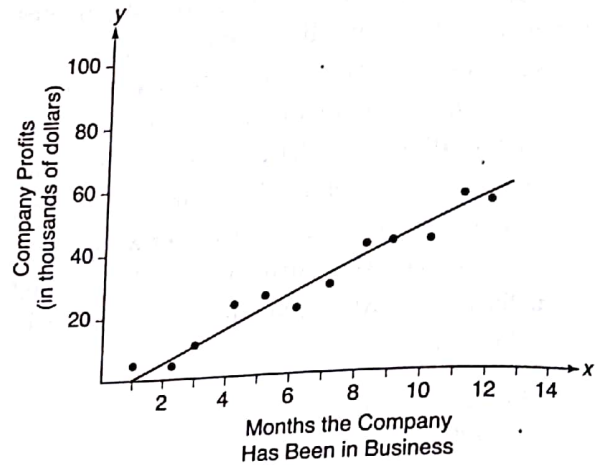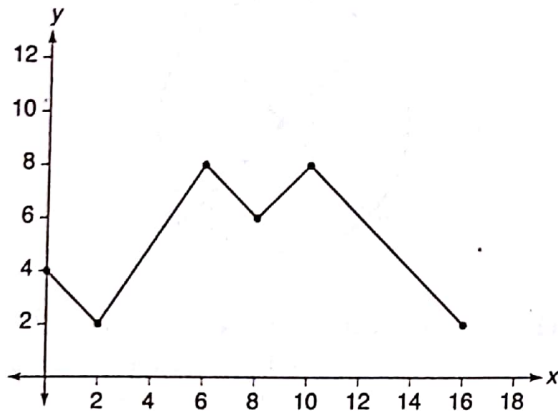(A) $\sqrt{2}$
(B) 2
(C) $2\sqrt{2}$
(D) $4\sqrt{2}$

13. The members of the varsity baseball team at Meadowlawn High School are all juniors and seniors. There are 5 more seniors on the team than juniors. If 40% of the team members are juniors, how many students are on the team?

(A) 18
(B) 24
(C) 25
(D) 30

14. The complete graph of $y = f(x)$ is shown above. If $f(3) = a$, what is the value of $f(3a)$?

   (A) 3.5
   (B) 5.5
   (C) 7.5
   (D) 10.5

15. The scatterplot diagram above shows the profits of a start-up company during its first year of business. If the company's profits continue to grow at the same rate as predicted by the line of best fit, which has been drawn in, which of the following will be closest to the company's monthly profit after it has been in business for a year and a half?

   (A) $40,000
   (B) $60,000
   (C) $80,000
   (D) $85,000

GO ON TO THE NEXT PAGE

16. What is the value of $8^{-\frac{1}{3}}$?

17. If the cosine of the larger acute angle in a right triangle is 0.6, what is the cosine of the smaller acute angle in that triangle?

18. If $i = \sqrt{-1}$, what is the value of

$(7 + i\sqrt{7})(7 - i\sqrt{7})$?

19. Based on the following system of equations, what is the value of xy?

$$3x + 4y = 4x + 3y$$
$$x + y = 5$$

20. Consider the parabola whose equation is $y = x^2 - 8x + 16$. If m represents the number of times the parabola crosses the y-axis and n represents the number of times the parabola intersects the x-axis, what is the value of $m + n$?

STOP

If there is still time remaining, you may review your answers.

MODEL TEST 2

55 MINUTES, 38 QUESTIONS

Turn to Section 4 of your answer sheet to answer the questions in this section.
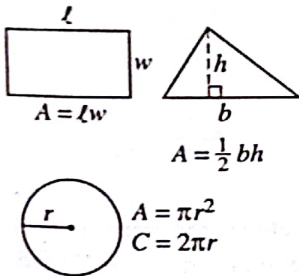
Directions: For questions 1–30, solve each problem and choose the best answer from the given choices. Fill in the corresponding circle on your answer sheet. For questions 31–38, solve each problem and enter your answer in the grid on your answer sheet.
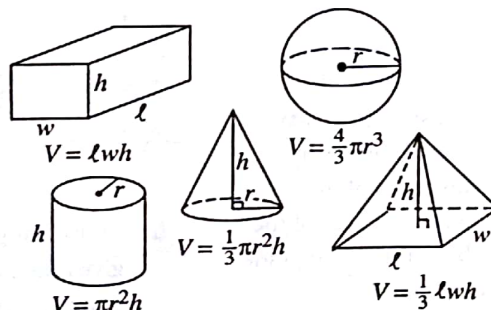
Notes:

- Calculators ARE PERMITTED in this section.
- All variables and expressions represent real numbers unless indicated otherwise.
- All figures are drawn to scale unless indicated otherwise.
- All figures are in a plane unless indicated otherwise.
- Unless indicated otherwise, the domain of a given function is the set of all real numbers x for which the function has real values.

REFERENCE INFORMATION

The arc of a circle contains 360°.

The arc of a circle contains 2π radians.

The sum of the measures of the angles in a triangle is 180°.

1. Water is pouring at a constant rate into a tank that is a 4-foot-high rectangular solid. If the water was turned on at 11:00 and if at 11:25 the depth of the water in the tank was 4 inches, at what time was the pool full?

   (A) 3:35
   (B) 4:00
   (C) 4:25
   (D) 5:00

2. Which of the following statements is true concerning the equation below?

   $$\sqrt{x+7} = -4$$

   (A) The equation has no solutions.
   (B) The equation has one positive solution.
   (C) The equation has one negative solution.
   (D) The equation has more than one solution.

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Hours Studied

3. The scatterplot above shows the relationship between the number of hours that a group of high school students studied for their biology midterm and their grades on their tests. The line of best fit has also been drawn. If the equation of the line of best fit is written in the form $y = mx + b$, what is the value of $m + b$?
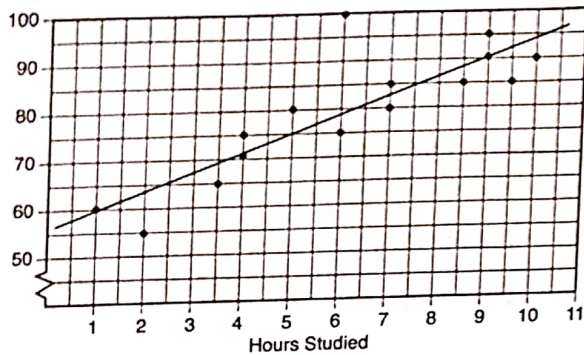
(A) 55.4
(B) 59.0
(C) 62.4
(D) 65.0

4. On a recent exam in Mr. Walsh's chemistry class, the mean grade of the b boys in the class was 82, and the mean grade of the g girls in the class was 88. If $b \neq g$, which of the following must be true about the mean grade, m, of all the students in the class?

(A) $m = 85$
(B) $m \neq 85$
(C) $m < 85$
(D) $m > 85$

5. Brigitte is translating children's books from French into English. On average, it takes her 45 minutes to translate a page. If Brigitte works 8 hours a day for 5 days per week, how many pages can she translate in 6 weeks?

(A) 180
(B) 240
(C) 320
(D) 480

Population Density: 1970 to 2000 (People per square mile of land area)
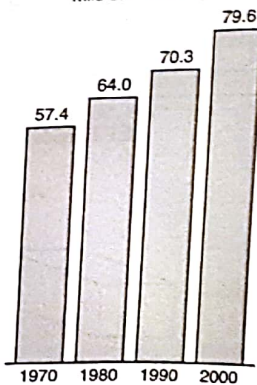
Total Population: 1970 to 2000 (Millions)
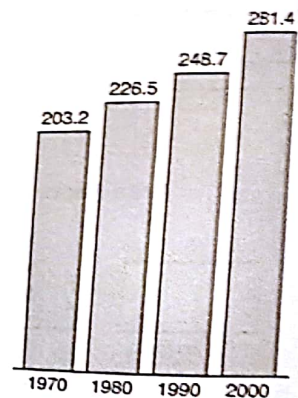
6. In the bar graphs above, the graph on the left gives the population density of the United States (number of people per square mile of land area) from 1970 to 2000. The graph on the right shows the population of the United States in millions for the same period of time. Which of the following is closest to the total land area of the United States, in square miles?

(A) 2,500,000
(B) 3,000,000
(C) 3,500,000
(D) 4,000,000

Questions 7–8 are based on the following information.

On January 1, 2014, Michael put d dollars into an empty safe deposit box. Then on the first day of every month, he put e dollars into the box. No other money was put into the box, and none was taken out. After 3 monthly deposits, the box contained $175. After 8 monthly deposits, it contained $300.

7. Which of the following equations gives the amount, a, of money in the box, in dollars, after m monthly deposits have been made?

   (A) $a = 100 + 25m$
   (B) $a = 100 + 25(m - 1)$
   (C) $a = 25 + 50m$
   (D) $a = 25 + 50(m - 1)$

8. What was the amount of money, in dollars, in the box on December 25, 2015?

   (A) $650
   (B) $675
   (C) $725
   (D) $750

9. If $f(x) = 4x^4 - 4$, for what value of x is $f(x) = 4$?

   (A) 1
   (B) 1.19
   (C) 1.41
   (D) 1.68

10. A car going 40 miles per hour set out on a 8-mile trip at 9:00 A.M. Exactly 10 minutes later, a second car left from the same place and followed the same route. How fast, in miles per hour, was the second car going if it caught up with the first car at 10:30 A.M.?

    (A) 45
    (B) 50
    (C) 55
    (D) 60

11. If the product of the two complex numbers $a + 4i$ and $9 - bi$ is a real number and if $a = 6$, what is the value of b?

    (A) 3
    (B) 4
    (C) 6
    (D) 9

12. If Eli flips five fair coins and if, for each of them, Max guesses whether it landed heads or tails, what is the probability that Max makes at least one correct guess?

    (A) 0.03
    (B) 0.50
    (C) 0.80
    (D) 0.97

Questions 13–15 are based on the information in the following graphs.

College Enrollment, by Age and Gender
1975 and 1995

Male, less than 25 years old 35%
Female, less than 25 years old 32%
Male, 25 years old and over 19%
Female, 25 years old and over 14%
1975

Male, less than 25 years old 28%
Female, less than 25 years old 31%
Male, 25 years old and over 17%
Female, 25 years old and over 24%
1995
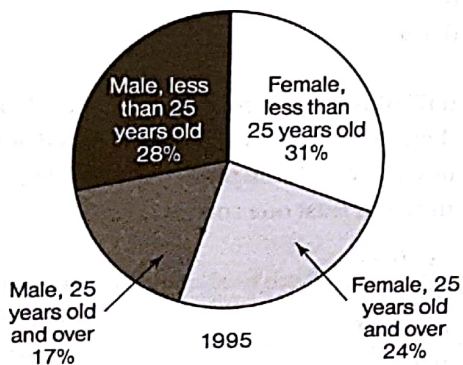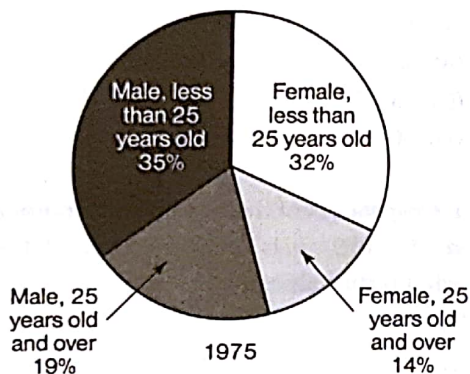
13. If there were 10,000,000 college students in 1975, how many more male students were there than female students?

(A) 400,000
(B) 600,000
(C) 800,000
(D) 1,000,000

14. In 1975, approximately what percent of female college students were at least 25 years old?

(A) 14%
(B) 30%
(C) 45%
(D) 76%

15. If the total number of students enrolled in college was 40% higher in 1995 than in 1975, what is the ratio of the number of male students in 1995 to the number of male students in 1975?

(A) 5:6
(B) 6:7
(C) 7:6
(D) 6:5

16. A and B are two points in the xy–plane. If their coordinates are $A(1, 1)$ and $B(5, 5)$, which of the following is the equation of the circle for which $\overline{AB}$ is a diameter?

(A) $(x-3)^2 + (y-3)^2 = 4$
(B) $(x-3)^2 + (y-3)^2 = 8$
(C) $(x+3)^2 + (y+3)^2 = 4$
(D) $(x+3)^2 + (y+3)^2 = 8$

17. At a national educational conference, all of the participants are teachers or administrators. If there are 584 teachers at the conference and 27% of the participants are administrators, how many administrators are attending the conference?

(A) 158
(B) 216
(C) 312
(D) 800

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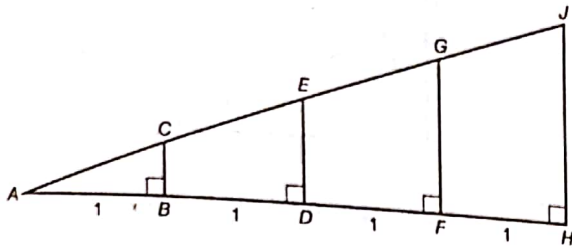
18. In the figure above, what is the ratio of the area of △AHJ to the area of △ABC?

(A) 4:1
(B) 8:1
(C) 12:1
(D) 16:1

The graphs below show the percent of boys and girls in the National Honor Society at Central High School in 2010 and 2015.
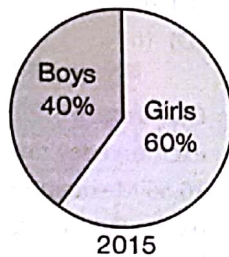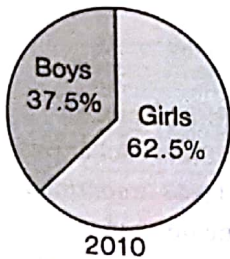
19. If in 2015 there were six more boys and two more girls in the school's National Honor Society than in 2010, how many students in total were in the society in 2015?

(A) 48
(B) 72
(C) 112
(D) 120

20. All general admission tickets for an upcoming concert are the same price and are available only online. The online agency handling ticket sales charges a processing fee for all orders, regardless of how many tickets are purchased. If the charge for four tickets is $107.95 and the charge for seven tickets is $181.45, how much is the processing fee?

(A) $6.95
(B) $7.95
(C) $8.95
(D) $9.95

Use the information below and the data in the following chart in answering Questions 21 and 22.

A survey was conducted of 82,184 citizens of the four Scandinavian countries—Denmark, Sweden, Norway, and Finland—concerning their vacation plans for next summer. The chart below shows where, if anyplace, the people surveyed plan to travel.

Country	Travel within Europe	Travel outside of Europe	Not planning to travel	Total
Denmark	10,321	6,244	5,388	21,953
Sweden	13,644	5,881	4,465	23,990
Norway	11,222	5,369	3,468	20,059
Finland	8,196	2,662	5,324	16,182
Total	43,383	20,156	18,645	82,184

21. According to the survey, in which country did the highest percentage of people say that they would be traveling outside of Europe?

(A) Denmark
(B) Sweden
(C) Norway
(D) Finland

22. When a random sampling of 1,000 of the people who said they planned to travel outside of Europe were asked during a follow-up survey if they planned to visit the United States, 168 said "yes." Based on the data in the chart and the follow-up survey, which of the following statements is most likely to be accurate?

(A) Of the 82,184 people in the original survey, fewer than 3,000 plan to visit the United States this summer.

(B) Of the 82,184 people in the original survey, between 3,000 and 5,000 plan to visit the United States this summer.

(C) Of the 82,184 people in the original survey, between 5,000 and 10,000 plan to visit the United States this summer.

(D) Of the 82,184 people in the original survey, more than 10,000 plan to visit the United States this summer.

23. What is the total surface area of a cube if the length of each main diagonal is 9?

(A) 81
(B) 162
(C) $27\sqrt{3}$
(D) $81\sqrt{3}$
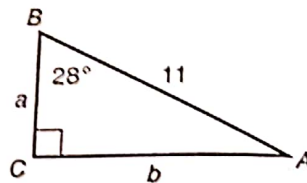
Note: Figure not drawn to scale.

24. In the figure above, what is the value of $\dfrac{b}{a}$?

(A) 0.47
(B) 0.53
(C) 0.67
(D) 0.88

25. If $i^2 = -1$ and if $(1 + 2i) + (3 + 4i) = (a + bi)$, what is the value of $a + b$?

(A) 0.25
(B) 0.52
(C) 6
(D) 10

26. On January 2, 2016, the official rate of exchange for one United States dollar was 16.56 Mexican pesos and 9.47 Argentinian pesos. On that date, to the nearest hundredth, how many Mexican pesos could be exchanged for one Argentinian peso?

(A) 0.57
(B) 0.75
(C) 1.57
(D) 1.75

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4

27. In a large urban high school, all students are assigned to a homeroom. One of those homerooms has 30 students in it, and all the others have 27. In each homeroom with 27 students, three students were chosen at random to participate in a survey. In the one homeroom with 30 students, 4 students were chosen. If the school has exactly 3,000 students, how many of them took part in the survey?

(A) 333
(B) 334
(C) 336
(D) 337 ·

Questions 28–30 are based on the information in the following graph.

Motor Vehicle Theft in the U.S.
Percent Change from 1994 to 1998

Source: U.S. Department of Justice,
Federal Bureau of Investigation.

28. If 1,000,000 vehicles were stolen in 1994, how many were stolen in 1996?

(A) 889,000
(B) 906,000
(C) 940,000
(D) 1,094,000

29. To the nearest tenth of a percent, by what percent did the number of vehicles stolen decrease from 1997 to 1998?

(A) 7.4%
(B) 8.0%
(C) 8.4%
(D) 12.0%

30. To the nearest percent, by what percent did the population of the United States increase from 1994 to 1998?

(A) 1%
(B) 2%
(C) 3%
(D) 4%

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31. If $-\frac{3}{7} < a - b < -\frac{3}{8}$, what is one possible value of $2b - 2a$?

34. If the graph of $y = 10x^2 + bx + c$ has x-intercepts at 1.4 and 1.5, what is the value of $c - b$?

32. At North Central High School, the only foreign languages taught are Spanish, French, and Chinese, and every student is required to take a language course. The table below shows how many sophomores, juniors, and seniors took classes in those languages last year.

	Sophomores	Juniors	Seniors	Total
Spanish	170	200	190	560
French	125	98	106	329
German	35	42	14	91
Totals	330	340	310	980

What fraction of the juniors and seniors did not take a Spanish class last year?

Use the data in the following diagram in answering Questions 35 and 36.
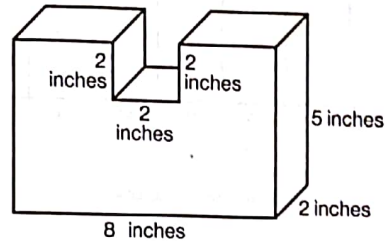
35. The figure above represents a block of wood in the shape of a rectangular solid from which a rectangular groove has been removed. What is the volume, in cubic feet, of the block?

33. To the nearest thousandth, what is the cosine of the angle formed by the line whose equation is $y = 2x$ and the positive x-axis?

36. Given that the density of Honduran mahogany is 41 pounds per cubic foot and the density of Spanish mahogany is 53 pounds per cubic foot, how much more, in pounds, would the block weigh if it were made of Spanish mahogany than if it were made of Honduran mahogany?

Questions 37 and 38 are based on the data in the following graphs that give information about the 500 campers who attended the New England Music Summer Camp for Teens in 2015. The bar graph gives the breakdown by age of the campers, and the circle graph shows the musical specialties of the 15-year-old campers.

Breakdown by Age of 500 Campers in 2015

Specialties of 15-Year Olds
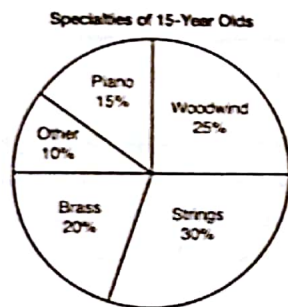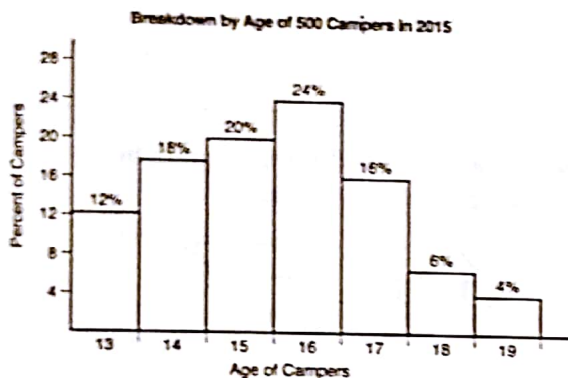
37. How many of the campers were 15-year-old pianists?

38. In 2015, 12 of the 13-year-olds, 18 of the 14-year-olds, and 12% of the campers aged 16 to 19 were pianists. What percent of all the campers were pianists? (Enter your answer without a percent sign. For example, if the answer were 50%, you should grid in 50.)

STOP

If there is still time remaining, you may review your answers.

ANSWERS EXPLAINED

Section 1: Reading Test

1. **(A)** In the course of this passage, you learn that Sir Walter is a conceited fool whose late wife, a sensible woman, had tried to protect him and their daughters from the consequences of his foolishness. You learn that he values his oldest daughter (who in looks and snobbery resembles him), but disregards his youngest daughter Anne (who in character and good sense most resembles his late wife). The author's intent here is to give you background information about this family in order to set the stage for the plot developments to come. Thus, the main purpose of the passage is to *provide an overview of the interrelationships of the members of Sir Walter's family.*

2. **(D)** The first paragraph opens by stating that Sir Walter was vain about two things: he exhibited both "vanity of person and of situation." The paragraph then goes on to explain both terms. Sir Walter, still handsome in his fifties, prides himself on his personal appearance; that is, his vanity of person. In addition, he takes pride in his baronetcy, the place he holds in society; that is, his vanity of situation. Thus, "situation" here most nearly means *social standing.*

3. **(B)** The first paragraph establishes Sir Walter as a vain and foolish character. The second paragraph establishes Lady Elliot as a sensible woman whose death leaves her three young daughters in their foolish father's care. Thus, *A vain and foolish character is left to care for three daughters after the death of his sensible wife* best summarizes the first two paragraphs of the passage. Choice (A) is incorrect. Nothing in the first two paragraphs suggests that Sir Walter was devastated by his wife's death. Choice (C) is incorrect. Lady Elliot abandons her family by dying, not by running away from a husband she can no longer endure. Choice (D) is incorrect. It sums up part of the story, but it fails to include vital information (Sir Walter's vanity, Lady Elliot's death, the relationship of the daughters with their father, etc.). Thus, it does not provide the *best* summary of the first two paragraphs.

4. **(D)** The narrator does not commend Lady Elliot for falling in love with Sir Walter, calling it a "youthful infatuation." Therefore, choice (D) is correct. The narrator speaks well of Lady Elliot for concealing Sir Walter's shortcomings: she has "promoted his real respectability." Choice (A) is supported by the passage. Therefore, it is incorrect. The narrator commends Lady Elliot for her choice of a friend: she has chosen "a sensible, deserving woman," one who even moves into the neighborhood to be near her. Choice (B) is supported by the passage. Therefore, it is incorrect. The narrator speaks well of the way Lady Elliot guides her daughters: she has given them "good principles and instruction." Choice (C) is supported by the passage. Therefore, it is incorrect.

5. **(B)** In the years following Lady Elliot's unwise marriage, her judgment and conduct demonstrated the superiority of her character; no one had to make any allowances for any foolishness or misbehavior on her part. Her infatuation with Sir Walter and subsequent marriage represent the only misjudgment in her otherwise blameless life.

6. **(C)** The narrator's statement that Lady Elliot was "not the very happiest being in the world herself" is preceded by a list of all Lady Elliot had to do to cover up for her "conceited, silly" husband. Thus we can infer that the cause of her unhappiness was

the difference or *disparity* between her character and that of her husband. Choice (A) is incorrect. Nothing in the passage suggests Lady Elliot lacks beauty. Indeed, we suspect that Sir Walter, so conscious of his own beauty, would not have chosen an unattractive wife. Choice (B) is incorrect. Lady Elliot's best friend had moved to be near her; they were not separated. Choice (D) is incorrect. Nothing in the passage suggests that *over the years* Lady Elliot had been unable to teach her daughters good principles. She regrets being unable to continue teaching them good principles in the years to come.

7. **(B)** The "awful charge" that Lady Elliot must entrust to her foolish husband is his *responsibility* for the guidance of their daughters. Choices (A), (C), and (D) are incorrect. Although "charge" can mean *accusation* ("a charge of attempted murder), *official instruction* ("the judge's charge to the jury"), or *headlong rush* ("a cavalry charge"), that is not how it is used here.

8. **(B)** Choice (B) is correct. The narrator tells little directly of Lady Elliot's feelings about dying. However, such phrases as "Three girls.. . . . was an awful legacy to bequeath" and "anxiously giving her daughters [instruction]" show us something of her mind. Her concern centers not on herself but on those she must leave behind: her daughters. Her emotions as she faces death are complicated by *anxieties over her daughters' prospects*. Choice (A) is incorrect. Nothing in the passage suggests resignation or pious submissiveness on her part. Choice (C) is incorrect. There is no evidence in the passage to suggest that Lady Elliot has any concerns about her husband's possible remarriage. Choice (D) is also incorrect. Lady Elliot clearly has faced the reality of her approaching death: she recognizes its inevitability and realizes that she is leaving her daughters to the care of her conceited, silly husband.

9. **(B)** Worry complicated Lady Elliot's emotions regarding her approaching death. She worried about what would happen to her daughters once she was no longer there to guide them. Which lines best support this answer? Lines 31–35: "Three girls, the two eldest sixteen and fourteen, was an awful legacy for a mother to bequeath, an awful charge rather, to confide to the authority and guidance of a conceited, silly father."

10. **(A)** Lady Elliot in "quitting" her family is not simply taking a trip: she is dying. We expect a person facing death to react strongly, emotionally. Instead, the narrator states that Lady Elliot was merely attached enough to life to make dying "no matter of indifference to her." That is clearly an *understatement*. It is an example of *irony*, the literary technique that points up the contradictions in life, in this case the contradiction between the understated expression and the deeply felt reality.

11. **(C)** Sir Walter's applications have been *marital* ones. In his conceit, he has applied for the hand in marriage of some women who were far too good for him (his applications were *unreasonable*). Sensibly enough, these women have turned him down (he has been *disappointed* in his proposals of matrimony). However, his conceit is undiminished: he prides himself on remaining single for his dear daughters' sake.

12. **(B)** By stating that the public loves a simple explanation and by commenting on how much easier it is for schoolchildren to ignore what happened on the American continent from 1492–1620, the historian-author reveals a *condescending*, superior attitude toward the public at large, who are content with easy answers.

13. **(C)** Throughout this passage, the author is making the point that it is wrong to consider the Mayflower Compact a cornerstone of American democracy. Instead of presenting his thesis immediately, the author uses the opening paragraph to *capture the reader's attention* with some light, humorous comments about why people foolishly continue to harbor this belief.

14. **(C)** Those who mark the start of democracy in 1620 are *designating* or specifying 1620 as the year democracy originated in America.

15. **(A)** Note the phrase set off in commas: "to be sure." It is a synonym for the adverb *admittedly* and is used to acknowledge that something is true. The author has just been lightly casting doubt on the idea of associating the Mayflower Compact with the birth of democracy. Here, he *concedes the point* that the compact did establish a form of self-government and thus had some relationship to democracy.

16. **(A)** According to the author, the Pilgrims "spurned democracy." In other words, they rejected it. Their attitude toward democracy was one of *complete rejection.*

17. **(B)** The democracy-rejecting Pilgrims would have been amazed to find themselves held up or *cited* as defenders of democracy.

18. **(A)** The Pilgrims had been given a royal patent that legally empowered them to settle in a certain area. Because they had decided to colonize a different area, some of the group felt that once they were ashore no laws would bind them. The compact bound the signers to obey the laws of the colony. It thus served to *establish legal authority within the colony.* That was its primary purpose.

19. **(C)** In these two sentences, the author sums up the situation on board the Mayflower that led to the signing of the compact. The Pilgrims had been granted a royal patent to form a colony in a specific area. If they had settled in that particular area, they would have been constrained to follow the terms of that patent; they would have been under the jurisdiction of the British crown, obeying British law. However, they "had decided to settle in an area outside the jurisdiction of their royal patent," and it was unclear what laws and rules would govern them. By signing the compact, the Pilgrims promised to abide by the laws of their new colony. This supports the claim that the compact's primary purpose was to *establish legal authority within the colony.*

20. **(A)** According to the passage, the Pilgrims signed the Mayflower Compact in order of rank: first, the gentlemen; next, the "goodmen" or yeoman-farmers; finally, the servants. In doing so, they showed their *respect for the social hierarchy.*

21. **(D)** These four brief sentences sum up the order in which the Pilgrims signed the compact. They signed in order of their class or rank. They were very aware of their position in the social hierarchy, and showed their *respect for the social hierarchy* by signing in their proper places.

22. **(D)** This bar graph represents the composition of those aboard the Mayflower who went on to found the colony. Look at the different shaded segments of the bar graph. The smaller the segment, the fewer people it represents. Of the four passenger categories given, the smallest is choice (D), *Female minor farmers.* These were children of farming families who had not been indentured as servants.

23. **(C)** The passage reports on *recent experiments regarding brain activity during sleep* and discusses their results and implications. Choice (A) is incorrect. Even though the passage indicates that humans sleep a great deal, it merely explains one reason why they need to sleep. It does not explain why they need to sleep more than other animals. Choice (B) is incorrect. It is well known, and assumed in the passage, that sleep is beneficial to humans. This does not need to be proved. The questions are why and how it is beneficial. Choice (D) is incorrect. The passage focuses on the "glymphatic" system in the brain, not the lymphatic system. In order to explain the function of the glymphatic system, the author compares it to the lymphatic system, but that is a supporting point and not the main focus of the passage.

24. **(D)** The passage indicates that one of the functions of the glymphatic system is the clearing out of toxic metabolic byproducts from the brain. The lymphatic system performs a similar function for the rest of the body: "the lymphatic system clears out metabolic waste products from the rest of the body." Thus, one of its functions is the *drainage of waste*. Choice (A) is incorrect. The *glymphatic* system is associated with the brain; the *lymphatic* system is not. Choice (B) is incorrect. The regulation of temperature is not mentioned in the passage. Choice (C) is incorrect. According to the passage, the *glymphatic* system transports cerebrospinal fluid, while the *lymphatic* system transports metabolic waste products from the rest of the body.

25. **(C)** Scan the passage to find the word "lymphatic." It appears solely in line 34, in which the workings of the lymphatic system in clearing out metabolic waste products from the body are compared to the workings of the so-called glymphatic system in clearing out cellular waste from the brain.

26. **(C)** According to the passage, sleep serves to drain toxic chemical waste products from the brain, in addition to carrying out other functions that are not yet understood fully. Choices (A), (B), and (D) are clearly incorrect because they do not include the cleaning function that is the main consideration described in the passage.

27. **(C)** The passage reports the long-standing hypothesis that sleep *promotes* recovery. In other words, sleep leads to, contributes to, or helps bring about recovery. The term *fosters* best captures this meaning. Choices (A), (B), and (D) are incorrect. Although "promotes" can have the meaning *exchanges a pawn* ("She wanted to promote her pawn into a queen"), *raises in rank* ("promoted to sergeant"), or *publicizes* ("ads promoting products"), that is not how the word is used here.

28. **(B)** The expansion of the glial channels by 60 percent created significantly more room for fluid in the channels. This was a significant result: the increased volume *suggested that the flow of cerebrospinal fluid increased during sleep*, resulting in an increased ability to wash waste chemicals out of the brain. Choice (A) is incorrect. Nothing in the passage suggests that the overall size of the brain increases. Choice (C) is incorrect. No information is provided about the effects of sleep on other organs. Choice (D) is incorrect. Less sensory information is processed during sleep. The scientists hypothesized that the cleaning function and the processing of sensory information are in a sense competing: the brain cannot maximize both at the same time.

29. **(B)** As used in the passage, "distinguish" means to differentiate the two dyed fluids or to *tell* them *apart*. Choices (A), (C), and (D) are incorrect. Although "distinguish" can

mean *characterize* ("Her Brooklyn accent distinguishes her"), *make prominent* ("She distinguished herself on the ski slopes"), or *discern* ("In the dark cellar he couldn't distinguish anything"), that is not how it is used here.

30. **(B)** The passage makes it clear that the point of using the dyed fluids is to differentiate between the fluid that circulates while the mice are asleep from the fluid that circulates while the mice are awake. Choice (A) is incorrect. The passage never mentions any different types of molecules that might make up the cerebrospinal fluid. In addition, the dyes are associated not with different types of molecules, but with different batches of cerebrospinal fluid that are essentially identical in composition. Choice (C) is incorrect. Lymph was not dyed in the experiment. Choice (D) is incorrect. The experiment focused on the glymphatic system exclusively, not on the lymphatic system.

31. **(C)** The sentence: "By tracking the movements of red and green dye throughout the brain, the team found that large amounts of CSF flowed into the brain during sleep, but not during the waking state" reveals the reason the different-colored dyes were used: to differentiate between fluid that flowed into the brain during sleep from fluid that flowed into the brain during the waking state. Choice (A) is incorrect. This sentence merely describes the preliminary work Lulu Xie had to do to make the experiment possible. Choice (B) is incorrect. This sentence reports that the two-photon microscope could distinguish the red dye from the green dye, but it does not explain why that was important for the success of the experiment. Choice (D) is incorrect. This sentence reports a concrete result of the experiment, but it does not reveal the specific logical steps that led the scientists to that conclusion.

32. **(C)** The passage compares what the brain does during sleep to what a human does during the weekend. The point is to suggest not only that cleaning is one function performed by both, but also that both carry out other functions in addition to cleaning. Sleep therefore most likely provides the brain time both to clean itself and to perform several other functions, just as the weekend provides a human the opportunity to clean the house, visit friends, and perform other functions. Choice (A) is incorrect. This statement sounds true. However, even though one could use this comparison to make the point that, just as sleep is essential for the health of the brain, the weekend is essential for the (mental and physical) health of the human, it is not the point the author is making here. Choice (B) is incorrect. There is no suggestion of ranking different activities and deciding which one is most beneficial. Choice (D) is incorrect. As with choice (A), the point sounds plausible, but that is not the focus of the comparison here.

33. **(D)** The primary focus of this passage is the contradiction between traditional beliefs about the frailty of women and the manner in which black women were treated under slavery. Though there may be other examples of women's strength in this passage, the best answer is choice (D) because it reflects the central theme of the passage. Choice (A) is incorrect. Though the passage mentions, "women at the North . . . talking about rights," this is done as an aside and is not a central part of Truth's argument. Choice (B) is incorrect. Though Truth mentioned having, "born thirteen children," she does this as a demonstration of her treatment under slavery, rather than as proof of the hard work that women do as mothers. Choice (C) is incorrect. Though childbirth is certainly physically challenging, Truth makes no mention of this in the passage.

34. **(B)** This is the section of the passage in which Truth recounts many of the details of her hard treatment as a slave, including hard physical labor and beatings. It comes immediately after she cites a man's argument that women need to be "helped into carriages" and is intended as evidence against this argument regarding women's weakness. Choice (A) is incorrect. As the explanation of question 33 states, the actions of northern women are mentioned as an aside; they are not a central part of Truth's argument. Choice (C) is incorrect. This sentence is a request for kindness and makes no mention of the strength of women. In fact, this sentence argues that even if women are weaker than men are, that does not justify denying them rights. Choice (D) is incorrect. Though this sentence does mention the strength of biblical women, it is not as strong an answer as choice (B). Why not? First, the sentence provides only one example of female strength. Second, the example is given in order to urge men to meet women's demands, rather than to contradict traditional depictions of women's frailty.

35. **(D)** "Fix" is used in informal English as a synonym for *predicament*. Though Truth is giving a speech, her style is down-to-earth and casual. One good way to test possible answers is to substitute them in the sentence for the word in question and see if the sentence makes sense with the substitution. In this case, saying that the white men will be in a predicament makes sense. Choice (A) is incorrect. Though repair is one meaning of *fix*, this sentence is not about fixing something that is broken. Additionally, if you substitute the word *repair* in the sentence, it does not make sense. We do not talk about being *in* a repair. Choice (B) is incorrect. While it is common to talk about being "in a rut," this figure of speech refers to being stuck in a particular way of doing things. Talking about rights for women and blacks is not going to cause white men to be unable to change. Choice (C) is incorrect. Although it is common to talk about being *in* a battle, a *battle* is a far more extreme conflict then a predicament or *fix*.

36. **(A)** The primary focus of this passage is the inevitability of progress toward women's rights because the equality of women is a fundamental truth. Douglass begins by pointing out that slavery, which had been legal for 200 years, was ended. He then refers to the ultimate triumph of Galileo's observation that the Earth revolves around the sun, despite the church's insistence to the contrary. Finally, he predicts a victory for women's rights because, "When a great truth gets abroad in the world, no power on earth can imprison it." Choice (B) is incorrect. The church is mentioned in regards to Galileo, not in regards to women. Choice (C) is incorrect. Though Douglass argues that women should receive the "rights of American citizenship," he does not argue that their citizenship is a reason that they will win those rights. Choice (D) is incorrect. Douglass argues that the truth always wins out but he does not explain why this occurs. Choice (D) might explain why, but Douglass does not make that argument.

37. **(D)** In this sentence, Douglass states his primary claim, which is that the truth cannot be stopped. This is for him the fundamental reason that women will be victorious in their struggle for equal rights. Choice (A) is incorrect. This sentence cites a barrier to winning women's suffrage rather than a reason that the movement will succeed. Choice (B) is incorrect. This sentence grants that belief in traditional roles for women is still powerful, despite its obvious falsehood. It states the opposite of Douglass's overall claim. Choice (C) is incorrect. This sentence grants that even when women achieve equal rights, some will still refuse to accept the change.

38. **(A)** *Authorized* is a synonym of "sanctioned." It is the best answer in this case because Douglass is speaking about the legislation that allowed slavery, despite the truth that "man cannot hold property in a man." He is describing Henry Clay's bold claim that the law defines what rights people have, rather than a theory of natural rights. Legislation *authorized* slavery, despite its violation of natural rights. Choice (B) is incorrect. The legislation that Douglass refers to allowed slavery rather than penalizing it. Choice (C) is incorrect. The legislation that Douglass refers to allowed slavery rather than prohibiting it. Choice (D) is incorrect. Douglass makes no mention of whether the legislation in question describes slavery as praiseworthy.

39. **(B)** The story of Galileo's conflict with the Church regarding the Earth's orbit of the sun is one of the most well-known historical examples of an organization's attempting to hold fast to its beliefs despite evidence to the contrary. Douglass uses this example to demonstrate that the truth will always be victorious, despite powerful opposition. Choice (A) is incorrect. Douglass does not believe that there is any basis, scientific or otherwise, for treating women unequally. Choice (C) is incorrect. Though Douglass believes that women's rights are important, he makes no mention of the state of women's rights and their acceptance in other parts of the world. Choice (D) is incorrect. The "unveiling of the statue of Galileo" in a location where the church was very strong demonstrates that the truth will triumph despite powerful opposition, not that this opposition was incorrect.

40. **(B)** In Passage 1, Sojourner Truth makes a strong argument that women should receive the same rights as men. In Passage 2, Douglass, who supports equal rights for women, argues that women will be victorious in the struggle for equal rights because the struggle is based on the truth that women are men's equals. Choice (A) is incorrect. Douglass is a supporter of Sojourner Truth's cause. Choice (C) is incorrect. Douglass takes no position on how rapidly progress should be made on this issue. He simply argues that progress is inevitable. Choice (D) is incorrect. Though Douglass notes that progress was made on the legality of slavery, he does not mention whether any progress has been made toward recognizing equal rights for women.

41. **(D)** "That man" argues that women are weak and require assistance. Douglass disagrees with this argument and likens it to the church's insistence that the sun revolves around the Earth. Both are examples of people vociferously advocating old beliefs despite evidence to the contrary. Choice (A) is incorrect. Douglass does not agree with the man's argument. Choice (B) is incorrect. Douglass does disagree with the man, but he fully agrees with the author of Passage 1. Choice (C) is incorrect. Though Douglass disagrees with the man and *might* be angered by his arguments, there is no evidence in the passage proving that he is angered. As a result, though choice (C) could be correct, choice (D) is the best answer.

42. **(B)** In this sentence, Douglass strongly implies that the "two hundred years of legislation" mentioned previously no longer authorize slavery. These laws were not able to "keep life" in the institution of slavery. Douglass is speaking in 1888, two decades after the Emancipation Proclamation. It is, therefore, a fact, that slavery is no longer legal at the time he is speaking. Choice (A) is incorrect. This is Henry Clay's argument for slavery. Douglass uses it as evidence of a powerful belief or argument that has been defeated by truth. Choice (C) is incorrect. In this sentence Douglass grants that incorrect beliefs still

have significant power. Choice (D) is incorrect. This sentence argues that the march of progress toward equal rights will not be reversed, but it makes no claim about what has occurred in the past.

43. **(D)** Note that the caption on the chart is "Metabolic middle ground." The dinosaurs and the shark are in the middle of the chart. This graphically reinforces the concept that, like sharks, dinosaurs are neither cold-blooded ectotherms nor warm-blooded endotherms, but have metabolisms that fall somewhere in between. Thus, the chief purpose of the chart is to illustrate that *in metabolic rate dinosaurs are most akin to sharks.*

44. **(C)** The author of the passage succinctly summarizes the competing theories that categorize dinosaurs as ectotherms, endotherms, or mesotherms. Clearly he is *well-informed about* these *competing theories* based on studies of dinosaur metabolic rates. Choices (A) and (D) are incorrect. Nothing in the passage suggests that the author is an active researcher or involved in the development of mathematical equations. Choice (B) is also incorrect: his presentation of the ectotherm theory is objective; nothing suggests he has any bias in its favor.

45. **(A)** In both the title of the article ("Dinosaur metabolism neither hot nor cold, but just right") and its opening sentence, the author is alluding or referring to the classic children's tale of Goldilocks and the three bears, with the three bowls of porridge. By calling this latest theory about dinosaurs a Goldilocks solution, he hints that this time the researchers may have gotten things "just right."

46. **(B)** First, the conventional wisdom was that dinosaurs were cold-blooded ectotherms. Then researchers came up with the heretical notion that dinosaurs were hot-blooded endotherms. Now Grady and his fellow researchers have come up with a third idea, in the process establishing an entirely new metabolic category. In admitting that what they have done is audacious (daring), Grady is *acknowledging* how *radical* or revolutionary their suggestion is and how profound a change it makes in the way we think of dinosaurs.

47. **(B)** Note the references to time with which paragraphs four and five open: "For the first 150 years" and "Beginning in the late 1960s." Paragraph 4 describes the theory that dinosaurs were cold-blooded; paragraph 5, the alternate theory that they were warm-blooded. Taken together, the two paragraphs *give an overview of previous theories about the body temperature and activity level of dinosaurs.*

48. **(C)** The scientists conducting this research are trying to figure out into which category dinosaurs fit. Are they cold-blooded ectotherms? Are they warm-blooded endotherms? Is there yet another category into which they can fit? By studying the dinosaurs' metabolic and growth rates, the researchers are attempting to *characterize dinosaurs* as cold-blooded, warm-blooded, or something in-between.

49. **(A)** Lines 13–22 sum up the conclusion reached by Grady and his fellow researchers: dinosaurs "belonged to an intermediate group that can raise their body temperature but don't keep it at a specific level." Their goal was to figure out into which category dinosaurs fit. In discovering that dinosaurs belonged to an intermediate group, they achieved their goal.

50. **(D)** To say that growth rates scale with metabolic rates is to say there is a *correlation* between the two rates. Creatures with a high metabolic rate have more energy to

expend. Thanks to this extra energy, they can reach their adult size faster: they have a high growth rate. Choices (A), (B), and (C) are incorrect. Although scale can mean *flake* ("paint scaling from the banister"), *reduce* ("they scaled back their plans"), or *ascend* ("she scaled a 30-foot flagpole"), that is not how the word is used here.

51. **(B)** To lay down bone is to build up a deposit of bone tissue. Thus, rings of bone were laid down or *deposited* each year. Choices (A), (C), and (D) are incorrect. Although laid down can mean *rested* ("laid down for a nap"), *sacrificed* ("laid down his life"), or *formulated* ("laid down strict rules), that is not how it is used here.

52. **(D)** The *Harbrace College Handbook* states that "[w]ords used in a special sense are sometimes enclosed in quotation marks." What is the usual sense of the word "defend"? Its primary meaning is to protect someone or something from harm, as in defending our country. Here, however, it *is being used in an unusual sense.* The author is not saying that sharks, tuna, and giant sea-turtles do not resist attacks on their body temperature. He's saying that their bodies do not maintain a constant set temperature. Choice (A) is incorrect. Although the word "defend" is not being used in its usual sense, it is not being used to create *an ironic* (satirical or wryly amusing; paradoxical) *effect.*

Section 2: Writing and Language Test

1. **(C)** The key phrase in the question is "not quite the most widespread." Stating that bats are "second only to rodents" means that bats are almost the most widespread but come in second place. Choice (A) does the opposite of what the question asks. Choice (B) gives a percentage without a frame of reference. Choice (D) is too vague because we would need information about the numbers of humans relative to those of other mammals.

2. **(A)** "Although" gives the needed contrast between the first part of the sentence and the second part. Choices (B) and (D) show cause and effect. Choice (C), "however," would work if a contrast was needed between the previous sentence and the current sentence but does not work to provide a contrast within a sentence like this.

3. **(A)** "Do" is numerically consistent with the plural subject "roles." Choice (B), "does," is singular. Choice (C), "don't," causes a double negative given the "not" that follows. Choice (D), "do's," is not a word.

4. **(A)** This is a complete sentence that requires no breaks. The phrase "bodies approximately one inch long" is relatively long, but it should remain a unified phrase without any pauses. The other options unnecessarily break up the sentence.

5. **(C)** This word refers to "echolocation," which is best described as a "phenomenon" since it is a process that allows bats to navigate. The other options are all associated with physical items.

6. **(D)** Notice that the footnote beneath the graph states that the population numbers are tabulated at the end of each year. According to the graph, the bat population decreased from around 6,000,000 at the time of the outbreak of the illness at the end of 2007 to about 2,000,000 in 2010. This is a decrease of roughly $\frac{2}{3}$, which equates to about 65%.

7. **(D)** The word "while" earlier in the sentence already provides the transition needed. So omitting any word at this point makes the most sense.

8. **(B)** "Effect," which is choice (B), is typically a noun. However, "affect" in choice (A) is typically a verb. In this sentence, the farmers are feeling the consequences of these changes, and "consequences" is a noun like "effect." Even though "affectedness" in choice (C) is a noun, it means having a pretentious attitude. Choice (D), "effectively," is an adverb.

9. **(D)** "Bats'" correctly shows possession by plural bats. Choice (A), "bats," is a noun. Choice (B), "bat's," shows possession by a single bat. Choice (C), "bat is," has a noun and a verb.

10. **(C)** The sentence states that this is a species "already on the endangered list." So the most logical choice is the bat species that has the smallest population. Since the paragraph is speaking from a more recent perspective, look at the bat species that has the smallest population in the most recent year, i.e., gray bats.

11. **(B)** Consider what immediately follows the insertion point—"so preservationists can make the necessary interventions." Preservationists would naturally be most interested in helping those species in need of intervention because the species were in danger of becoming extinct. So the statement "are learning which species are in the most danger" most logically connects to this. Choice (A) is the opposite of what is needed. Choice (C) is irrelevant. Even though choice (D) relates a bit to the information that follows, it does not give as strong a connection as choice (B) does. Preservationists would more likely find information about which bat species most need help more useful than information about bat predator locations.

12. **(B)** This choice uses consistent punctuation, dashes, to set aside the parenthetical phrase. Choices (A) and (D) are inconsistent; a parenthetical phrase that begins with one form of punctuation should end with the same type. Choice (C) does not have a needed pause before the start of the parenthetical phrase with the word "as."

13. **(B)** What follows are two general ways that married couples in *The Canterbury Tales* are dysfunctional, so choice (B) gives the best transition. Choice (A) is incorrect because the listed items are not quotations. Choice (C) is incorrect because these themes are consistent with the text, not ironic. Choice (D) is incorrect because the listed items lead to conflict, not resolution.

14. **(C)** The subject comes after the underlined portion. The subject is the plural "marital troubles," so the plural verb "are" works. Choices (A) and (B) are both singular, and choice (D) uses "them" incorrectly.

15. **(C)** There is no need to repeat the name of the story, as choice (A) does, since it is mentioned immediately before this sentence. Choice (B) is not correct because it is wordy and adds no substance to the sentence. Choice (D) is incorrect because the current sentence is simply expanding on the previous one, not showing cause and effect.

16. **(D)** This is a direct quotation from Lord Walter, as indicated by the word "stating" immediately beforehand and by the use of old English spelling. Choices (A) and (B) give factual reasoning, but it is necessary to leave the quotation marks for clarity. Choice

(C) is not correct because these words are not coming from the narrator but from a character.

17. **(A)** This choice is parallel to the structure of the previous phrase "a false order for . . ." and is logical. Choice (B) is illogical, choice (C) is too choppy, and choice (D) is too wordy and is not parallel.

18. **(D)** This phrase completes the idiomatic expression "is not so much . . . as he is." The other options do not connect appropriately to this earlier phrasing.

19. **(A)** It is correct to say "contributes . . . through," making choice (A) correct. The other options do not work in conjunction with "contributes" to make a sensible phrase.

20. **(C)** The key word in this question is "limited." Therefore "only that" makes sense since it minimizes the extent of her request. The other options do not limit the request in any way.

21. **(D)** The entire phrase "at what she believes to be the end of their marriage" is parenthetical. Choice D is the only option that both leaves this phrase intact and places a comma at the end of it so that it is set aside from the rest of the sentence.

22. **(A)** Even though this story is from long ago, the paragraph is referring to the events as though they were read in a present-day perspective. Therefore, choice (A) works to give a present-tense verb that matches the singular subject "concern." Choices (B) and (C) indicate past events, and choice (D) is plural.

23. **(A)** Choices (C) and (D) do not use the required possessive form "its." Choice (B) incorrectly uses the plural verb "are." Choice (A) gives appropriate pauses with the commas, uses the singular "is" to match the singular subject "workforce," and correctly uses the possessive "its" to show that school teachers are a part of the singular society.

24. **(D)** Choices (A) and (B) do not indicate a wide time span since they limit the instructional influence to the confines of a day. Choice (C) refers to places, not time. Choice (D) works best since it indicates that teachers can influence students from the early years of school all the way through postsecondary education.

25. **(A)** The first word in the underlined portion must be "your" since it refers to the reader's possession of "best," making choices (B) and (D) incorrect. Choice (C) is incorrect because it jumps to using "one" partway through instead of being consistent in the use of "you." Choice (A) uses the correct form of "your" to show possession and uses "you're" to stand for "you are."

26. **(B)** "So," gives a logical transition from the previous paragraph to the rhetorical sentence that starts this paragraph. Choices (A) and (C) incorrectly show contrast, and choice (D) shows a causal connection that is too direct.

27. **(C)** You won't have a calculator at your disposal on the Writing and Language section. However, you can estimate the average, especially given that the answer choices are reasonably far apart from one another. Based on the different salaries in each of the five cities, $55,000 comes closest to the average, making choice (C) correct.

28. **(B)** This choice properly indicates that a singular teacher owns a workday. Choice (A) indicates plural teacher ownership. Choice (C) indicates plural teachers as a subject. Choice (D) inserts unnecessary verbs.

29. **(B)** "Than" completes the comparative phrase "better . . . than." Choice (A) can work for comparisons but not in this context. Choice (C) is for time, and choice (D) does not lead to a comparison.

30. **(C)** "Furthermore," provides an appropriate transition into the continued explanation of the education and training of teachers. Choice (A) indicates confusion, choice (B) indicates an assumption, and choice (D) does not provide a transition.

31. **(B)** "Prospective" means "preparing to do so in the future," which applies to teachers who are being trained since they are not yet licensed professionals. "Perspective" in choice (A) indicates a point of view. "Prospecting" in choice (C) indicates searching. "Previewing" in choice (D) does not apply to people in the process of learning their profession, although it could refer to what the trainees themselves will be doing with respect to professional skills.

32. **(C)** The data in the chart give an approximate salary range between $52,000 and $62,000, making the variation about $10,000.

33. **(B)** The colon is appropriate because it indicates a clarification to follow. Choice (A) results in a comma splice, while choices (C) and (D) result in run-on sentences.

34. **(D)** "Dubious," which can mean "suspicious," correctly refers to the unsavory and illegal happenings mentioned in the beginning of the sentence. The activities are not best described as "transparent," choice (A). Since these activities were associated with lawbreaking, they were not likely done in a way that was easily seen. Choice (B) is incorrect since events from just a few decades past could not be accurately characterized as "ancient." Choice (C) is associated with speakeasies but not necessarily with a person or a massacre.

35. **(A)** "Because" functions to show a cause-and-effect relationship between the first part of the sentence and the second part. Choices (B) and (C) show contrast, and choice (D) shows a continuation of the same thought.

36. **(C)** This is the only option that leaves the unified phrase "force-feeding of corn to ducks" completely intact.

37. **(A)** This is the only choice that shows ownership by the singular city of Chicago of the City Council. Choices (B) and (D) do not show possession, and choice (C) shows plural possession.

38. **(B)** A break between the independent clauses in the sentence is needed, which choices (A) and (D) do not have. Choice (C) needs a comma after the introductory phrase "not surprisingly," and also needs to show that "Chicago" possesses the "chefs." Choice (B) uses a semicolon to break up the two independent clauses and uses the correct possessive form of "Chicago."

39. **(C)** The emotions expressed in the previous sentence are extreme and intense, so writing "just wondered what all the fuss was about" demonstrates a clear contrast in attitude. Choices (A), (B), and (D) all indicate some degree of agreement with the attitudes of the chefs mentioned in the previous sentence.

40. **(A)** "What's more" correctly indicates a continuation of the ideas from the previous paragraph. The other options all illustrate a contrast. Sometimes similarities among the answers can help you eliminate choices.

41. **(B)** Choices (A) and (D) do not provide vivid descriptions. Choice (C) is inconsistent with the type of food one wants at a restaurant. Choice (B) is both logical and vivid.

42. **(A)** The dash serves to provide a long pause before the closing thought in the sentence. Choice (B) is too choppy and creates a run-on. Choice (C) has an unnecessary comma. Choice (D) is incorrect because there is not a complete sentence after the semicolon.

43. **(D)** The context indicates that the Health Department stopped enforcing this ban, making "froze" the most logical option. "Vivified," choice (A), conveys an increase in the liveliness of the ban, which is inconsistent with the context. "Congealed," choice (B), means "to take shape." Choice (C), "checked," is illogical. Stating "were checked" could possibly work, but "checked" by itself doesn't make sense.

44. **(C)** The proper idiomatic phrase is "victory for." The other options join "victory" with prepositions that don't agree given the phrasing needed in this context.

Section 3: Math Test (No Calculator)

1. **(C)** Test the choices. In **1994**, Adam entered 3 more tournaments than in 1993, an increase of $\frac{3}{6} = \frac{1}{2} = 50\%$. (From 1990 to 1991 the increase was 25%, from 1991 to 1992 it was 100%, and from 1994 to 1995 it was $33\frac{1}{3}\%$.)

2. **(B)** $5(x + 1) + 3 = 3(x + 3) \Rightarrow 5x + 5 + 3 = 3x + 9 \Rightarrow 5x + 8 = 3x + 9 \Rightarrow 2x = 1 \Rightarrow x = 0.5$

   **A solution to the equation $5(x + 1) + 3 = 3(x + 3)$ is the x-coordinate of the point of intersection of the straight lines $y = 5(x + 1) + 3$ and $y = 3(x + 3)$. Since these lines intersect at the point (0.5, 10.5), the original equation has one solution, $x = 0.5$.

3. **(B)** Rewrite the given equation in $y = mx + b$ form.

$$3x + 4y = 24 \Rightarrow 4y = -3x + 24 \Rightarrow y = -\frac{3}{4}x + 6$$

   So the slope, m, is $-\frac{3}{4}$.

   **Find two points on the given line and use the slope formula. For example, when $x = 0$, $y = 6$, and when $y = 0$, $x = 8$. Therefore, (0, 6) and (8, 0) are points on the line, and the slope of the line is $\frac{6-0}{0-8} = \frac{6}{-8} = -\frac{3}{4}$.

4. **(A)** To answer any question about maps or scale drawings, set up a proportion and cross-multiply:

$$\frac{\text{miles}}{\text{centimeters}}: \frac{m}{c} = \frac{n}{x} \Rightarrow mx = cn$$

So $x = \frac{cn}{m}$.

5. **(D)** Multiplying (not dividing) the number of courses a student takes by the number of credits each course is worth gives the total number of credits the student earns. (Clearly, taking 5 three-credit courses earns $5 \times 3 = 15$ credits, not $5 \div 3 = 1.66$ credits.) So the answer is either choice (C) or choice (D). Since "at least 120 credits" means "120 credits or more," the desired inequality is "greater than or equal to" 120: $3x + 4y \geq 120$.

6. **(C)** When you have to determine which of four statements is true, just treat each one as a true-false question.

- The French club could have 2 boys and 3 girls, and the Spanish club could have 30 boys and 50 girls. Statement (A) is false.
- The Spanish club could have 3 boys and 5 girls, and the French club could have 20 boys and 30 girls. Statement (B) is false.
- 3 out of every 5 members of the French club, or 60%, are girls; 5 out of every 8 members of the Spanish club, or 62.5%, are girls. Statement (C) is true.
- Once you know that Statement (C) is true, you don't have to waste your time testing Statement (D); it must be false. For example, if the French club originally had 2 boys and 3 girls and if among the new members there were 30 boys and 20 girls, then the number of boys and girls would *not* be equal.

7. **(B)** Since John averaged 25 miles per gallon for the 200-mile trip, he used $200 \div 25 = 8$ gallons of gas. At the point that Mary had used 8 gallons of gas, she had traveled $8 \times 20 = 160$ miles. So she was still $200 - 160 = 40$ miles from home.

8. **(B)** If (a, b) is a point on each line, then $2a + 3b = 4$ and $b = 2a$. Replacing b by $2a$ in the first equation, we get $2a + 3(2a) = 4 \Rightarrow 8a = 4 \Rightarrow a = \frac{1}{2}$. Since $b = 2a$, $b = 1$. Finally, $a + b = \frac{1}{2} + 1 = \frac{3}{2} = \mathbf{1.5}$.

9. **(B)** The formulas for the volumes of a rectangular solid and a cylinder are $V = lwh$ and $V = \pi r^2 h$, respectively. (Remember that these formulas are given to you on the first page of every math section.) The volume of container I is $(4)(4)(5) = 80$ cubic inches. Since the diameter of container II is 4, its radius is 2, and so its volume is $\pi(2^2)(5) = 20\pi$. The difference in volumes is $80 - 20\pi = \mathbf{20(4 - \pi)}$.

10. **(C)** The simplest way to answer this type of question is to plug in a simple number. Since this is a question involving percents, the easiest number to use is 100. Assume that Pam sells her vases to Carl for $100. Since 60% of 100 is 60, he sells them for $160. Since 20% of 100 is 20, during the July 4th sale Carl sells the vases for $80, $20 less than he pays for them. Since $80 is exactly half of $160, the customer is receiving a **50% discount**.

If you didn't think to plug in a number, you should have proceeded in exactly the same manner. If Pam sells Carl her vases for x dollars, he normally sells them for $1.6x$ dollars. During the July 4th sale, he sells them for $0.8x$, which is exactly **50% of $1.6x$.

11. **(D)** If $y = x^2 + 1$ and $y = -x^2 + 3$, then $x^2 + 1 = -x^2 + 3 \Rightarrow 2x^2 = 2 \Rightarrow x^2 = 1$. So $x = 1$ or $x = -1$.

If $x = 1$, then $y = 2$. If $x = -1$, then $y = 2$. So the two solutions are $(1, 2)$ and $(-1, 2)$, and $a + b + c + d = 1 + 2 + (-1) + 2 = 4$.
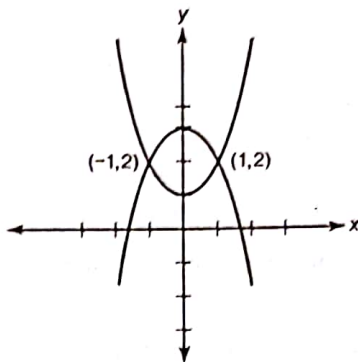
12. **(C)** Each of the four triangles in the diagram below are 45-45-90 right triangles.
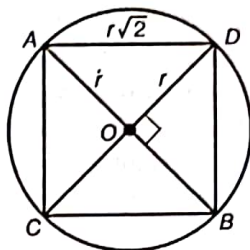
The sides of each triangle are r, r, and $r\sqrt{2}$. So each side of square $ADBC$ is $\sqrt{2}$, and its perimeter, b, is $4r\sqrt{2}$. The area, a, of square $ADBC$ is $(r\sqrt{2})^2 = 2r^2$.

Since $a = b$, we have $2r^2 = 4r\sqrt{2} \Rightarrow r = 2\sqrt{2}$.

13. **(C)** Let x represent the number of juniors on the team. Then the number of seniors on the team is $x + 5$, and the total number of students on the team is $2x + 5$. So the fraction of the team that are juniors is $\dfrac{x}{2x+5}$. However, it is given that the juniors make up 40% or $\dfrac{4}{10}$ of the team. So,

$$\frac{x}{2x+5} = \frac{4}{10} \Rightarrow 10x = 8x + 20 \Rightarrow 2x = 20 \Rightarrow x = 10$$

So the team consists of 10 juniors and 15 seniors, a total of **25** students.

**You are told that 40% of the team members are juniors and 60% of them are seniors. The 20% difference is due to the fact that there are 5 more seniors on the team than juniors. So those "extra" 5 seniors make up the 20% difference. If those 5 seniors represent 20% or one-fifth of the team, the entire team consists of $5 \times 5 = 25$ players.

14. **(C)** The slope of the straight line segment connecting $(2, 2)$ and $(6, 8)$ is

$$\frac{8-2}{6-2} = \frac{6}{4} = \frac{3}{2} = 1.5$$

Therefore, as x goes up 1 from 2 to 3, y goes up 1.5 from 2 to 3.5. Therefore, the point (3, 3.5) is on the graph. So $a = 3.5$, and $3a = 3 \times 3.5 = 10.5$. To evaluate $f(10.5)$, consider the straight-line segment connecting (10, 8) and (16, 2). The slope of that segment is

$$\frac{2-8}{16-10} = \frac{-6}{6} = -1$$

So as x goes up 0.5 from 10 to 10.5, y goes down 0.5 from 8 to **7.5**.

15. **(D)** Since the profit is increasing linearly, we need to find the slope of the line of best fit. The points that are easiest to read exactly are the lattice points. We see that the line passes through (3, 10) and (9, 40). So the slope of the line is $\frac{40-10}{9-3} = \frac{30}{6} = 5$. So the company's profit is increasing by approximately \$5,000 per month. A year and a half is 18 months. In the 9 months from the time the company was in business 9 months to when it will be in business 18 months, the profit is expected to increase by \$45,000 from \$40,000 to **\$85,000.**

16. $\frac{1}{2}$ **or .5** This problem would be trivial if you could use a calculator. But, since this question is in the non-calculator section, you need to know how to manipulate fractional and negative exponents.

$$8^{-\frac{1}{3}} = \frac{1}{8^{\frac{1}{3}}} = \frac{1}{\sqrt[3]{8}} = \frac{1}{2}$$

17. $\frac{4}{5}$ **or** $\frac{8}{10}$ **or .8** Draw a right triangle. Label it ABC, with C as the right angle, and let the cosine of B be $0.6 = \frac{6}{10} = \frac{3}{5}$. Then label the side adjacent to angle B as 3 and the hypotenuse as 5.
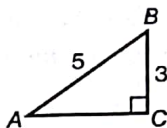
Clearly, this is a 3-4-5 right triangle, so side $\overline{AC}$ is 4, and $\cos A = \frac{4}{5}$ **or** $\frac{8}{10}$ **or .8.**

18. **56** $(7 + i\sqrt{7})(7 - i\sqrt{7}) = 49 - 7i^2 = 49 - 7(-1) = 49 + 7 = 56$

19. $\frac{25}{4}$ **or 6.25** Subtracting $3x$ and $3y$ from both sides of the first equation gives $x = y$. Since $x + y = 5$, we see that $x = y = 2.5$. So $xy = 2.5 \times 2.5 = $ **6.25.**

**Alternatively, since $x + y = 5$, we have that $x = 5 - y$. Then replacing x by $5 - y$ in the first equation, we get that

$$3(5 - y) + 4y = 4(5 - y) + 3y \Rightarrow 15 + y = 20 - y \Rightarrow 2y = 5 \Rightarrow y = \frac{5}{2}$$

So, $x = 5 - \frac{5}{2} = \frac{5}{2}$. Finally, $xy = \frac{5}{2} \times \frac{5}{2} = \frac{25}{4}$.

20. **2** First of all, every parabola whose equation is of the form $y = ax^2 + bx + c$ crosses the y-axis exactly once, at the point where $x = 0$. Here, it is at the point (0, 16). So $m = 1$.

In general, such a parabola can cross the x-axis once, twice, or not at all. It happens wherever $y = 0$. To know how many times this parabola crosses the x-axis, we have to solve the equation $0 = x^2 - 8x + 16 = (x-4)(x-4)$. The equation has only one solution: $x = 4$. The parabola crosses the x-axis once, at the point (4, 0). So $n = 1$ and $m + n = 2$.
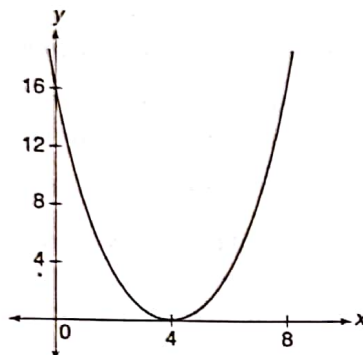
Section 4: Math Test (Calculator)

1. **(B)** Convert 4 feet to 48 inches, and set up a proportion:

$$\frac{\text{depth of water in inches}}{\text{time in minutes}} : \frac{4}{25} = \frac{48}{x}$$

By cross-multiplying, we get $4x = (25)(48) = 1200$, and so $x = 300$. So the tank will be full 300 minutes, or exactly 5 hours, after 11:00, which is **4:00**.

**Equivalently, you could reason that if it takes 25 minutes to fill the tank to 4 inches, it would take 3 times as long (75 minutes) to fill the tank to 12 inches, or 1 foot. So it would take $(4)(75) = 300$ minutes to fill the tank to 4 feet.

2. **(A)** The value of a square root can never be negative So there is no value of x that could make $\sqrt{x+7}$ equal to -4. **The equation has no solutions.**

If you didn't see that, you should have proceeded as follows: If $\sqrt{x+7} = -4$, then squaring both sides gives $x + 7 = 16$. So $x = 9$. So 9 is the only possible solution. However, before choosing choice (B), we have to check that 9 is, in fact, a solution; i.e., it is not extraneous. Does $\sqrt{9+7} = -4$? No, $\sqrt{9+7} = \sqrt{16} = 4$, not -4.

3. **(B)** It appears that the y-intercept of the line of best fit, the grade that would correspond to not studying at all (0 hours), is 55. So $b = 55$. The slope of the line is obtained by using the slope formula. Since the line of best fit passes through the points (4, 70) and (9, 90), the slope of the line is $\frac{90-70}{9-4} = \frac{20}{5} = 4$, and $m = 4$. So $m + b = 4 + 55 = 59$.

4. **(B)** Since the average of 82 and 88 is 85, the only way that the mean grade, m, of all the students in the class could be 85 is if $b = g$. Since it is given that $b \neq g$, m cannot be 85; $m \neq 85$.

**The weighted average, m, of all the students in the class is $\frac{82b+88g}{b+g}$. So if $m = 85$, then $\frac{82b+88g}{b+g} = 85 \Rightarrow 82b + 88g = 85b + 85g \Rightarrow 3b = 3g \Rightarrow b = g$. Since it is given that $b \neq g$, m cannot be 85.

5. **(C)** Since 45 minutes is $\frac{3}{4}$ of an hour, a rate of 1 page per 45 minutes is a rate of 1 page per $\frac{3}{4}$ of an hour, which is equal to $1 \div \frac{3}{4} = \frac{4}{3}$ pages per hour. So in an 8 hour day Brigitte can translate $8 \times \frac{4}{3} = \frac{32}{3}$ pages. In a 5-day week, she can translate $5 \times \frac{32}{3} = \frac{160}{3}$ pages. Finally, in 6 weeks, she can translate $6 \times \frac{160}{3} = $ **320** pages.

6. **(C)** Note that (population) ÷ (population per square mile) = area, in square miles.

Since the area of the United States didn't change between 1970 and 2000, subject to rounding errors in approximating both the population density and the population, the answer should be the same for each of the years. For example,

- 1970: 203,200,000 people ÷ 57.4 people per square mile = 3,540,000 square miles ≈ **3,500,000**.
- 2000: 281,400,000 people ÷ 79.6 people per square mile = 3,535,000 square miles ≈ **3,500,000**.

7. **(A)** After m monthly deposits have been made, the box contained $d + me$ dollars. From the given information, we have

$$175 = d + 3e \quad \text{and} \quad 300 = d + 8e$$

Subtracting the first equation from the second one gives $125 = 5e$, and so $e = 25$. Then $175 = d + 3(25) = d + 75$. Therefore, $d = 100$, and we have that $a = \mathbf{100 + 25m}$.

8. **(B)** Since after the initial deposit in January 2014 deposits to the box were made on the first of each month, 11 monthly deposits were made in 2014 (on the first of February through the first of December) and 12 monthly deposits were made in 2015 (on the first of January through the first of December). Therefore on December 25, 2014, the amount in the box was the amount of the initial deposit on January 1, 2014 plus 23 times the amount of the monthly deposits. From the solution to the preceding question, we have that the amount in the box on December 25, 2014 was $100 + 23 \times \$25 = \$100 + \$575 = \mathbf{\$675}$.

9. **(C)** $f(x) = 4x^4 - 4 = 4 \Rightarrow 4x^4 = 8 \Rightarrow x^4 = 2 \Rightarrow x = \sqrt[4]{2} \approx 1.189$

Use TACTIC 5: backsolve. Clearly 1, choice (B), doesn't work, so try choice (C). $f(1.19) = 4(1.19)^4 = 4.02$. That is so close to 4 that it must be the answer. The small difference is due to rounding in the answer choices. The real value of x is closer to 1.1892, and $4(1.1892)^4 - 4 = 3.9998$.

10. **(A)** At 10:30 A.M. the first car had been going 40 miles per hour for 1.5 hours, and so had gone $40 \times 1.5 = 60$ miles. The second car covered the same 60 miles in 1 hour and 20 minutes, or $1\frac{1}{3} = \frac{4}{3}$ hours. Therefore, its rate was $60 \div \frac{4}{3} = 60 \times \frac{3}{4} = 45$ miles per hour.

11. **(C)** The product $(a + 4i)(9 - bi) = 9a - abi + 36i - 4bi^2 = 9a + 4b + i(36 - ab)$. Since the product is a real number, the coefficient of i must be 0. So $36 - ab = 0$. Then $ab = 36$, and since $a = 6$, b is also equal to **6**.

12. **(D)** For each coin, the probability that Max guesses wrong is $\frac{1}{2}$. So the probability that he guesses wrong 5 times in a row is $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{32}$. The probability that he does not guess incorrectly each time (and hence the probability that he is correct at least once) is $1 - \frac{1}{32} = \frac{31}{32} \approx 0.97$.

13. **(C)** From the top graph, we see that in 1975, 54% (35% + 19%) of all college students were male and the other 46% were female. So there were 5,400,000 males and 4,600,000 females—a difference of **800,000**.

14. **(B)** In 1975, of every 100 college students, 46 were female—32 of whom were less than 25 years old, and 14 of whom were 25 years old and over. So, 14 of every 46 female students were at least 25 years old. Finally, $\frac{14}{46} \approx 0.30 = \mathbf{30\%}$.

15. **(C)** From the two graphs, we see that in 1975 54% (35% + 19%) of all college students were male, whereas in 1995 the corresponding figure was 45% (28% + 17%). For simplicity, assume that there were 100 college students in 1975, 54 of whom were male. Then in 1995 after a 40% increase in enrollment, there were 140 college students, 63 of whom were male (45% of 140 = 63). So the ratio of the number of male students in 1995 to the number of male students in 1975 is 63:54 = **7:6**.

16. **(B)** The standard form for the equation of a circle whose center is the point (h, k) and whose radius is r is $(x - h)^2 + (y - k)^2 = r^2$. The center of the circle for which $\overline{AB}$ is a diameter is $(3, 3)$, which is the midpoint of segment $\overline{AB}$. The radius of the circle is the distance from a point on the circle, say $A(1, 1)$ to the center $(3, 3)$.

$r = \sqrt{(3-1)^2 + (3-1)^2} = \sqrt{8}$. So $h = 3$, $k = 3$, and $r^2 = 8$.

The equation of the circle is $(x - 3)^2 + (y - 3)^2 = \mathbf{8}$.

17. **(B)** If the administrators constitute 27% of the total, then the teachers are 100% − 27% = 73% of the total. So if T is the total number of participants:

$$0.73T = 584 \Rightarrow T = 584 \div 0.73 = 800$$

Therefore, there are 800 − 584 = **216** administrators at the conference.

18. **(D)** Since $\angle A$ is an angle in both $\triangle AHJ$ and $\triangle ABC$ and since each triangle has a right angle, the triangles are similar. Since $AH = 1$ and $AB = 4$, the ratio of similitude is 4:1, which means that the ratio of their areas is $4^2:1 = \mathbf{16:1}$.

**Since $AH = 4 \times AB$, $HJ = 4 \times BC$. Assume $BC = 2$; then $HJ = 8$. Then the area of $\triangle ABC = \frac{1}{2}(1)(2) = 1$, and the area of $\triangle AHJ = \frac{1}{2}(4)(8) = 16$.

19. **(D)** Let x represent the number of students in the society in 2010. Then the number of students in the society in 2015 was $x + 8$. The number of boys in the society in 2010 was $.375x$ and the number of boys in the society in 2015 could be expressed both as $0.375x + 6$ and $.4(x + 8)$. Therefore,

$$0.375x + 6 = 0.4(x + 8) \Rightarrow 0.375x + 6 = 0.4x + 3.2 \Rightarrow 2.8 = 0.025x \Rightarrow x = 112$$

So, in 2010 the society had 112 members. In 2015, it had 112 + 8 = **120**.

20. **(D)** If P represents the processing fee and t is the cost of each ticket, we have

$$107.95 = P + 4t \quad \text{and} \quad 181.45 = P + 7t$$

Subtracting the first equation from the second one gives $73.50 = 3t$. So $t = 24.50$. Then $107.95 = P + 4(24.5) = P + 98$. Therefore, $P = 107.95 - 98 = \mathbf{9.95}$.

21. **(A)** For each of the four countries, you can just divide the number in the column headed "Travel Outside of Europe" by the number in the column headed "Total." However, if you notice immediately that the answer can't be Finland since there were fewer than half as many people in Finland planning to travel outside of Europe than people from any of the other countries, then you can just do the division for the other three countries.

- Denmark: $6{,}244 \div 21{,}953 = 0.284 = 28.4\%$
- Sweden: $5{,}881 \div 23{,}990 = 0.245 = 24.5\%$
- Norway: $5{,}369 \div 20{,}059 = 0.268 = 26.8\%$

The answer is (A), **Denmark**.

22. **(B)** Of the 1,000 people in the sample, 16.8% ($168 \div 1{,}000$) of them plan to travel to the United States. Since the sample was random, it is likely that about 16.8% of all the original respondents who said they planned to travel outside of Europe would travel to the United States: $0.168 \times 20{,}156 = 3{,}386$. So it is highly likely that the actual number of people would be **between 3,000 and 5,000**.

23. **(B)** Draw and label a cube with a main diagonal of 9 and a side of s.
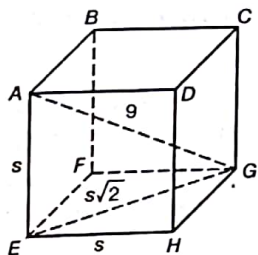
By KEY FACT J8, the length of $\overline{EG}$, a diagonal of the square base, is $s\sqrt{2}$. Then by the Pythagorean theorem (KEY FACT J5), in right $\triangle AEG$:

$$s^2 + (s\sqrt{2})^2 = 9^2 \Rightarrow s^2 + 2s^2 = 81 \Rightarrow 3s^2 = 81 \Rightarrow s^2 = 27$$

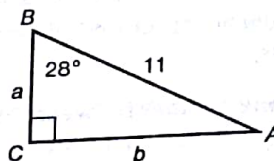Since a cube has 6 faces, each of which has area s^2, the formula for the total surface area of a cube is $A = 6s^2$. So $A = 6 \times 27 = \mathbf{162}$.

24. **(B)** In $\triangle ABC$, $\dfrac{b}{a} = \tan 28° = 0.53$.

**$\sin 28° = \dfrac{b}{11} \Rightarrow b = 11 \sin 28° = 5.164$.

$\cos 28° = \dfrac{a}{11} \Rightarrow a = 11 \cos 28° = 9.712$.

So $\dfrac{b}{a} = \dfrac{5.164}{9.712} = \mathbf{0.53}$.

25. **(B)** Express the quotient as a fraction. Then multiply the numerator and denominator by the conjugate of the denominator:

$$(1+2i)\div(3+4i)=\frac{1+2i}{3+4i}=\frac{1+2i}{3+4i}\cdot\frac{3-4i}{3-4i}=\frac{3-4i+6i-8i^2}{9+16}=\frac{11+2i}{25}=\frac{11}{25}+\frac{2}{25}i$$

So $a=\frac{11}{25}$ and $b=\frac{2}{25}$ and $a+b=\frac{13}{25}=0.52$.

26. **(D)** 16.56 Mexican pesos and 9.47 Argentinian pesos have the same value (namely, 1 U.S. dollar). Set up a proportion:

$$\frac{\text{Mexican pesos}}{\text{Argentinian pesos}}=\frac{16.56}{9.47}=\frac{x}{1}\Rightarrow x=1.7486\approx\mathbf{1.75}$$

27. **(B)** Since $3{,}000\div27=111.1111\ldots$, the school has 111 homerooms. (110 of the homerooms have 27 students each, which accounts for $27\times110=2{,}970$ students. The remaining 30 students are in the 111th homeroom.) Since each of the 110 homerooms with 27 students has 3 participating students, there were a total of 330 participants from those homerooms. The total number of students participating in the survey was those 330 students plus the 4 students in the homeroom with 30 students, a total of **334** students.

28. **(B)** From 1994 to 1996 there was a 9.4% decrease in the number of vehicles stolen. Since 9.4% of $1{,}000{,}000=94{,}000$, the number of vehicles stolen in 1996 was $1{,}000{,}000-94{,}000=\mathbf{906{,}000}$. If you get stuck on a question such as this, you have to guess. But since the number of stolen vehicles is clearly decreasing, be sure to eliminate choice (D) before guessing.

29. **(C)** For simplicity, assume that 1,000 vehicles were stolen in 1994. By 1997, the number had decreased by 12.0% to 880 (12% of $1{,}000=120$, and $1{,}000-120=880$); by 1998, the number had decreased 19.4% to 806 (19.4% of $1{,}000=194$ and $1{,}000-194=806$). So from 1997 to 1998, the number of vehicles stolen decreased by 74 from 880 to 806. This represents a decrease of $\frac{74}{880}\approx0.084=\mathbf{8.4\%}$.

30. **(D)** Simplify the situation by assuming that in 1994 the population was 100,000 and there were 1,000 vehicles stolen. As in the solution to question 29, in 1998 the number of stolen vehicles was 806. At the same time, the number of thefts per 100,000 inhabitants decreased 22.4% from 1,000 to 776. So if there were 776 vehicles stolen for every 100,000 inhabitants, and 806 cars were stolen, the number of inhabitants must have increased. To know by how much, solve the proportion: $\frac{776}{100{,}000}=\frac{806}{x}$. By cross-multiplying, we get $776x=80{,}600{,}000$ and $x=80{,}600{,}000\div776\approx103{,}900$. Then for every 100,000 inhabitants in 1994, there were 103,900 in 1998, an increase of 3.9% or approximately **4%**.

31. **any number between .75 and .857** Since $2b-2a$ is -2 times $a-b$, multiply each term of the given inequality by -2, remembering to change the order of the inequalities since you are multiplying by a negative number:

$$\frac{6}{7}>-2a+2b>\frac{6}{8}\Rightarrow\frac{6}{8}<2b-2a<\frac{6}{7}\Rightarrow0.75<2b-2a<0.857$$

Alternate solution. Pick values for a and b that satisfy the original inequality. Since $-\frac{3}{7} = -0.428$ and $-\frac{3}{8} = -0.375$, let $a = 0$ and $b = 0.4$ so that $a - b = -0.4$. Then $2a - 2b = -0.8$ and $2b - 2a = 0.8$.

32. $\frac{2}{5}$ **or** $\frac{4}{10}$ **or .4** There are a total of 650 juniors and seniors (340 juniors and 310 seniors). Of those, 260 took a language other than Spanish ($98 + 42 + 106 + 14 = 260$). So, the desired fraction is $\frac{260}{650} = \frac{4}{10} = \frac{2}{5}$.

33. **.447** Sketch the line $y = 2x$. Label two points on the line, such as $(0, 0)$ and $(1, 2)$.
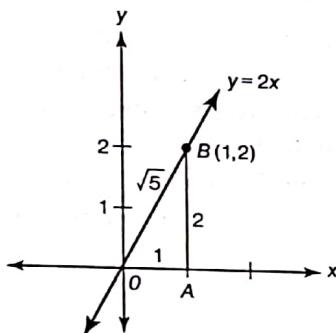
Use the Pythagorean theorem to find the length of $\overline{OB}$, the hypotenuse of $\triangle OAB$:

$$(OB)^2 = 1^2 + 2^2 = 5 \Rightarrow OB = \sqrt{5} \approx 2.236$$

Then $\cos \angle BOA = \dfrac{\text{adjacent}}{\text{hypotenuse}} = \dfrac{1}{2.236} \approx 0.447.$

34. **50** Since the graph of $y = 10x^2 + bx + c$ has x-intercepts at 1.4 and 1.5, $(x - 1.4)$ and $(x - 1.5)$ are factors of $10x^2 + bx + c$. So $y = 10(x - 1.4)(x - 1.5) = 10(x^2 - 2.9x + 2.1) = 10x^2 - 29x + 21$. Then $b = -29$ and $c = 21$. So $c - b = 21 - (-29) = 21 + 29 = 50$.

35. $\frac{1}{2}$ **or .5** The volume of the rectangular block is the area of its face multiplied by its length. Of course, we must use consistent units; since we want the volume in cubic feet, we have to convert the dimensions given in inches to feet:

$$8 \text{ inches} = \frac{8}{12} = \frac{2}{3} \text{ feet; } 5 \text{ inches} = \frac{5}{12} \text{ feet; } 2 \text{ inches} = \frac{2}{12} = \frac{1}{6} \text{ feet}$$

The face of the block is a rectangle with a square removed. The area of the rectangle is $\frac{2}{3} \times \frac{5}{12} = \frac{10}{36}$ square feet. The area of the square is $\frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$ square feet. So the area of the face is $\frac{10}{36} - \frac{1}{36} = \frac{9}{36} = \frac{1}{4}$ square feet. So the volume of the solid is $\frac{1}{4}$ square feet $\times$ 2 feet $= \frac{1}{2}$ cubic feet.

36. **6** Since the density of an object is its weight divided by its volume, the weight of an object is the product of its volume times its density. From the solution to question 35, we know that the volume of the block is $\frac{1}{2}$ cubic feet.

So calculate the densities:

- Spanish mahogany: (0.5 cubic feet) × (53 pounds per cubic foot) = 26.5 pounds.
- Honduran mahogany: (0.5 cubic feet) × (41 pounds per cubic foot) = 20.5 pounds.

So a block made of Spanish mahogany would weigh 6 pounds more than a block made of Honduran mahogany.

37. **15** From the bar graph, we see that 20% of the 500 campers were 15 years old. Since 20% of 500 is 100, there were 100 15-year-old campers at the camp. From the circle graph, we see that 15% of the 15 year olds were pianists. So the number of 15-year-old pianists at the camp in 2015 was 15% of 100, which equals 15.

38. **15** Since 12 of the 13-year-olds and 18 of the 14-year-olds were pianists, 30 of the campers under the age of 15 were pianists. From the solution to question 37, we know that 15 of the 15 year olds were pianists. Finally, from the bar graph, we know that 24% + 16% + 6% + 4% = 50% of the 500 campers, or 250, were 16 or older. Since 12% of those 250 campers were pianists, there were 30 pianists aged 16 or more. Finally, the total number of pianists was 30 + 15 + 30 = 75. So 75 of the 500 campers were pianists, and 75 ÷ 500 = .15 = **15%.**

SCORE ANALYSIS

Reading and Writing Test

Section 1: Reading $\underline{\hspace{2cm}} = \underline{\hspace{2cm}}$ (A)

correct   raw score

Section 2: Writing $\underline{\hspace{2cm}} = \underline{\hspace{2cm}}$ (B)

correct   raw score

To find your Reading and Writing test scores, consult the chart below: find the ranges in which your raw scores lie and read across to find the ranges of your test scores.

$$\underline{\hspace{3cm}} + \underline{\hspace{3cm}} = \underline{\hspace{3cm}} \text{(C)}$$

range of reading   range of writing   range of reading + writing
test scores   test scores   test scores

To find the range of your Reading and Writing Scaled Score, multiply (C) by 10.

Test Scores for the Reading and Writing Sections

Reading Raw Score	Writing Raw Score	Test Score
44–52	39–44	35–40
36–43	33–38	31–34
30–35	28–32	28–30
24–29	22–27	24–27
19–23	17–21	21–23
14–18	13–16	19–20
9–13	9–12	16–18
5–8	5–8	13–15
less than 5	less than 5	10–12

Math Test

Section 3: $\underline{\hspace{2cm}} = \underline{\hspace{2cm}}$ (D)

correct   raw score

Section 4: $\underline{\hspace{2cm}} = \underline{\hspace{2cm}}$ (E)

correct   raw score

Total Math raw score: (D) + (E) = $\underline{\hspace{2cm}}$

To find your Math Scaled Score, consult the chart below: find the range in which your raw score lies and read across to find the range for your scaled score.

Scaled Scores for the Math Test

Raw Score	Scaled Score	Raw Score	Scaled Score
50–58	700–800	20–25	450–490
44–49	650–690	15–19	400–440
38–43	600–640	11–14	350–390
32–37	550–590	7–10	300–340
26–32	500–540	less than 7	200–290

ANSWER SHEET
Model Test 3

Section 1: Reading

1. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓐ Ⓑ Ⓒ Ⓓ
3. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓐ Ⓑ Ⓒ Ⓓ
5. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓐ Ⓑ Ⓒ Ⓓ
7. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓐ Ⓑ Ⓒ Ⓓ
9. Ⓐ Ⓑ Ⓒ Ⓓ
10. Ⓐ Ⓑ Ⓒ Ⓓ
11. Ⓐ Ⓑ Ⓒ Ⓓ
12. Ⓐ Ⓑ Ⓒ Ⓓ
13. Ⓐ Ⓑ Ⓒ Ⓓ

14. Ⓐ Ⓑ Ⓒ Ⓓ
15. Ⓐ Ⓑ Ⓒ Ⓓ
16. Ⓐ Ⓑ Ⓒ Ⓓ
17. Ⓐ Ⓑ Ⓒ Ⓓ
18. Ⓐ Ⓑ Ⓒ Ⓓ
19. Ⓐ Ⓑ Ⓒ Ⓓ
20. Ⓐ Ⓑ Ⓒ Ⓓ
21. Ⓐ Ⓑ Ⓒ Ⓓ
22. Ⓐ Ⓑ Ⓒ Ⓓ
23. Ⓐ Ⓑ Ⓒ Ⓓ
24. Ⓐ Ⓑ Ⓒ Ⓓ
25. Ⓐ Ⓑ Ⓒ Ⓓ
26. Ⓐ Ⓑ Ⓒ Ⓓ

27. Ⓐ Ⓑ Ⓒ Ⓓ
28. Ⓐ Ⓑ Ⓒ Ⓓ
29. Ⓐ Ⓑ Ⓒ Ⓓ
30. Ⓐ Ⓑ Ⓒ Ⓓ
31. Ⓐ Ⓑ Ⓒ Ⓓ
32. Ⓐ Ⓑ Ⓒ Ⓓ
33. Ⓐ Ⓑ Ⓒ Ⓓ
34. Ⓐ Ⓑ Ⓒ Ⓓ
35. Ⓐ Ⓑ Ⓒ Ⓓ
36. Ⓐ Ⓑ Ⓒ Ⓓ
37. Ⓐ Ⓑ Ⓒ Ⓓ
38. Ⓐ Ⓑ Ⓒ Ⓓ
39. Ⓐ Ⓑ Ⓒ Ⓓ

40. Ⓐ Ⓑ Ⓒ Ⓓ
41. Ⓐ Ⓑ Ⓒ Ⓓ
42. Ⓐ Ⓑ Ⓒ Ⓓ
43. Ⓐ Ⓑ Ⓒ Ⓓ
44. Ⓐ Ⓑ Ⓒ Ⓓ
45. Ⓐ Ⓑ Ⓒ Ⓓ
46. Ⓐ Ⓑ Ⓒ Ⓓ
47. Ⓐ Ⓑ Ⓒ Ⓓ
48. Ⓐ Ⓑ Ⓒ Ⓓ
49. Ⓐ Ⓑ Ⓒ Ⓓ
50. Ⓐ Ⓑ Ⓒ Ⓓ
51. Ⓐ Ⓑ Ⓒ Ⓓ
52. Ⓐ Ⓑ Ⓒ Ⓓ

Section 2: Writing and Language

1. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓐ Ⓑ Ⓒ Ⓓ
3. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓐ Ⓑ Ⓒ Ⓓ
5. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓐ Ⓑ Ⓒ Ⓓ
7. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓐ Ⓑ Ⓒ Ⓓ
9. Ⓐ Ⓑ Ⓒ Ⓓ
10. Ⓐ Ⓑ Ⓒ Ⓓ
11. Ⓐ Ⓑ Ⓒ Ⓓ

12. Ⓐ Ⓑ Ⓒ Ⓓ
13. Ⓐ Ⓑ Ⓒ Ⓓ
14. Ⓐ Ⓑ Ⓒ Ⓓ
15. Ⓐ Ⓑ Ⓒ Ⓓ
16. Ⓐ Ⓑ Ⓒ Ⓓ
17. Ⓐ Ⓑ Ⓒ Ⓓ
18. Ⓐ Ⓑ Ⓒ Ⓓ
19. Ⓐ Ⓑ Ⓒ Ⓓ
20. Ⓐ Ⓑ Ⓒ Ⓓ
21. Ⓐ Ⓑ Ⓒ Ⓓ
22. Ⓐ Ⓑ Ⓒ Ⓓ

23. Ⓐ Ⓑ Ⓒ Ⓓ
24. Ⓐ Ⓑ Ⓒ Ⓓ
25. Ⓐ Ⓑ Ⓒ Ⓓ
26. Ⓐ Ⓑ Ⓒ Ⓓ
27. Ⓐ Ⓑ Ⓒ Ⓓ
28. Ⓐ Ⓑ Ⓒ Ⓓ
29. Ⓐ Ⓑ Ⓒ Ⓓ
30. Ⓐ Ⓑ Ⓒ Ⓓ
31. Ⓐ Ⓑ Ⓒ Ⓓ
32. Ⓐ Ⓑ Ⓒ Ⓓ
33. Ⓐ Ⓑ Ⓒ Ⓓ

34. Ⓐ Ⓑ Ⓒ Ⓓ
35. Ⓐ Ⓑ Ⓒ Ⓓ
36. Ⓐ Ⓑ Ⓒ Ⓓ
37. Ⓐ Ⓑ Ⓒ Ⓓ
38. Ⓐ Ⓑ Ⓒ Ⓓ
39. Ⓐ Ⓑ Ⓒ Ⓓ
40. Ⓐ Ⓑ Ⓒ Ⓓ
41. Ⓐ Ⓑ Ⓒ Ⓓ
42. Ⓐ Ⓑ Ⓒ Ⓓ
43. Ⓐ Ⓑ Ⓒ Ⓓ
44. Ⓐ Ⓑ Ⓒ Ⓓ

ANSWER SHEET
Model Test 3

Section 3: Math (No Calculator)

1. Ⓐ Ⓑ Ⓒ Ⓓ   5. Ⓐ Ⓑ Ⓒ Ⓓ   9. Ⓐ Ⓑ Ⓒ Ⓓ   13. Ⓐ Ⓑ Ⓒ Ⓓ

2. Ⓐ Ⓑ Ⓒ Ⓓ   6. Ⓐ Ⓑ Ⓒ Ⓓ   10. Ⓐ Ⓑ Ⓒ Ⓓ   14. Ⓐ Ⓑ Ⓒ Ⓓ

3. Ⓐ Ⓑ Ⓒ Ⓓ   7. Ⓐ Ⓑ Ⓒ Ⓓ   11. Ⓐ Ⓑ Ⓒ Ⓓ   15. Ⓐ Ⓑ Ⓒ Ⓓ

4. Ⓐ Ⓑ Ⓒ Ⓓ   8. Ⓐ Ⓑ Ⓒ Ⓓ   12. Ⓐ Ⓑ Ⓒ Ⓓ

16.   17.   18.

19.   20.

ANSWER SHEET
Model Test 3

Section 4: Math (Calculator)

1. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓐ Ⓑ Ⓒ Ⓓ
3. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓐ Ⓑ Ⓒ Ⓓ
5. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓐ Ⓑ Ⓒ Ⓓ
7. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓐ Ⓑ Ⓒ Ⓓ

9. Ⓐ Ⓑ Ⓒ Ⓓ
10. Ⓐ Ⓑ Ⓒ Ⓓ
11. Ⓐ Ⓑ Ⓒ Ⓓ
12. Ⓐ Ⓑ Ⓒ Ⓓ
13. Ⓐ Ⓑ Ⓒ Ⓓ
14. Ⓐ Ⓑ Ⓒ Ⓓ
15. Ⓐ Ⓑ Ⓒ Ⓓ
16. Ⓐ Ⓑ Ⓒ Ⓓ

17. Ⓐ Ⓑ Ⓒ Ⓓ
18. Ⓐ Ⓑ Ⓒ Ⓓ
19. Ⓐ Ⓑ Ⓒ Ⓓ
20. Ⓐ Ⓑ Ⓒ Ⓓ
21. Ⓐ Ⓑ Ⓒ Ⓓ
22. Ⓐ Ⓑ Ⓒ Ⓓ
23. Ⓐ Ⓑ Ⓒ Ⓓ
24. Ⓐ Ⓑ Ⓒ Ⓓ

25. Ⓐ Ⓑ Ⓒ Ⓓ
26. Ⓐ Ⓑ Ⓒ Ⓓ
27. Ⓐ Ⓑ Ⓒ Ⓓ
28. Ⓐ Ⓑ Ⓒ Ⓓ
29. Ⓐ Ⓑ Ⓒ Ⓓ
30. Ⓐ Ⓑ Ⓒ Ⓓ

31.
32.
33.
34.
35.
36.
37.
38.

READING TEST

65 MINUTES, 52 QUESTIONS

Turn to Section 1 of your answer sheet to answer the questions in this section.

> **Directions:** Following each of the passages (or pairs of passages) below are questions about the passage (or passages). Read each passage carefully. Then, select the best answer for each question based on what is stated in the passage (or passages) and in any graphics that may accompany the passage.

Questions 1–11 are based on the following passage.

The following passage is taken from Great Expectations *by Charles Dickens. In it, the hero, Pip, recollects a dismal period in his youth during which he for a time lost hope of ever bettering his fortunes.*

It is a most miserable thing to feel ashamed of home. There may be black ingratitude in the thing, and the punishment
Line may be retributive and well deserved; but,
(5) that it is a miserable thing, I can testify. Home had never been a very pleasant place to me, because of my sister's temper. But Joe had sanctified it and I believed in it. I had believed in the best parlor as a most elegant
(10) salon; I had believed in the front door as a mysterious portal of the Temple of State whose solemn opening was attended with a sacrifice of roast fowls; I had believed in the kitchen as a chaste though not magnificent
(15) apartment; I had believed in the forge as the glowing road to manhood. Now, it was all coarse and common, and I would not have had Miss Havisham and Estella see it on any account.
(20)   Once, it had seemed to me that when I should at last roll up my shirt sleeves and go into the forge, Joe's 'prentice, I should be distinguished and happy. Now the reality was in my hold, I only felt that I was dusty
(25) with the dust of small coal, and that I had a weight upon my daily remembrance to which the anvil was a feather. There have been occasions in my later life (I suppose as in most lives) when I have felt for a time as
(30) if a thick curtain had fallen on all its interest and romance, to shut me out from any thing save dull endurance any more. Never has that curtain dropped so heavy and blank, as when my way in life lay stretched out straight
(35) before me through the newly-entered road of apprenticeship to Joe.
    I remember that at a later period of my "time," I used to stand about the churchyard on Sunday evenings, when night was falling,
(40) comparing my own perspective with the windy marsh view, and making out some likeness between them by thinking how flat and low both were, and how on both there came an unknown way and a dark mist and
(45) then the sea. I was quite as dejected on the first working-day of my apprenticeship as in that after time; but I am glad to know that I never breathed a murmur to Joe while my indentures lasted. It is about the only thing I
(50) am glad to know of myself in that connection.
    For, though it includes what I proceed to add, all the merit of what I proceed to add was Joe's. It was not because I was faithful, but because Joe was faithful, that I never ran
(55) away and went for a soldier or a sailor. It was not because I had a strong sense of the virtue

of industry, but because Joe had a strong
sense of the virtue of industry, that I worked
with tolerable zeal against the grain. It is not
(60) possible to know how far the influence of any
amiable honest-hearted duty-going man flies
out into the world; but it is very possible to
know how it has touched one's self in going
by, and I know right well that any good that
(65) intermixed itself with my apprenticeship
came of plain contented Joe, and not of
restless aspiring discontented me.

   What I wanted, who can say? How can I
say, when I never knew? What I dreaded was,
(70) that in some unlucky hour I, being at my
grimiest and commonest, should lift up my
eyes and see Estella looking in at one of the
wooden windows of the forge. I was haunted
by the fear that she would, sooner or later,
(75) find me out, with a black face and hands,
doing the coarsest part of my work, and
would exult over me and despise me. Often
after dark, when I was pulling the bellows for
Joe, and we were singing Old Clem, and when
(80) the thought how we used to sing it at Miss
Havisham's would seem to show me Estella's
face in the fire, with her pretty hair fluttering
in the wind and her eyes scorning me,—often
at such a time I would look towards those
(85) panels of black night in the wall which the
wooden windows then were, and would fancy
that I saw her just drawing her face away, and
would believe that she had come at last.

   After that, when we went in to supper,
(90) the place and the meal would have a more
homely look than ever, and I would feel more
ashamed of home than ever, in my own
ungracious breast.

1. The passage as a whole is best described as

   (A) an analysis of the reasons behind a
       change in attitude.
   (B) an account of a young man's reflections
       on his emotional state.
   (C) a description of a young man's
       awakening to the harshness of working
       class life.
   (D) a criticism of young people's ingratitude
       to their elders.

2. Thanks to Joe, the narrator's early image of
   his home can best be described as basically

   (A) miserable.
   (B) modest.
   (C) positive.
   (D) realistic.

3. Which choice provides the best evidence for
   the answer to the previous question?

   (A) Lines 1–5 ("It is a most . . . testify")
   (B) Lines 8–16 ("I had believed . . .
       manhood")
   (C) Lines 23–36 ("Now the reality . . . Joe")
   (D) Lines 37–45 ("I remember . . . the sea")

4. In the passage, Joe is portrayed most
   specifically as

   (A) distinguished.
   (B) virtuous.
   (C) independent.
   (D) coarse.

GO ON TO THE NEXT PAGE

5. Which word could best replace "time" in line 38?

(A) apprenticeship
(B) childhood
(C) sentence
(D) existence

6. The passage suggests that the narrator's increasing discontent with his home during his apprenticeship was caused by

(A) a new awareness on his part of how his home would appear to others.
(B) the increasing heaviness of the labor that his apprenticeship required.
(C) the unwillingness or inability of Joe to curb his sister's temper.
(D) a combination of simple ingratitude and human sinfulness.

7. Which choice provides the best evidence for the answer to the previous question?

(A) Lines 1–2 ("It is . . . home")
(B) Lines 6–7 ("Home . . . temper")
(C) Lines 16–19 ("Now, it . . . account")
(D) Lines 23–27 ("Now the reality . . . feather")

8. According to the passage, the narrator gives himself a measure of credit for

(A) working diligently despite his unhappiness.
(B) abandoning his hope of a military career.
(C) keeping his menial position secret from Estella.
(D) concealing his despondency from Joe.

9. The author includes the description of the narrator's view from the churchyard (lines 37–45) primarily to

(A) suggest the narrator's strong prospects for advancement.
(B) highlight the beauty of the natural setting.
(C) emphasize the depth of the narrator's gloom.
(D) foreshadow Joe's eventual demise.

10. As used in line 91, "homely" most nearly means

(A) plain and unrefined.
(B) cosy and comfortable.
(C) proper and domestic.
(D) commonly known.

11. The description in the next-to-last paragraph indicates that what the narrator fears most about Estella is her

(A) passionate temperament.
(B) scornful disposition.
(C) haunting beauty.
(D) inquisitive nature.

Questions 12–21 are based on the following passage.

The following passage is excerpted from a text on Native American history. Here, the author describes how certain major Indian nations related to the European powers during the 1700s.

By the end of the seventeenth century the coastal tribes along most of the Atlantic seaboard had been destroyed, dispersed,
Line or subjected directly to European control.
(5) Yet the interior tribes—particularly those who had grouped themselves into confederations—remained powers (and were usually styled nations) who dealt with Europeans on a rough plane of equality.
(10) Throughout the eighteenth century, the Creeks, Choctaws, Chickasaws, Cherokees, and Iroquois, as well as the tribes of the Old Northwest, alternately made war and peace with the various European powers,
(15) entered into treaties of alliance and friendship, and sometimes made cessions of territory as a result of defeat in war. As the imperial power of France and Great

Britain expanded into the interior, those
(20) powerful Indian nations were forced to seek new orientations in their policy. For each Indian nation the reorientation was different, yet each was powerfully affected by the growth of European settlements,
(25) population, and military power. The history of the reorientation of Iroquois policy toward the Europeans may serve as an example of the process that all the interior nations experienced in the eighteenth century.
(30) The stability that had marked the Iroquois Confederacy's generally pro-British position was shattered with the overthrow of James II in 1688, the colonial uprisings that followed in Massachusetts, New York, and
(35) Maryland, and the commencement of King William's War against Louis XIV of France. The increasing French threat to English hegemony in the interior of North America was signalized by French-led or French-
(40) inspired attacks on the Iroquois and on outlying colonial settlements in New York and New England. The high point of the Iroquois response was the spectacular raid of August 5, 1689, in which the Iroquois virtually

**Iroquois Confederacy Relations and Treaties
with the French & English**
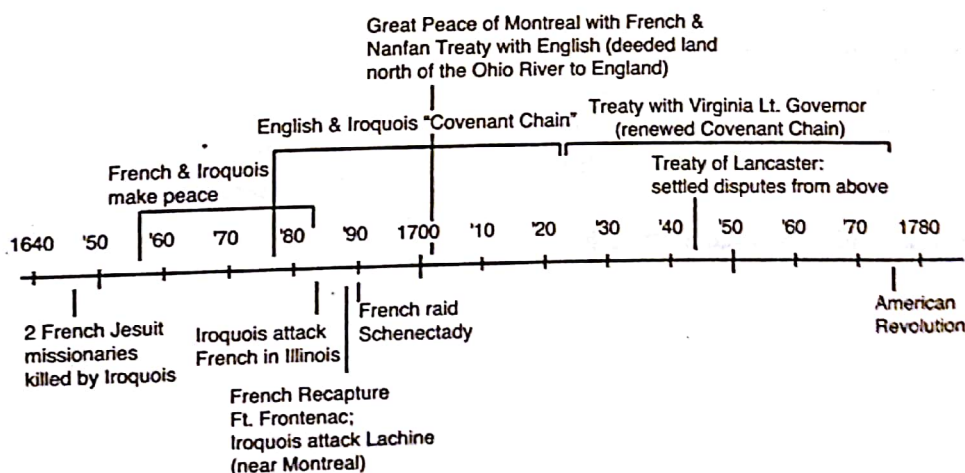
GO ON TO THE NEXT PAGE

(45) wiped out the French village of Lachine, just outside Montreal. A counterraid by the French on the English village of Schenectady in March, 1690, instilled an appropriate measure of fear among the English and their
(50) Iroquois allies.

The Iroquois position at the end of the war, which was formalized by treaties made during the summer of 1701 with the British and the French, and which was maintained
(55) throughout most of the eighteenth century, was one of "aggressive neutrality" between the two competing European powers. Under the new system the Iroquois initiated a peace policy toward the "far Indians," tightened
(60) their control over the nearby tribes, and induced both English and French to support their neutrality toward the European powers by appropriate gifts and concessions.

By holding the balance of power in
(65) the sparsely settled borderlands between English and French settlements, and by their willingness to use their power against one or the other nation if not appropriately treated, the Iroquois played the game of
(70) European power politics with effectiveness. The system broke down, however, after the French became convinced that the Iroquois were compromising the system in favor of the English and launched a full-scale attempt
(75) to establish French physical and juridical presence in the Ohio Valley, the heart of the borderlands long claimed by the Iroquois. As a consequence of the ensuing Great War for Empire, in which Iroquois neutrality was
(80) dissolved and European influence moved closer, the play-off system lost its efficacy and a system of direct bargaining supplanted it.

12. The author's primary purpose in this passage is to

(A) disprove the charges of barbarism made against the Indian nations.
(B) expose the French government's exploitation of the Iroquois balance of power.
(C) describe and assess the effect of European military power on the policy of an Indian nation.
(D) show the inability of the Iroquois nation to engage in European-style diplomacy.

13. As used in line 8, "styled" most nearly means

(A) arranged.
(B) designated.
(C) brought into conformity with.
(D) designed in a particular fashion.

14. In writing that certain of the interior tribes "dealt with Europeans on a rough plane of equality" (lines 8–9), the author

(A) suggests that the coastal tribes lacked essential diplomatic skills.
(B) concedes that the Indians were demonstrably superior to the Europeans.
(C) acknowledges that European-Indian relations were not those of absolute equals.
(D) emphasizes that the Europeans wished to treat the Indians equitably.

15. According to the chart, the years 1684–1700 were characterized by

(A) a significant easing in relations between the Iroquois and the French.
(B) roughly neutral relationships between the Iroquois and both the French and the English.
(C) intermittent warlike raids by the Iroquois against the French.
(D) a lessening of hostility toward the English by the French.

16. It can be inferred from the passage that the author's attitude toward the Iroquois leadership can best be described as one of

(A) suspicion of their motives.
(B) respect for their competence.
(C) indifference to their fate.
(D) pride in their heritage.

17. Which choice provides the best evidence for the answer to the previous question?

(A) Lines 17–21 ("As the imperial . . . policy")
(B) Lines 25–29 ("The history . . . century")
(C) Lines 46–50 ("A counterraid . . . allies")
(D) Lines 57–63 ("Under . . . concessions")

18. The author attributes such success as the Iroquois policy of aggressive neutrality had to

(A) the readiness of the Iroquois to fight either side.
(B) the Iroquois' ties of loyalty to the British.
(C) French physical presence in the borderlands.
(D) European reliance on formal treaties.

19. Which choice provides the best evidence for the answer to the previous question?

(A) Lines 10–17 ("Throughout . . . war")
(B) Lines 30–36 ("The stability . . . France")
(C) Lines 64–70 ("By holding . . . effectiveness")
(D) Lines 71–77 ("The system . . . Iroquois")

20. As used in line 73, "compromising" most nearly means

(A) embarrassing.
(B) jeopardizing.
(C) accepting lower standards.
(D) striking a balance.

21. The final three paragraphs of the passage provide

(A) an instance of a state of relationships described earlier.
(B) a modification of a thesis presented earlier.
(C) a refutation of an argument made earlier.
(D) a summary of the situation referred to earlier.

Questions 22–31 are based on the following passage.

The following passage on the formation of oil is excerpted from Athabasca, *a novel about oil exploration written by Alistair MacLean.*

Five main weather elements act upon rock. Frost and ice fracture rock. It can be gradually eroded by airborne dust. The action
Line of the seas, whether through the constant
(5) movement of tides or the pounding of heavy storm waves, remorselessly wears away the coastlines. Rivers are immensely powerful destructive agencies—one has but to look at the Grand Canyon to appreciate their
(10) enormous power. And such rocks as escape all these influences are worn away over the eons by the effect of rain.

Whatever the cause of erosion, the net result is the same. The rock is reduced to its
(15) tiniest possible constituents—rock particles or, simply, dust. Rain and melting snow carry this dust down to the tiniest rivulets ·and the mightiest rivers, which, in turn, transport it to lakes, inland seas and the
(20) coastal regions of the oceans. Dust, however fine and powdery, is still heavier than water, and whenever the water becomes sufficiently still, it will gradually sink to the bottom, not only in lakes and seas but also in the sluggish
(25) lower reaches of rivers and where flood conditions exist, in the form of silt.

And so, over unimaginably long reaches of time, whole mountain ranges are carried down to the seas, and in the process, through
(30) the effects of gravity, new rock is born as layer after layer of dust accumulates on the bottom, building up to a depth of ten, a hundred, perhaps even a thousand feet, the lowermost layers being gradually compacted
(35) by the immense and steadily increasing

pressures from above, until the particles fuse together and reform as a new rock.

It is in the intermediate and final processes of the new rock formation that
(40) oil comes into being. Those lakes and seas of hundreds of millions of years ago were almost choked by water plants and the most primitive forms of aquatic life. On dying, they sank to the bottom of the lakes and
(45) seas along with the settling dust particles and were gradually buried deep under the endless layers of more dust and more aquatic and plant life that slowly accumulated above them. The passing of millions of years and
(50) the steadily increasing pressures from above gradually changed the decayed vegetation and dead aquatic life into oil.

Described this simply and quickly, the process sounds reasonable enough. But
(55) this is where the gray and disputatious area arises. The conditions necessary for the formation of oil are known; the cause of the metamorphosis is not. It seems probable that some form of chemical catalyst is involved,
(60) but this catalyst has not been isolated. The first purely synthetic oil, as distinct from secondary synthetic oils such as those derived from coal, has yet to be produced. We just have to accept that oil is oil, that
(65) it is there, bound up in rock strata in fairly well-defined areas throughout the world but always on the sites of ancient seas and lakes, some of which are now continental land, some buried deep under the encroachment
(70) of new oceans.

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22. The passage is written from the perspective of someone who is

   (A) actively engaged in conducting petrochemical research.
   (B) an advocate for the production of purely synthetic oil.
   (C) a prospector involved in the search for underwater oil deposits.
   (D) knowledgeable about oil deposits and the oil-mining industry.

23. As used in line 1, "act" most nearly means

   (A) behave.
   (B) make a decision.
   (C) have a particular effect.
   (D) counterfeit.

24. The author uses the Grand Canyon (line 9) as an example of

   (A) the urgent need for dams.
   (B) the devastating impact of rivers.
   (C) the magnificence of nature.
   (D) a site where oil may be found.

25. According to the author, our understanding of the process by which oil is created is

   (A) adequate.
   (B) systematic.
   (C) erroneous.
   (D) deficient.

26. Which choice provides the best evidence for the answer to the previous question?

   (A) Lines 38–40 ("It is . . . being")
   (B) Lines 43–49 ("On dying . . . them")
   (C) Lines 56–58 ("The conditions . . . not")
   (D) Lines 60–63 ("The first . . . produced")

27. It can most reasonably be inferred that prospectors should search for oil deposits

   (A) wherever former seas existed.
   (B) in mountain streambeds.
   (C) where coal deposits are found.
   (D) in new rock formations.

28. The author does all of the following EXCEPT

   (A) describe a process.
   (B) state a possibility.
   (C) mention a limitation.
   (D) propose a solution.

29. As used in line 56, "conditions" most nearly means

   (A) surroundings.
   (B) prerequisites.
   (C) medical problems.
   (D) social positions.

30. The author indicates that the cause of the metamorphosis of decayed vegetation and dead aquatic life into oil should be considered

  (A) an historical anomaly.
  (B) an unexplained phenomenon.
  (C) a scientific curiosity.
  (D) a working hypothesis.

31. Which choice provides the best evidence for the answer to the previous question?

  (A) Lines 38–40 ("It is in . . . being")
  (B) Lines 49–52 ("The passing . . . oil")
  (C) Lines 56–60 ("The conditions . . . isolated")
  (D) Lines 60–63 ("The first . . . produced")

Questions 32–41 are based on the following passage.

The following passage is taken from Up from Slavery, *the autobiography of Booker T. Washington.*

Finally the war closed, and the day of freedom came. It was a momentous and eventful day to all upon our plantation. We
Line had been expecting it. Freedom was in the
(5) air, and had been for months. . . . As the great day drew nearer, there was more singing in the slave quarters than usual. It was bolder, had more ring, and lasted later into the night. Most of the verses of the plantation
(10) songs had some reference to freedom. True, they had sung those same verses before, but they had been careful to explain that the "freedom" in these songs referred to the next world, and had no connection with life in
(15) this world. Now they gradually threw off the mask, and were not afraid to let it be known that the "freedom" in their songs meant freedom of the body in this world.

The night before the eventful day, word
(20) was sent to the slave quarters to the effect that something unusual was going to take place at the "big house" the next morning. There was little, if any, sleep that night. All was excitement and expectancy. Early the
(25) next morning word was sent to all the slaves, old and young, to gather at the house. In company with my mother, brother, and sister, and a large number of other slaves, I went to the master's house. All of our master's family
(30) were either standing or seated on the veranda of the house, where they could see what was to take place and hear what was said. There was a feeling of deep interest, or perhaps sadness, on their faces, but not bitterness. As
(35) I now recall the impression they made upon me, they did not at the moment seem to be

GO ON TO THE NEXT PAGE

sad because of the loss of property, but rather because of parting with those whom they had reared and who were in many ways very
(40) close to them. The most distinct thing that I now recall in connection with the scene was that some man who seemed to be a stranger (a United States officer, I presume) made a little speech and then read a rather long
(45) paper—the Emancipation Proclamation, I think. After the reading we were told that we were all free, and could go when and where we pleased. My mother, who was standing by my side, leaned over and kissed her children,
(50) while tears of joy ran down her cheeks. She explained to us what it all meant, that this was the day for which she had been so long praying, but fearing that she would never live to see.

(55)   For some minutes there was great rejoicing, and thanksgiving, and wild scenes of ecstasy. But there was no feeling of bitterness. In fact, there was pity among the slaves for our former owners. The wild
(60) rejoicing on the part of the emancipated colored people lasted but for a brief period, for I noticed that by the time they returned to their cabins there was a change in their feelings. The great responsibility of being
(65) free, of having charge of themselves, of having to think and plan for themselves and their children, seemed to take possession of them. It was very much like suddenly turning a youth of ten or twelve years out
(70) into the world to provide for himself. In a few hours the great questions with which the Anglo-Saxon race had been grappling for centuries had been thrown upon these people to be solved. These were the
(75) questions of a home, a living, the rearing of children, education, citizenship, and the establishment and support of churches. Was

it any wonder that within a few hours the wild rejoicing ceased and a feeling of deep
(80) gloom seemed to pervade the slave quarters? To some it seemed that, now that they were in actual possession of it, freedom was a more serious thing than they had expected to find it. Some of the slaves were seventy or
(85) eighty years old; their best days were gone. They had no strength with which to earn a living in a strange place and among strange people, even if they had been sure where to find a new place of abode. To this class the
(90) problem seemed especially hard. Besides, deep down in their hearts there was a strange and peculiar attachment to "old Marster" and "old Missus," and to their children, which they found it hard to think of breaking off.
(95) With these they had spent in some cases nearly a half-century, and it was no light thing to think of parting. Gradually, one by one, stealthily at first, the older slaves began to wander from the slave quarters back to the
(100) "big house" to have a whispered conversation with their former owners as to the future.

32. As used in line 1, "closed" most nearly means

 (A) shut.
 (B) ended.
 (C) grew nearer.
 (D) blocked off.

33. Which choice best summarizes the first two paragraphs of the passage (lines 1–54)?

 (A) Even though a young man has been brought up in slavery, he finds comfort in singing.
 (B) A loving parent attempts to help her children understand the importance of freedom.
 (C) A man recollects an historic moment that changed his life and the lives of everyone he knew.
 (D) The end of the Civil War failed to disrupt the customary routines of plantation life.

34. Which choice provides the best evidence for the answer to the previous question?

 (A) Lines 5–9 ("As the great . . . night")
 (B) Lines 19–22 ("The night before . . . morning")
 (C) Lines 34–48 ("As I now . . . pleased")
 (D) Lines 48–54 ("My mother . . . see")

35. It can most reasonably be inferred from the passage that the mask that the slaves gradually threw off was

 (A) a disguise that they wore in order to conceal their true identity.
 (B) the pretense that the freedom they sang about was purely spiritual.
 (C) an elaborate façade that allowed them to perform at public gatherings.
 (D) a grotesque false face typically worn at a carnival or masquerade.

36. Which choice provides the best evidence for the answer to the previous passage?

 (A) Lines 1–3 ("Finally . . . plantation")
 (B) Lines 5–7 ("As . . . usual")
 (C) Lines 9–10 ("Most . . . freedom")
 (D) Lines 15–18 ("Now . . . world")

37. The "charge" to which the author refers (line 65) can best be characterized as

 (A) a formal accusation.
 (B) a headlong rush forward.
 (C) the price asked for goods or services.
 (D) the duty of being responsible for oneself.

38. As used in line 96, "light" most nearly means

 (A) indistinct.
 (B) pale.
 (C) trivial.
 (D) agile.

39. Throughout the passage the narrator most emphasizes which aspect of the experience?

 (A) The orderliness of the freed slaves' reception of the news.
 (B) The absence of any ill will expressed by either the slaves or their masters.
 (C) The presence of a white stranger on the veranda of the big house.
 (D) The lack of appropriate preparation for events of such great significance.

40. During the course of the final paragraph, the focus of the narrator's recollection shifts from

(A) a scene of momentary jubilation to sobering reflection on problems to be faced.
(B) generalizations about newfound freedom to the specifics of his personal situation.
(C) the identification of a change of mood to consideration of current possibilities.
(D) evaluation of factors making the slaves unhappy to recognition of solutions.

41. The final paragraph indicates that the older slaves' stealthy visit to the big house was mainly inspired by their

(A) bitterness at the sudden changes in their lives.
(B) impatience with the noisy rejoicing of the younger slaves.
(C) reluctance to remain in the slave quarters any longer.
(D) apprehensions about their uncertain future.

Questions 42–52 are based on the following passages.

The following two passages explore recent research on the effects of food intake on animal metabolisms.

PASSAGE 1

Fruit flies' brains may be wired to count calories.

Several genes in the brain appear to
Line help the flies learn to distinguish between
(5) normal-calorie and high-calorie foods—and to remember to choose the healthier option later. Feeding the flies a constant diet of high-calorie foods disrupts their ability to make these metabolic memories, researchers
(10) report April 7 in *Nature Communications*.

Preliminary studies suggest that mice make similar metabolic memories, the researchers say. Taken together, the results hint that human brains may also be wired
(15) to do the same thing, which could have implications for weight control and health. But constant exposure to high-calorie foods may have damaged humans' abilities to make metabolic memories, says study
(20) coauthor Dongsheng Cai. Being able to rebuild humans' metabolic memory could help control diseases such as obesity and diabetes, he says.

Cai and his colleagues gave fruit flies
(25) (*Drosophila melanogaster*) a choice between yeast mixed with a moderate amount of a sugar called sorbitol and yeast mixed with an extra amount of this sugar. Flies spent a day in a vial with the moderately sugary yeast and
(30) then a day in a vial with extra-sugary (and therefore higher-calorie) yeast. After cycling through the vials several times, the flies started to eat more of the moderately sugary yeast. The food choices tasted the same, but

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(35) each was matched with a particular smell. Flies put in a container with only the smells that matched the two food options (but no food) preferred the smell associated with the moderate-calorie yeast.

(40)   When the flies spent consecutive days in vials with the more sugary yeast, however, they lost their ability to distinguish between the moderate-calorie and high-calorie options. This observation suggests that

(45) access to high-calorie food may damage the flies' ability to make metabolic memories, the researchers say. These flies also had higher levels of sugar and fat accumulated in their bodies, conditions that predispose mammals

(50) to diabetes.

["Brains may be wired to count calories, make healthy choices," by Ashley Yeager, *Science News* blog, 11:00AM, APRIL 7, 2015]

PASSAGE 2

When you eat may determine how long and strongly your heart beats.

Fruit flies that limited eating to 12-hour stints had steadier heartbeats in old age

(55) than flies that ate whenever they wanted, researchers report in the March 13 *Science*. The study adds to a growing body of evidence that the timing of meals may be as important for health as diet composition and calorie

(60) counts are.

The research also "suggests that the body clock is involved in cardiovascular function and risk," says Frank Scheer, a neuroscientist and physiologist at Harvard Medical School.

(65) Scheer was not involved in the fruit fly study, but has shown that disrupting people's daily, or circadian, rhythms can damage their health.

Circadian clocks work in nearly every

(70) cell in the body. They govern a wide variety of body rhythms, such as those associated with body temperature, blood pressure, and sleep. The main timekeeper is located in the brain and is set by light, but other clocks

(75) synchronize themselves according to feeding time.

Previous research in mice had suggested that limiting eating to 12 hours per day could protect rodents from obesity and

(80) other ravages of high-fat diets. Those studies couldn't address heart problems associated with poor diet because mice don't get heart disease the way people do, says Satchidananda Panda, a circadian biologist at

(85) the Salk Institute for Biological Studies.

Fruit flies, on the other hand, develop irregular heartbeats and other heart problems as they age. So Panda set out to test whether limiting the amount of time fruit

(90) flies eat, but not cutting back on calories, could affect the insects' heart health.

One group of flies ate a cornmeal diet around the clock; another group had access to the same food for only 12 hours each day.

(95) Both groups ate about the same amount overall, but the 24-hour group snacked at night.

The groups had similar amounts of activity. The flies with time-restricted feeding

(100) did most of their moving during the day, though, and slept better at night.

At 3 weeks old, flies in both groups had regular, healthy hearts. At 5 weeks—fruit fly middle age—the 12-hour eaters' hearts

(105) maintained a steady rhythm of roughly one beat per second. The hearts of the anytime eaters beat irregularly, sometimes skipping a beat and sometimes quivering. By 7 weeks, the anytimers had badly deteriorated heart
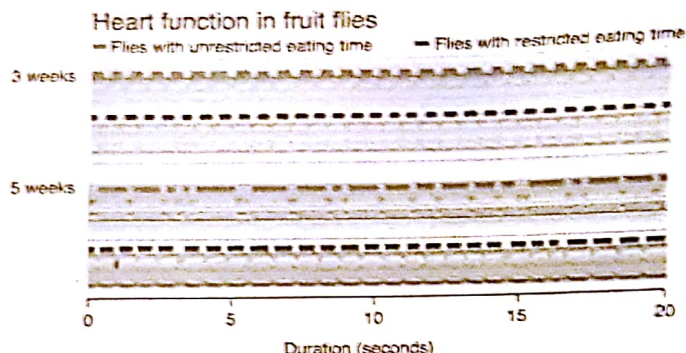
(110) function. Flies on a 12-hour schedule also

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Heart function in fruit flies

KEEPING TIME
Fruit flies that eat just 12 hours per day (black lines) maintain steady heartbeats into middle age (5 weeks old), whereas the hearts of fruit flies that can eat around the clock (gray) beat irregularly. Each gray or black dash represents the contraction of the heart.

lost a few beats over time, but their heart problems were not as severe.

Switching anytime flies to a 12-hour schedule at 5 weeks old improved some (115) measures of heart function, but not all. In other experiments, restricting feeding time also staved off some of the negative heart effects of high-fat diets.

Improved sleep in the 12-hour eaters (120) might account for some of the heart benefits, Scheer says. Lack of sleep is linked to a variety of diseases in people, including heart disease. No one knows whether restricting mealtimes will improve human health, he (125) says.

[From "For healthy eating, timing matters," by Tina Hesman Saey, *Science News*, Vol. 187, #7, April 4, 2015.]

42. The main purpose of Passage 1 is to

(A) present a recent study with possible implications for humans.
(B) provide new evidence to support the use of fruit flies in scientific experiments.
(C) analyze the importance of following a low-calorie diet.
(D) note a common misconception about the nature of memory.

43. As used in line 14, "wired" most nearly means

(A) equipped.
(B) tense.
(C) stregthened.
(D) tied.

44. It can most reasonably be inferred from Passage 1 that metabolic memories

(A) encourage the absorption of sorbitol and yeast by both mice and fruit flies.
(B) are involved in the process of food selection.
(C) last longer than other forms of memory found in laboratory animals.
(D) are solely dependent on the sense of smell.

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MODEL TEST 3

45. Which choice provides the best evidence for the answer to the previous question?

   (A) Lines 3–7 ("Several . . . later")
   (B) Lines 11–13 ("Preliminary . . . say")
   (C) Lines 17–20 ("But . . . Cai")
   (D) Lines 36–39 ("Flies . . . yeast")

46. The author of Passage 2 cites Scheer as

   (A) a reporter involved in an ongoing investigation of the eating patterns of fruit flies.
   (B) a researcher unconnected with the study being discussed but possessing relevant expertise.
   (C) an advocate for heart-healthy, low-fat diets for adults.
   (D) an expert on the cardiovascular effects of restricting feeding time.

47. It can most reasonably be inferred from Passage 2 that fruit flies are preferable to mice as subjects for cardiovascular research because

   (A) mice seldom suffer any ill effects from eating high-fat diets.
   (B) fruit flies, unlike mice, contract cardiac problems as they age.
   (C) fruit flies are more prone to obesity than mice are.
   (D) fruit flies breed rapidly and therefore are readily available as cardiac research subjects.

48. Which choice provides the best evidence for the answer to the previous question?

   (A) Lines 53–56 ("Fruit flies . . . *Science*")
   (B) Lines 77–80 ("Previous research . . . diets")
   (C) Lines 80–88 ("Those studies . . . age")
   (D) Lines 88–91 ("So Panda . . . heart health")

49. As used in line 81, "address" most nearly means

   (A) speak to.
   (B) protest.
   (C) deal with.
   (D) call.

50. Which statement about the effect of restricted eating times on fruit flies is best supported by the chart?

   (A) Fruit flies whose eating time was restricted to 12 hours per day developed irregular heartbeats at the age of 3 weeks.
   (B) Fruit flies limited to eating just 12 hours per day for the most part maintained a one heartbeat per second rhythm into middle age.
   (C) The hearts of the fruit flies with restricted eating time frequently skipped a beat or quivered.
   (D) Fruit flies with time-restricted feeding slept better at night than their counterparts in the anytime feeding group did.

51. One difference between the experiments described in the two passages is that, unlike the researchers discussed in Passage 1, Panda and his colleagues

(A) fed one group of fruit flies a more highly calorific diet than they fed the other.

(B) regulated the amount of time groups of fruit flies had for eating.

(C) restricted the amount of calories the fruit flies were allowed to consume.

(D) failed to develop high levels of sugar and fat in their test subjects.

52. The fruit flies given extra sugary yeast in Passage 1 and those following the 24-hour eating schedule in Passage 2 shared which trait?

(A) They gradually adapted to a high-calorie diet.

(B) They became unable to remember which food option to select.

(C) They increasingly grew physically inactive and began to develop sleep problems at night.

(D) They suffered more severe health problems than fruit flies in their control groups did.

STOP

If there is still time remaining, you may review your answers.

WRITING AND LANGUAGE TEST

35 MINUTES, 44 QUESTIONS

Turn to Section 2 of your answer sheet to answer the questions in this section.

Directions: Questions follow each of the passages below. Some questions ask you how the passage might be changed to improve the expression of ideas. Other questions ask you how the passage might be altered to correct errors in grammar, usage, and punctuation. One or more graphics accompany some passages. You will be required to consider these graphics as you answer questions about editing the passage.

There are three types of questions. In the first type, a part of the passage is underlined. The second type is based on a certain part of the passage. The third type is based on the entire passage.

Read each passage, Then, choose the answer to each question that changes the passage so that it is consistent with the conventions of standard written English. One of the answer choices for many questions is "NO CHANGE." Choosing this answer means that you believe the best answer is to make no change in the passage.

Questions 1–11 are based on the following passage.

The Giants of Theater

The great dramatists of the 20th century—Arthur Miller, Tennessee Williams, John Osborne, and Harold Pinter—still owe an enormous creative debt to their 19th-century ❶ forebears, most particularly to the two Scandinavian playwrights Henrik Ibsen and August Strindberg. The hallmarks of modern theater in their present incarnation—from stark realism to surreal expressionism— ❷ from the two mens' works directly derive.

1. (A) NO CHANGE
  (B) elders
  (C) seniors
  (D) historians

2. (A) NO CHANGE
  (B) from the works of these two men directly derive.
  (C) derive directly from the works of these two men.
  (D) come directly from this.

MODEL TEST 3

Strindberg and Ibsen were themselves not just rivals ❸ but grave enemies. Famously, Strindberg mocked and attacked Ibsen's most successful and enduring play, "A Doll's House," in a short story of the same title and claimed that his ongoing hostilities with Ibsen had cost him his "wife, children, fortune, and career." Ibsen, meanwhile, somewhat more ❹ soberly—though no less venomously—kept a portrait of Strindberg in his study where he worked, naming it "Madness Incipient." He once remarked, "I can't write a line without that madman staring down at me with those crazy eyes."

Strindberg and Ibsen found ways to clash with one another on nearly every issue of their time—politics, society, science, religion, women's rights— ❺ by focusing on how these current events had global implications. But at the core of their rivalry lay something more elemental than mere differences of opinion and competitive antagonism; the characters that populate each writer's ❻ respectedly works are fundamentally

3. Which choice best expresses that the intellectual relationship between Strindberg and Ibsen went far beyond an ordinary rivalry?

(A) NO CHANGE
(B) while being peaceful advocates.
(C) but impassioned artistic adversaries.
(D) and fiercely competitive belligerents.

4. (A) NO CHANGE
(B) soberly; though no less venomously kept
(C) soberly though no less—venomously kept
(D) soberly: though no less venomously, kept

5. The writer would like to express that Strindberg and Ibsen shared their ideas on contemporary issues in both direct and indirect ways. Which choice best conveys this?

(A) NO CHANGE
(B) all of which found either subtle or overt expression in their plays.
(C) through a willingness to both compromise and stick to their guns, depending on the situation.
(D) some of which called for metaphor, some which called for simile.

6. (A) NO CHANGE
(B) respectable
(C) respectful
(D) respective

distinct in the way they relate to the world around them. Michael Meyer ❼ , a Hollywood screenwriter for many prominent films, once compared the two, writing, "Ibsen's characters think and speak logically and consecutively . . . Strindberg's dart backwards and forwards. They do not think, or speak, ABCDE but AQBZC." These two men—writing in the same genre at the same point in history, and emerging from both the same level of society and corner of the world— ❽ nonetheless developed remarkably antithetical worldviews, each powerful enough not only to weather the criticism of the opposition but to develop and grow in spite of it.

Although in life the two considered themselves plenary ❾ opposites as drama continues to evolve into the postmodern era, we may begin to realize that the worlds envisioned by Strindberg and Ibsen were perhaps not so different as they believed. Described by playwright Bernard Shaw as ❿ "the giants of the theatre of our time," their lingering influences have coexisted and even comingled in drama for more than a century now. The staggering plurality of postmodern theater itself we must attribute, at least in part, to the initial fracturing of the modern drama in its ⓫ outset state, when refusing to yield to prevailing winds, Strindberg and Ibsen produced a cyclone.

7. The writer wants to insert a brief statement at this point that speaks about Meyer's qualifications to have a worthwhile opinion on this topic. Which, if true, best accomplishes this goal?

   (A) NO CHANGE
   (B) , a noted scholar on ancient Scandinavian history,
   (C) , a contemporary Scandinavian poet,
   (D) , translator and biographer of both playwrights,

8. (A) NO CHANGE
   (B) consequently
   (C) also
   (D) divergently

9. (A) NO CHANGE
   (B) opposites as drama continues, to evolve into the postmodern era we may
   (C) opposites, as drama continues to evolve into the postmodern era, we may
   (D) opposites as drama continues to evolve into the postmodern era we may

10. (A) NO CHANGE
   (B) the giants of the theatre of our time,
   (C) the giants' of the theatre of our time,
   (D) 'the giants of the theatre of our time,'

11. (A) NO CHANGE
   (B) germinating
   (C) floral
   (D) germinal

Questions 12–22 are based on the following passage.

Gravity, It's Everywhere

His is a household name, and he is most often thought of as a man unearthing the world's most **⓬** imminent mysteries while napping under an apple tree. He is Sir Isaac Newton, an English physicist and mathematician responsible for the law of universal gravitation. More than 300 years ago, the idea was quite **⓭** revolutionary: two objects, regardless of their mass, exert gravitational force toward one another with a force proportional to the product of the two masses and inversely proportional to the square of the distance between them. Newton's equation explained why that apple fell onto his head, **⓮** why on the ground one firmly stays, and how Earth orbits the sun. It also allowed NASA scientists to send a man to the moon many years later. Newton's discovery of gravity wasn't nearly as impressive as his revelation that gravity was universal.

Using Kepler's laws of planetary motion, Newton attempted **⓯** to cast aside all previous scientific discoveries, supposing that planets could move around the Sun because of a force acting between the bodies. The apple, he reasoned, fell **⓰** and it was attracted to Earth, and even if it was much higher in the tree, it would still fall toward Earth. So why didn't the moon fall and crash into Earth? Newton attested that the moon is, **⓱** in fact, in a constant freefall to Earth but is caught in a gravitational field, and Earth's

12. (A) NO CHANGE
     (B) eminent
     (C) complimentary
     (D) complementary

13. (A) NO CHANGE
     (B) revolutionary, two objects regardless of their mass, exert
     (C) revolutionary—two objects regardless of their mass, exert
     (D) revolutionary; two objects, regardless of their mass exert

14. (A) NO CHANGE
     (B) on the ground one firmly stays,
     (C) why one stays firmly on the ground,
     (D) one stays firmly on the ground,

15. Which choice best expresses Newton's scientific journey based on the context of the passage?

     (A) NO CHANGE
     (B) to fill in the blanks,
     (C) to gather more observational data,
     (D) to explore the solar system,

16. (A) NO CHANGE
     (B) because
     (C) but
     (D) from

17. (A) NO CHANGE
     (B) as a matter of fact,
     (C) (can you believe it?),
     (D) based on his accurate theoretical contemplations,

movement allows the moon to orbit it without ever hitting the surface. The equation, though simple, accounts for the position of all planets and moons and is partly responsible for **⓲** the paths of astronauts and the successful orbits of satellites.

It wasn't until 1915 that Albert Einstein expanded on Newton's work to impart his theory of general relativity, which states that the gravity of any mass curves the space and time around it. Einstein's theory of relativity is superior to **⓳** Newton because it takes into account special relativity and can be used when great precision is necessary. By creating a metric theory of gravitation, Einstein showed that phenomena in classical mechanics correspond to inertial motion within a curved geometry of space-time. This scientific discovery laid the groundwork in both astrophysics and cosmology for years to come. Not only did the theory help to explain an irregularity in Mercury's orbit, but **⓴** the bending of starlight was also demonstrated by it and set the theoretical foundations for black holes.

㉑ So, when extreme precision isn't a requirement, Newton's law of universal gravitation is still widely used to approximate the effects of gravitation—say, for instance, in physics class. **㉒** While Newton's theory was preeminent for a time, that time is long since gone.

18. The writer wishes to express that Newton's theory can explain the behavior of human-influenced space activities. Which choice best accomplishes this goal?

(A) NO CHANGE
(B) the movements of both comets and asteroids.
(C) the rising of the tides and the occurrence of earthquakes.
(D) Einstein's eventual development of a revolutionary paradigm.

19. (A) NO CHANGE
(B) it
(C) these
(D) Newton's law of universal gravitation

20. (A) NO CHANGE
(B) starlight used it to bend the demonstration
(C) it also demonstrated how starlight bends
(D) demonstrating the starlight

21. (A) NO CHANGE
(B) Additionally,
(C) For this very reason,
(D) Yet,

22. The writer wants to conclude the essay with a sentence that speaks to the lasting relevance of Newtonian theory. Which choice best accomplishes the writer's aim?

(A) NO CHANGE
(B) It's hard to believe that science from the year 1687 is still applicable today.
(C) It is impressive that Newtonian theory could account for irregularities in Mercury's orbit.
(D) Students in today's classrooms still recognize Newton as a brilliant mind.

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Questions 23–33 are based on the following passage and supplementary material.

Do the Numbers Lie?

The question of college rankings **㉓** <u>continue</u> to be a major player at every level of the university. From the student flipping through college guides, to academics searching for job offerings, to department administrators figuring their next year's budget, the number next to the university can decide quite a bit. The ranking is supposed to be an indicator of the **㉔** <u>institute's performance:</u> its ability to produce excellence. So it makes sense, particularly with the rising tuition costs, that prospective students should weigh the value of their money against the reputation of the education they will receive. **㉕** Furthermore, faculty must consider, like all job seekers, the security of their employment and the

Average Revenues Per Student at Public Universities
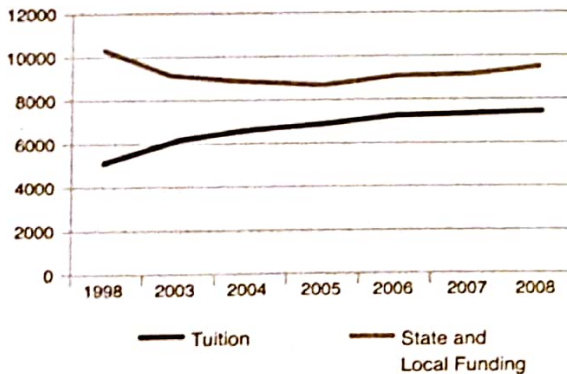
23. (A) NO CHANGE
    (B) continues
    (C) is continue
    (D) are continuing

24. (A) NO CHANGE
    (B) institutes performance—its
    (C) institutes performance; it's
    (D) institute's performance, its'

25. The writer wants to insert a sentence at this point that further develops the argument in the paragraph and incorporates information from the graph. Which choice best accomplishes this goal?

    (A) This trend is diluted by nearly a 20 percent overall drop in state and local governmental support for public universities between 1998 and 2008, making college students bear ever less of the tuition burden.
    (B) This trend is encouraged by nearly a 10 percent overall increase in state and local governmental support for public universities between 1998 and 2008, making college students bear a moderate amount of the tuition burden.
    (C) This trend is exacerbated by nearly a 10 percent overall drop in state and local governmental support for public universities between 1998 and 2008, making college students bear ever more of the tuition burden.
    (D) This trend is worsened by nearly a 30 percent overall drop in state and local governmental support for public universities between 1998 and 2008, making college students bear far too much of the tuition burden.

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opportunities for career advancement. And more often than not, a university's funding and resources are directly affected by how it measures up in the vast world of rankings. **26** Rankings often comprise a variety of important educational factors.

The needs and goals of high school students are far too nuanced to decide on a university by a single number. Could a particular student searching for the best fit for the next four to five years of **27** their life ever find all the answers in a college ranking report? While one student may be looking for small class sizes, another may be looking for job placement, while **28** in another is in search of a strong study abroad program. When taking into account all the aspects of a successful college experience, the ranking system is oversimplified and ineffective. What works for one may not work for another. Moreover, ranking reports do little to show whether universities are doing a good job at actually educating.

29 To counter ranking systems and create a more meaningful college experience, many universities are adopting undergraduate initiatives that incorporate internships, research experiences, study abroad programs, and community outreach

26. Which choice provides the best transition between the current paragraph and the following paragraph?

(A) NO CHANGE
(B) Universities are in dire need of alternative sources of income.
(C) Applicants often consider college rankings, but those numbers provide insufficient information on which to base a choice.
(D) High schools today have become real pressure cookers.

27. (A) NO CHANGE
(B) your
(C) they're
(D) his or her

28. (A) NO CHANGE
(B) from
(C) one
(D) still

29. Which choice provides the most relevant introduction to this paragraph?

(A) NO CHANGE
(B) In order to satisfy federal demands for greater governmental oversight,
(C) So they may attract students from underrepresented demographic groups,
(D) To provide more opportunities for students to acquire financial assistance,

GO ON TO THE NEXT PAGE

opportunities. The idea is simple: the best undergraduate experience is one that is engaging, challenging, and lifelong. **㉚** In such programs these experiences just like required classes, are essential to the degree which encourages collaboration between faculty and students, as well as commitment to the community. Often, students are introduced to their university's **㉛** alumni who have graduated from the school who share their interests and exposed to careers in their field of study. This university approach can be attractive to the student who is looking for more than a number on a page.

The decision of which college to attend is one of the biggest a person will make. While it is important to keep up with which universities are leading the world's research and hiring the most notable experts, it is more important to consider which university will **㉜** best foster your growth and personal development. College rankings that encourage differentiation between better and worse universities **㉝** leaves a lot on the table.

30. (A) NO CHANGE
    (B) In such programs, these experiences just like required classes are essential to the degree, which
    (C) In such programs these experiences just, like required classes, are essential to the degree which
    (D) In such programs, these experiences, just like required classes, are essential to the degree, which

31. (A) NO CHANGE
    (B) alumni who are graduates of the educational institution in question
    (C) alumnuses who are proud to have both matriculated and successfully graduated from the school
    (D) alumni

32. (A) NO CHANGE
    (B) well
    (C) better
    (D) good

33. (A) NO CHANGE
    (B) leafs
    (C) lives
    (D) leave

Questions 34–44 are based on the following passage and supplementary material.

Draw Your Home

In the third grade, ㉞ my teacher Mrs. Wabash, asked the class to spend ten minutes sketching our home, specifically the exterior of our house as it appeared to passersby. This prelude was part of a larger exercise that I ㉟ have long since forgotten. What I remember most was sitting in my desk completely dumbfounded for the majority of that interval, wondering how on earth I had forgotten the space where I spent the majority of my eight years. Surely, I could recall most of my bedroom; I knew my house was blue; of course, there were many windows and a big porch. ㊱ Consequently what did the door look like? Were there three or four steps leading to it? ㊲ How could he know this was even a real door? To these questions and many more, I had no answer.

That afternoon, I walked home from the bus stop, sat on my lawn, and meticulously copied what I saw ㊳ in paper, memorizing every detail. Wounded at my previous inattention, I began studying every structure that I ㊴ personally visited myself. The obsession resulting from Mrs. Wabash's experiment did not fade with time. By high school, my journal of sketched structures transformed from ones I had seen to ones I had thought up independently. I became transfixed with several iconic ㊵ buildings: the Guggenheim, Getty Center, Reichstag, Smithsonian, among others. When it came time to fill out college applications, I didn't blink before selecting "Architecture" as my intended major.

34. (A) NO CHANGE
    (B) my teacher, Mrs. Wabash; asked
    (C) my teacher—Mrs. Wabash, asked
    (D) my teacher, Mrs. Wabash, asked

35. (A) NO CHANGE
    (B) had since long forgot.
    (C) has long since forgotten.
    (D) forgot since long.

36. (A) NO CHANGE
    (B) And
    (C) For
    (D) But

37. Which choice logically maintains the flow and focus established by the preceding sentences?

    (A) NO CHANGE
    (B) Was the roof pointed or squared?
    (C) Why should I study architecture?
    (D) I remembered what my neighbor's house looked like.

38. (A) NO CHANGE
    (B) into paper,
    (C) onto paper,
    (D) within paper,

39. (A) NO CHANGE
    (B) witnessed with my own two eyes.
    (C) entered.
    (D) foresaw.

40. (A) NO CHANGE
    (B) buildings; the Guggenheim, Getty Center,
    (C) buildings—the Guggenheim Getty Center
    (D) buildings. The Guggenheim, Getter Center,

GO ON TO THE NEXT PAGE

The word meant little to me at the time: just that I could eventually be paid to do what I had been doing ineptly for years. An architect is one who plans, designs, and oversees the construction of **41** buildings homes and other structures. I researched the course requirements at three universities I was considering and found, to my amazement, a quote from a professor of architectural engineering in one of the programs; he said, "The study of architecture is one grounded in the sciences, but inspired by the arts." I was hooked.

Since then, I have found my work as a professional architect to be **42** undoubtedly rewarding and mercilessly demanding. Architects are rarely afforded a regular workweek. Instead, we spend hours upon hours preparing and re-preparing scale drawings, looking into environmental and safety regulations, and meeting with clients. From contracts to design to construction, the architect is there, **43** there job never done. It is indeed an occupation that encompasses nearly every field of work—engineering, mathematics, marketing, administration, customer service, law, and public safety are all needed in successful architecture. **44** Sometimes I ponder whether all of the time I spend on my architectural projects is truly worth the effort.

41. (A) NO CHANGE
    (B) buildings, homes, and other structures.
    (C) buildings homes, and other structures.
    (D) buildings, homes, and other, structures.

42. If the author wishes to express both the positive and negative nature of architecture, which of the following choices best accomplishes her goal?

    (A) NO CHANGE
    (B) fearsomely boring and drearily trivial.
    (C) moderately enjoyable and somewhat interesting.
    (D) terribly impersonal and pleasantly dispassionate.

43. (A) NO CHANGE
    (B) their job
    (C) our job
    (D) his or her job

44. Which choice most effectively concludes the essay by tying it to the introductory paragraph?

    (A) NO CHANGE
    (B) I look forward to one day fulfilling my dream of becoming an actual architect rather than a starry-eyed student.
    (C) Yet when a job is finished, truly finished, and I look up at it, I thank Mrs. Wabash.
    (D) My dream ever since the third grade of studying architecture was about to become a reality.

STOP

If there is still time remaining, you may review your answers.

MATH TEST (NO CALCULATOR)

25 MINUTES, 20 QUESTIONS

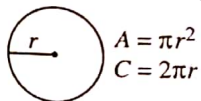Turn to Section 3 of your answer sheet to answer the questions in this section.
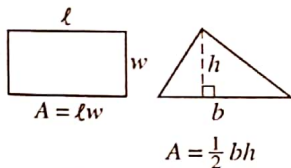
Directions: For questions 1–15, solve each problem and choose the best answer from the given choices. Fill in the corresponding circle on your answer sheet. For questions 16–20, solve each problem and enter your answer in the grid on your answer sheet.
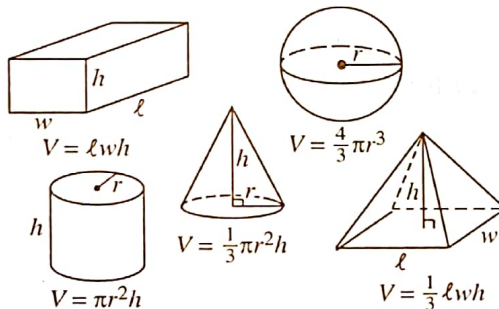
Notes:
- Calculators are **NOT PERMITTED** in this section.
- All variables and expressions represent real numbers unless indicated otherwise.
- All figures are drawn to scale unless indicated otherwise.
- All figures are in a plane unless indicated otherwise.
- Unless indicated otherwise, the domain of a given function is the set of all real numbers x for which the function has real values.
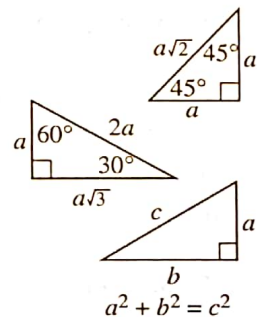
REFERENCE INFORMATION

Area Facts

$A = \ell w$

$A = \frac{1}{2} bh$

$A = \pi r^2$
$C = 2\pi r$

Volume Facts

$V = \ell wh$

$V = \pi r^2 h$

$V = \frac{4}{3} \pi r^3$

$V = \frac{1}{3} \pi r^2 h$

$V = \frac{1}{3} \ell wh$

Triangle Facts

$a^2 + b^2 = c^2$

The arc of a circle contains 360°.
The arc of a circle contains 2π radians.
The sum of the measures of the angles in a triangle is 180°.

GO ON TO THE NEXT PAGE

MODEL TEST 3

1. Which of the following statements is true concerning the lines whose equations are $2x + 3y = 4$ and $4x + 6y = 8$?

    (A) The lines are the same line.
    (B) The lines are distinct parallel lines.
    (C) The lines are perpendicular.
    (D) The lines intersect, but are not perpendicular.

2. On September 1, Bill deposited d dollars into a non-interest-bearing bank account. He then made weekly deposits of w dollars and made no withdrawals. After 4 weeks, Bill had $60 in his account. After 8 weeks, he had $85. Which of the following equations gives the dollar amount, A, in Bill's account x weeks after his initial deposit?

    (A) $A = 10x + 20$
    (B) $A = 10x + 5$
    (C) $A = 8.25x + 27$
    (D) $A = 6.25x + 35$

3. How many values of x satisfy the equation $x^2 - 8x = -16$?

    (A) None
    (B) 1
    (C) 2
    (D) More than 2

4. On January 1, 2015, the values of Alice's brokerage account and of Barbara's brokerage account were a dollars and b dollars, respectively. During the year, the value of Alice's account increased by 10% and the value of Barbara's account decreased by 10%. If on December 31, 2015 the values of their accounts were equal, what is the ratio of a to b?

    (A) $\dfrac{9}{11}$

    (B) $\dfrac{9}{10}$

    (C) $\dfrac{10}{9}$

    (D) $\dfrac{11}{9}$

5. Which of the following is an equation of a line that has the same x-intercept as the line whose equation is $y = 3x - 6$?

    (A) $y = 3x - 4$
    (B) $y = 2x - 6$
    (C) $y = 6x - 3$
    (D) $y = 2x - 4$

$$y = x^2 + 2$$
$$y = \frac{1}{2}x^2 + 1$$

6. Which of the following is a true statement concerning the graphs of the two equations above?

    (A) The two graphs do not intersect.
    (B) The two graphs have exactly one point of intersection.
    (C) The two graphs have exactly two points of intersection.
    (D) The two graphs have more than two points of intersection.

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7. For what value of n will the equation

$$3(x + 2) + 2(x + 3) = 6(x + 1) - n(x + 5)$$

have no solutions?

(A) −1
(B) 0
(C) 1
(D) 2

8. Which of the following are the solutions of the equation: $x^2 + 2x = 11$?

(A) $1 + 2\sqrt{2}$ and $1 - 2\sqrt{2}$
(B) $-1 + 2\sqrt{2}$ and $-1 - 2\sqrt{2}$
(C) $1 + 2\sqrt{3}$ and $1 - 2\sqrt{3}$
(D) $-1 + 2\sqrt{3}$ and $-1 - 2\sqrt{3}$

9. $\overline{AB}$ and $\overline{CB}$, the two congruent sides of isosceles triangle ABC, are each 5, and the cosine of $\angle A$ is 0.8. What is the area of triangle ABC?

(A) 8
(B) 10
(C) 12
(D) 16

10. Elaine had d dollars. She used 60 percent of her money to buy pencils that cost p cents each. She spent the rest of her money to buy markers that cost m cents each. Which of the following expressions represents the number of markers she bought?

(A) $\dfrac{2d}{5m}$

(B) $\dfrac{5d}{2m}$

(C) $\dfrac{40d}{m}$

(D) $\dfrac{40d}{mp}$

11. Which of the following expresses the area of a circle in terms of C, its circumference?

(A) $\dfrac{C^2}{4\pi}$

(B) $\dfrac{C^2}{2\pi}$

(C) $\dfrac{C}{2\pi}$

(D) $\dfrac{C}{4\pi}$

12. The JFK Middle School select chorus consisted of b boys and g girls. After auditions, the director of the chorus added 3 more boys and 5 more girls. The next day, the director randomly chose one chorus member to sing the first solo at the spring concert. What is the probability that a boy was chosen?

(A) $\dfrac{b}{b+g}$

(B) $\dfrac{b+3}{g+5}$

(C) $\dfrac{b+3}{b+g+5}$

(D) $\dfrac{b+3}{b+g+8}$

13. If $f(x) = 2(ax^2 + bx + c) - 3(2ax^2 + 3bx + 3)$, where a, b, and c are constants, and if $f(x) = xg(x)$, what is the value of c?
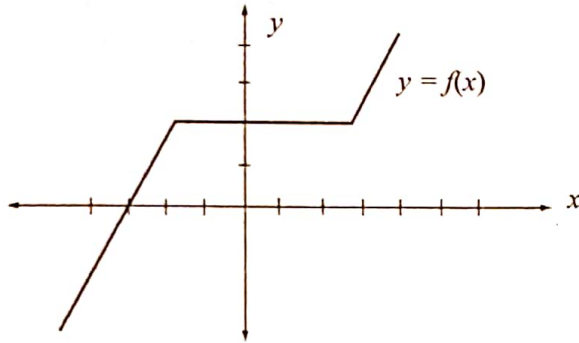
(A) 0
(B) 1
(C) 4.5
(D) It depends on what $g(x)$ is.

GO ON TO THE NEXT PAGE

$y = f(x)$

14. The figure above is the graph of the function $y = f(x)$. What are the x-coordinates of the points where the graph of $y = f(x-2)$ intersects the x-axis?

(A) Only –5
(B) Only –1
(C) –5 and –1
(D) All numbers between –2 and 3

15. A sphere and a cone have equal volumes. If the radius of the cone is twice the radius of the sphere, what is the ratio of the height of the cone to its radius?

(A) .5:1
(B) 1:1
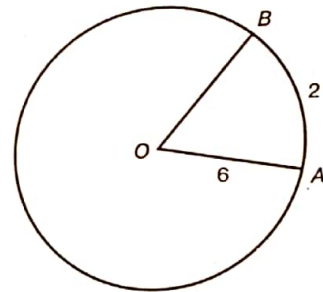(C) 2:1
(D) π:1

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16. During 2015, the nine members of the Playa Vista Senior Book Club read on average 52 books. When Mary, the oldest member of the club, moved away, the average number of books read in 2015 by the eight remaining members was 42. How many books did Mary read in 2015?

17. At Central High School, 50 girls play intramural basketball and 40 girls play intramural volleyball. If 10 girls play both sports, what is the ratio of the number of girls who play only basketball to the number who play only volleyball?

18. If $-\frac{1}{2} < x - 3 < \frac{1}{3}$, what is one possible value of $\frac{1}{x}$?

19. If b is a real number and if $2 + i$ is a solution of the equation $x^2 - bx + 5 = 0$, what is the value of b?

Note: Figure not drawn to scale.

20. In the figure above, what is the radian measure of $\angle AOB$?

STOP

If there is still time remaining, you may review your answers.

MATH TEST (CALCULATOR)

55 MINUTES, 38 QUESTIONS

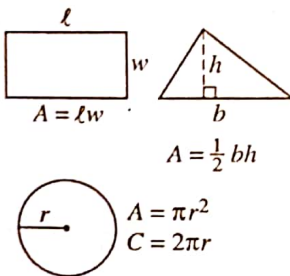Turn to Section 4 of your answer sheet to answer the questions in this section.

Directions: For questions 1–30, solve each problem and choose the best answer from the given choices. Fill in the corresponding circle on your answer sheet. For questions 31–38, solve each problem and enter your answer in the grid on your answer sheet.
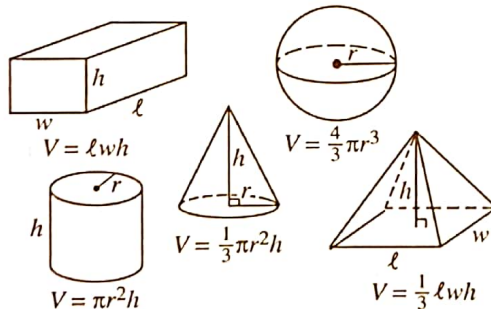
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$V = \pi r^2 h$

$V = \frac{4}{3}\pi r^3$

$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}\ell wh$

Triangle Facts

$a^2 + b^2 = c^2$

The arc of a circle contains 360°.

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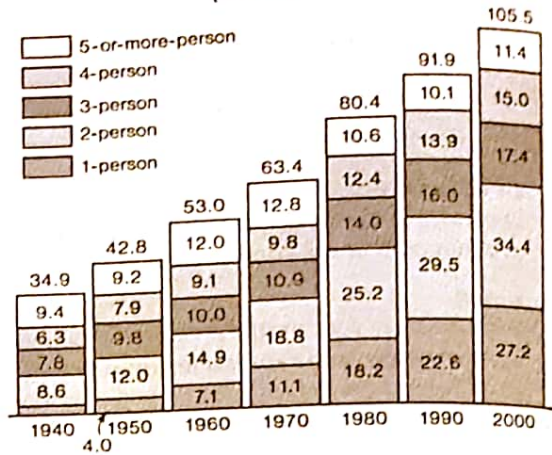

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MODEL TEST 3

1. After leaving home at 10:30 A.M. and driving at an average speed of 40 miles per hour, Brigitte arrived at her parents' house at 1:30 P.M. How fast, in miles per hour, would she have had to have driven in order to have arrived at 1:00?

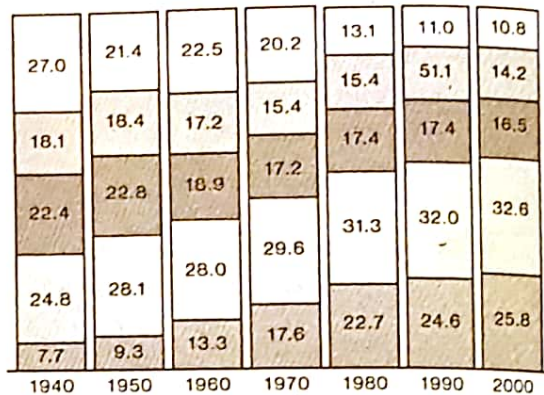   (A) 45
   (B) 48
   (C) 50
   (D) 60

2. On the final exam in a university psychology course, the average (arithmetic mean) grade was 86. If the average grades of the m men and w women in the course were 80 and 90, respectively, what is the ratio of the number of men to the number of women in the course?

   (A) $\dfrac{3}{5}$

   (B) $\dfrac{2}{3}$

   (C) $\dfrac{3}{2}$

   (D) $\dfrac{5}{3}$

Households by Size: 1940 to 2000
(Millions)

Legend:
- 5-or-more-person
- 4-person
- 3-person
- 2-person
- 1-person

Size	1940	1950	1960	1970	1980	1990	2000
Total	34.9	42.8	53.0	63.4	80.4	91.9	105.5
5-or-more	9.4	9.2	9.1	10.9	29.5	—	34.4
4-person	—	7.9	10.0	—	25.2	13.9	17.4
3-person	6.3	9.8	14.9	18.8	—	10.1	15.0
2-person	7.8	12.0	7.1	11.1	18.2	22.6	27.2
1-person	8.6	4.0	—	—	—	11.4	—
(other)		12.0	9.8	9.8	14.0	16.0	
			12.0	12.8	12.4		
				10.6			

Distribution of Households by Size: 1940 to 2000
(percent)

	1940	1950	1960	1970	1980	1990	2000
	27.0	21.4	22.5	20.2	13.1	11.0	10.8
				15.4	15.4	51.1	14.2
	18.1	18.4	17.2	17.2	17.4	17.4	16.5
	22.4	22.8	18.9	29.6	31.3	32.0	32.6
	24.8	28.1	28.0				
	7.7	9.3	13.3	17.6	22.7	24.6	25.8

3. Based on the information in the graphs above, all of the following statements are true except

   (A) there were more households with 5 or more persons in 1960 than in 2000.
   (B) the percent of 1-person households more than tripled from 1940 to 2000.
   (C) the median size of a household in 1970 was 3 people.
   (D) the percent of 2-person households increased in every decennial census from 1940 to 2000.

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4

4. In rectangle *ABCD*, the length, *AB*, is twice as long as the width, *BC*. If the length were doubled and the width were halved, which of the following statements concerning the perimeter (*P*) and the area (*A*) of the new rectangle would be true?

(A) *P* would not change, and *A* would not change.
(B) *P* would increase by 50%, and *A* would not change.
(C) *P* would not change, and *A* would increase by 50%.
(D) *P* would increase by 50%, and *A* would increase by 100%.

5. The weights, in kilograms, of five students are 48, 56, 61, 52, and 57. If 1 kilogram = 2.2 pounds, how many of the students weigh over 120 pounds?

(A) 1
(B) 2
(C) 3
(D) 4

Questions 6 and 7 are based on the information in the following table.

Team Participation by Class at Central H.S. in 2015

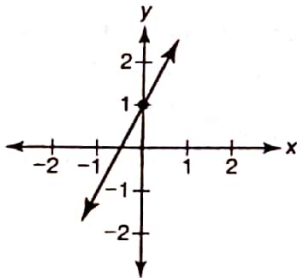| Class	Number of Students	Percent of Students
Freshman	180	15
Sophomore	120	*x*
Junior	*y*	40
Senior	*z*	*w*
Total	*t*	100

6. What is the value of *t*, the total number of students on teams?

(A) 750
(B) 1,200
(C) 1,500
(D) 1,800

7. What is the value of *z*, the number of seniors on teams?
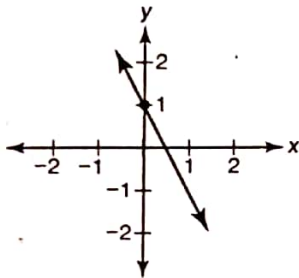
(A) 360
(B) 420
(C) 630
(D) 720

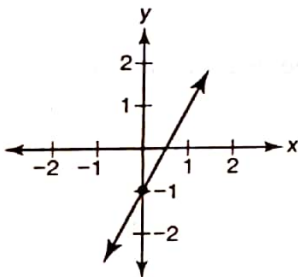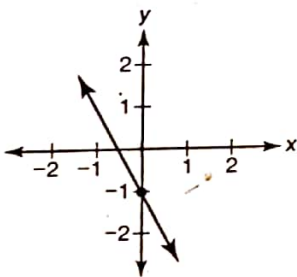8. If $a < -1$, which of the following could be the graph of $y - 1 = \dfrac{a}{a+1} x$?

(A)

(B)

(C)

(D)

9. If Naveed is riding his bike at a rate of 22 feet per second, how fast is he going in miles per hour? (1 mile = 5,280 feet)

(A) 10
(B) 12
(C) 15
(D) 16

10. If the average of 5 positive integers is 70, what is the largest possible value of their median?

(A) 70
(B) 114
(C) 116
(D) 346

11. Susan is a candidate for mayor of a city that has 20 election precincts. She assigned each of her 84 volunteers to work in one of the precincts. Each precinct that has 1,000 or more registered voters has been assigned 5 volunteers, and each precinct that has fewer than 1,000 registered voters has been assigned 3 volunteers. What percent of the precincts have fewer than 1,000 registered voters?

(A) 25%
(B) 40%
(C) 60%
(D) 75%

12. If the length of a rectangle is three times its width, what is the sine of the angle that the diagonal makes with the longer side?
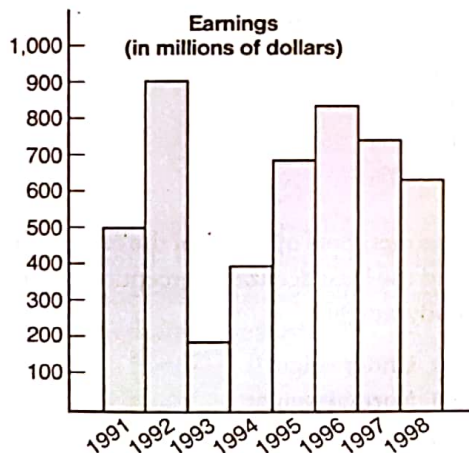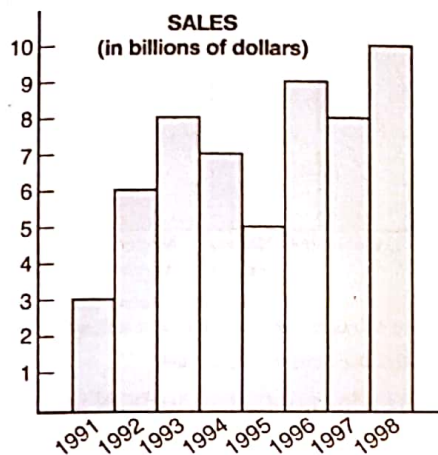
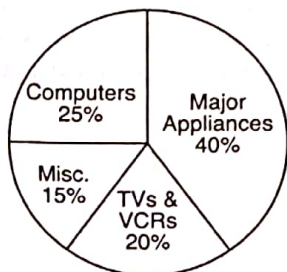(A) 0.316
(B) 0.333
(C) 0.500
(D) 0.866

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Questions 13–15 are based on the information in the following graphs.

**Sales and Earnings of
XYZ Corporation 1991–1998**

**SALES
(in billions of dollars)**

**Earnings
(in millions of dollars)**

**1998 Sales of XYZ Corporation
by Category**

Computers 25%
Major Appliances 40%
Misc. 15%
TVs & VCRs 20%

13. What is the average (arithmetic mean) in billions of dollars of the sales of XYZ Corporation for the period 1991–1998?

   (A) 5.5
   (B) 6.0
   (C) 7.0
   (D) 8.0

14. For which year was the percentage increase in earnings from the previous year the greatest?

   (A) 1992
   (B) 1993
   (C) 1994
   (D) 1995

15. What was the ratio of earnings to sales of XYZ Corporation in 1993?

   (A) $\frac{40}{1}$

   (B) $\frac{25}{1}$

   (C) $\frac{1}{25}$

   (D) $\frac{1}{40}$
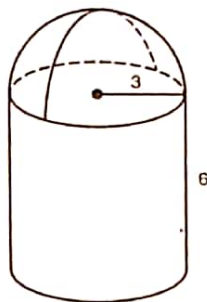
16. The figure above shows a solid formed by placing a hemisphere of radius 3 centimeters onto a cylinder whose height is 6 centimeters and whose radius is 3 centimeters. What is the total volume, in cubic inches, of this solid?

   (A) 36π
   (B) 54π
   (C) 72π
   (D) 90π

17. Each week Sally, a salesperson in Eddie's Electronic Emporium, receives a base pay of $300 plus a commission on the dollar amount of her sales. During any week when the total value of her sales is $5,000 or less, her commission is 10%. During those weeks when the total value of her sales exceeds $5,000, her commission is 12% of the entire amount. Last year during the first week of February, she earned $1,080. What was the total value of her sales that week?

   (A) $5,400
   (B) $6,500
   (C) $7,500
   (D) $9,000

Questions 18 and 19 are based on the information in the following graph.

Perceptions of Body Weight Status
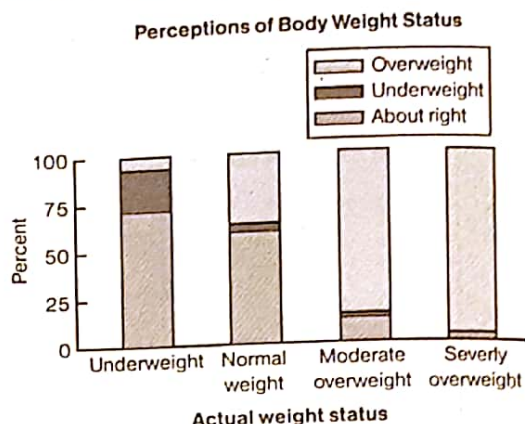
Perceived compared with actual weight status of adult females.

Source: U.S. Department of Agriculture.

18. To the nearest 5%, what percent of underweight adult females perceive themselves to be underweight?

   (A) 10%
   (B) 25%
   (C) 35%
   (D) 40%

19. The members of which of the four groups had the least accurate perception of their body weight?

   (A) Underweight
   (B) Normal weight
   (C) Moderately overweight
   (D) Severely overweight

20. Henry drove a distance of 198 kilometers. If he left at 10:00 A.M. and arrived at 1:40 P.M., what was his average speed, in kilometers per hour?

   (A) 45
   (B) 54
   (C) 60
   (D) 65

GO ON TO THE NEXT PAGE

21. On January 1, 2000, the value of a certificate of deposit (CD) was $765. If the value of the CD increased by 6% each year, what was its value, in dollars, on January 1, 2012?

(A) 1,316
(B) 1,370
(C) 1,498
(D) 1,539

22. If $i = \sqrt{-1}$ and $(a + bi)(1 + i) = 3 + 5i$, then $a + bi =$

(A) $-2 + 2i$
(B) $2 + 2i$
(C) $1 + 4i$
(D) $4 + i$

23. For what value of k will the graphs of $3x + 4y + 5 = 0$ and $kx + 6y + 7 = 0$ NOT intersect?

(A) –8
(B) 4.5
(C) 5
(D) 8

24. Of the 326 children at North Central preschool, 211 have a dog and 174 have a cat. If 83 of the children have neither a cat nor a dog, how many have both?
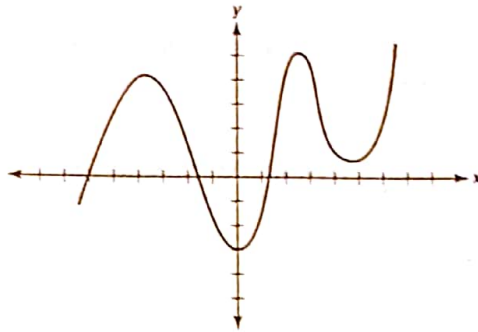
(A) 32
(B) 72
(C) 112
(D) 142

25. If the volume of a sphere is equal to the volume of a cube, what is the ratio of the edge of the cube to the radius of the sphere?

(A) 1.16
(B) 1.53
(C) 1.61
(D) 2.05

26. The figure above shows the graph of $y = f(x)$ for all values of x between –6 and 7. For how many values of x in that interval is $f(x)$ equal to 3?

(A) 4
(B) 5
(C) 6
(D) 7

27. Assume that 0.1% of the population of the United States has a certain disease. Assume further that there is a test for this disease that is 99% accurate. This means that 99% of the people who have the disease will test positive, and 1% of the people who have the disease will erroneously test negative. Similarly, 99% of the people who do not have the disease will test negative, and 1% of the people who do not have the disease will erroneously test positive. In 2015, 1,000,000 people were given this test. What percent of the people who tested positive actually had the disease?
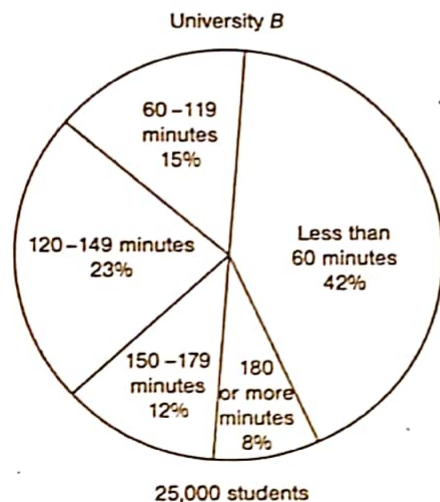
(A) 1%
(B) 9%
(C) 90%
(D) 99%

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4 **4**

Number of Minutes Per Day on Average
that Students at Two Universities Study

University A

60–119 minutes
25%

Less than
60 minutes
30%

120–149 minutes
20%

180
or more
minutes
10%

150–179
minutes
15%

15,000 students

University B

60–119
minutes
15%

120–149 minutes
23%

Less than
60 minutes
42%

150–179
minutes
12%

180
or more
minutes
8%

25,000 students
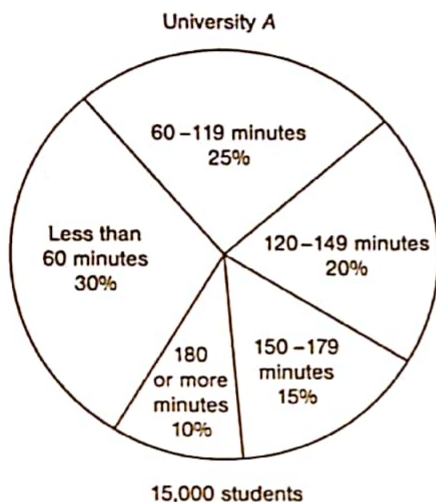
The circle graphs above show the distribution of students at two universities based on how much time on average, in minutes, they studied each day.

28. Which of the following could be the median number of minutes studied per day by the students at University A?

(A) 50
(B) 100
(C) 125
(D) 175

29. Compared with University A, how many more students at University B on average studied less than one hour per day?

(A) 2,200
(B) 3,300
(C) 6,000
(D) 8,500

30. If one student is chosen at random from all the students at Universities A and B, what is the probability, to the nearest ten thousandth, that he or she studies on average at least three hours per day?

(A) 0.0625
(B) 0.0675
(C) 0.0785
(D) 0.0875

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31. Water enters a vat, whose capacity is 60 liters, through a faucet at the top and leaves the vat through a drain at the bottom. If the vat is empty, the drain is open, and water starts to flow through the faucet at a constant rate of 5 liters per minute, it takes exactly 50 minutes until the vat is full. At what rate, in liters per minute, is water flowing through the drain?

32. Two 747 jumbo jets flew the same 2,954-mile flight path from LAX in Los Angeles to JFK in New York. The average speed for the two jets, from takeoff to landing, was 569 miles per hour and 543 miles per hour. To the nearest minute, how much less time did the faster jet take to complete the flight?

33. To the nearest hundredth, what is the sine of the acute angle formed by the line whose equation is $y = 3x - 3$ and the positive x-axis?

34. To go to a customer's house to do repair work, a plumber charges a flat fee of f dollars, which includes the first hour of her time. For her time in excess of one hour, the plumber charges h dollars per hour. One day she had two jobs. The first job took 3.5 hours, for which her charge was $290. The second job took 4.25 hours, for which her charge was $335. What is the value of $f + h$?
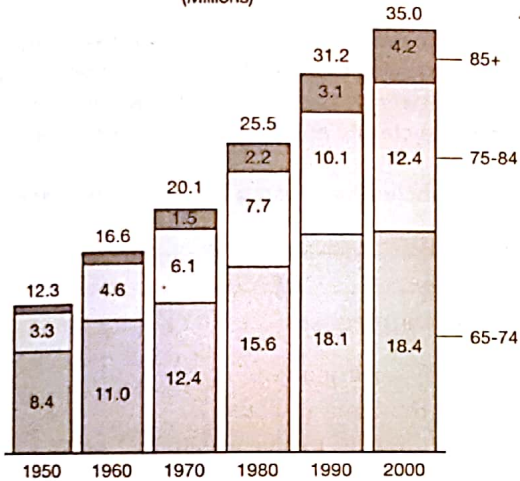
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Questions 35–36 are based on the graphs below.

Population Age 65 and Over: 1950 to 2000
(Millions)

Percent of Total Population Age 65 and Over:
1950 to 2000
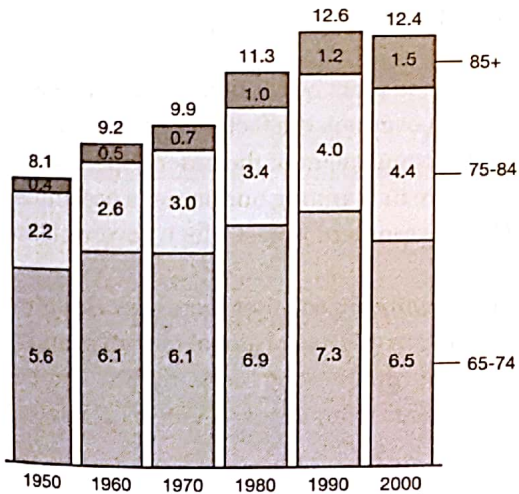
35. Based on the information in the graphs above, to the nearest million, how many millions of people lived in the United States in 1950? (For example, if the population in 1950 was 75,126,000, rounded to the nearest million it was 75,000,000, and you should grid in 75.)

36. The number of people age 85 and above living in the United States in 2000 was how many times the number of people age 85 and above living in the United States in 1950?

Questions 37–38 are based on the following information.

In a certain country, all citizens pay an annual tax of 20% of their first $20,000 of income and 30% of all income in excess of $20,000.

37. Michelle is a citizen of this country. If in 2014 her income was N and her tax was $9,250, what is the value of $\dfrac{N}{1,000}$?

38. If in 2014, 20% of Michelle's income had been exempt from taxation, how much less in taxes, to the nearest dollar, would she have had to pay?

STOP

If there is still time remaining, you may review your answers.

ANSWERS EXPLAINED

Section 1: Reading Test

1. **(B)** The opening lines indicate that the narrator is *reflecting on his feelings*. Throughout the passage he uses words like "miserable," "ashamed," and "discontented" to describe his emotional state. Choice (A) is incorrect. The narrator does not *analyze* or dissect the reasons for a change in attitude; he dwells on an ongoing attitude. Choice (C) is incorrect. The passage presents an example of emotional self-awareness, not of political consciousness. Choice (D) is incorrect. The narrator criticizes himself, not young people in general.

2. **(C)** Consider the narrator's early beliefs about his home. How does the narrator describe it? Clearly he views it in *positive* terms: "a most elegant salon" (lines 9–10), "the Temple of State" (line 11). Choice (A) is incorrect: it is the narrator's growing feeling of shame about his home that is miserable, not the home itself. Choice (B) is incorrect: to believe in one's home as the Temple of State is to have a somewhat exaggerated image of it, not a modest (humble, unpretentious) one. Choice (D) is incorrect: the narrator's childhood beliefs in his humble home as the Temple of State and his parlor as a most elegant salon are unrealistic rather than realistic.

3. **(B)** The repeated refrain of "I had believed" calls the reader's attention to the positive way in which the narrator looked on his home, with even the humble kitchen described as "a chaste though not magnificent apartment." (*Chaste* here means simple and restrained in style, without unnecessary ornamentation.) Choice (A) is incorrrect. Lines 1–5 provide evidence that the narrator's view of his home was miserable, not positive. Likewise, choices (C) and (D) are incorrrect. Lines 23–36 and 37–45 provide additional evidence that the narrator's view of his home was negative rather than positive.

4. **(B)** Note the adjectives used to describe Joe: "faithful," "industrious," "kind." These are virtues, and Joe is fundamentally *virtuous*. Choice (A) is incorrect. Joe is plain and hardworking, not renowned or distinguished. Choice (C) is incorrect. The passage portrays not Joe but the narrator as desiring to be independent. Choice (D) is incorrect. The narrator thinks his life is coarse; he thinks Joe is virtuous.

5. **(A)** Choice (A) is correct. Consider the sentence "Before achieving the status of master carpenter, John served his time as a journeyman for three years." The "time" to which the narrator refers is the period of his *apprenticeship*. This is supported by the last sentence of the previous paragraph, in which the narrator speaks of his profound gloom as he entered his "apprenticeship to Joe."

6. **(A)** Choice A is correct. As a child, the narrator had no idea how his home might appear to others. Now, however, he has been exposed to Miss Havisham and to Estella, and he has become painfully aware how these others would despise him for the coarseness and commonness of his home and work. Choices (B) and (C) are incorrect. Nothing in the passage suggests that either might be the case. Choice (D) is incorrect. Nothing in the passage suggests that sinfulness has prompted the narrator's discontent. Although ingratitude may play a part in his discontent, shame at his background plays a far greater part.

7. **(C)** The narrator states that he "would not have had Miss Havisham and Estella see (his home) on any account." He is aware that his home would appear coarse and common

in their eyes. (The use of "Now" to introduce the sentence indicates that this is a new awareness for the narrator, who previously viewed his home in a far more positive light.)

8. **(D)** In lines 47–49, the narrator manages to say something good about his youthful self: "I am glad to know that I never breathed a murmur to Joe while my indentures lasted." He gives himself credit for *concealing his despondency from Joe* during the time he was apprenticed. Choices (A) and (B) are incorrect. The narrator gives Joe all the credit for his having worked industriously and for his not having run away to become a soldier. Choice (C) is incorrect. While the narrator struggles to keep his menial position a secret from Estella, he gives himself no credit for doing so; instead, he blames himself for having been so ashamed of his humble origins.

9. **(C)** Choice (A) is incorrect. Nothing in the passage suggests that the narrator has strong prospects for advancement. Choice (B) is incorrect. The natural setting, a "flat and low," mist-shrouded marsh, is bleak rather than beautiful. Choice (D) is incorrect. Nothing in the passage hints that Joe is going to die. Only choice (C) is left. The description of the windy marsh view, with an uncertain path leading only to darkness and the sea, accentuates the reader's sense of the narrator's melancholy mood.

10. **(A)** The narrator is ashamed of his home because it is "homely": *plain and unrefined*, lacking in the elegance and sophistication that would make it acceptable to the elegant and beautiful Estella. Note that, because the narrator is ashamed of his home, he must be using *homely* in a negative sense. You can eliminate any answers that present *homely* in a positive light.

11. **(B)** The narrator fears that Estella would catch him "with a black face and hands, doing the coarsest part of (his) work," and would rejoice to see him in such a lowly, contemptible position. He fears her readiness to despise those she thinks below her status. Thus, he fears her *scornful disposition* (nature; character).

12. **(C)** The opening sentence describes the shattering of the Iroquois leadership's pro-British policy. The remainder of the passage describes how Iroquois policy changed to reflect changes in European military goals. Choice (A) is incorrect. Nothing in the passage suggests that such charges were made against the Iroquois. Choice (B) is incorrect. It is unsupported by the passage. Choice (D) is incorrect. The passage demonstrates the Iroquois were able to play European power politics. Remember: when asked to find the main idea, be sure to check the opening and summary sentences of each paragraph.

13. **(B)** The Europeans *designated* or called these confederations of Indian tribes nations, giving them the same title they used for European states. Choices (A), (C), and (D) are incorrect. Although styled can mean *arranged* ("neatly-styled hair"), *brought into conformity with* ("styled according to *The Chicago Manual of Style*"), or *designed in a particular fashion* ("a conservatively styled gown"), that is not how it is used here.

14. **(C)** In this sentence, "rough" means approximate, as in "a rough guess." The tribes dealt with Europeans as approximate equals, not as exact or *absolute equals*.

15. **(C)** The time line clearly indicates that the period between 1684 and 1700 included many warlike acts involving the Iroquois and the French, acts that ceased only with the Great Peace of Montreal in 1701. This visual impression is supported by lines 37–50, which state that "[t]he increasing French threat to English hegemony in the interior of North America was signalized by French-led or French-inspired attacks on the Iroquois

and on outlying colonial settlements in New York and New England. The high point of the Iroquois response was the spectacular raid of August 5, 1689, in which the Iroquois virtually wiped out the French village of Lachine, just outside Montreal. A counterraid by the French on the English village of Schenectady in March, 1690, instilled an appropriate measure of fear among the English and their Iroquois allies."

16. **(B)** In lines 69–70, the author states that the Iroquois "played the game of European power politics with effectiveness." Thus, he shows *respect for their competence.* None of the other choices is supported by the passage. Remember: when asked to determine the author's attitude or tone, look for words that convey value judgments.

17. **(D)** Look closely at lines 57–63. What is their function? They list what the Iroquois accomplished by means of their system of aggressive neutrality. The Iroquois initiated a peace policy toward the British and the French (and were able to enforce it). The Iroquois won concessions from the British and the French, who had to keep on the tribe's good side by giving the Iroquois gifts. The Iroquois strengthened their dominance over other tribes nearby. In listing all these instances in which "the Iroquois played the game of European power politics with effectiveness," the author plainly shows that the Iroquois were competent in their dealings with the European powers. Thus, his most likely attitude toward the Iroquois leadership is one of respect for their competence.

18. **(A)** The Iroquois shifted their allegiance from one side to the other, depending on which allegiance was most advantageous to the tribes. Playing the British and French against each other, their policy of aggressive neutrality depended on *the readiness of the Iroquois to fight either side.* Choice (B) is incorrect. Ties of loyalty may actually have hampered the Iroquois; the French fear that the Iroquois were compromising the system in favor of the British led to the eventual breakdown of the policy of neutrality. Choice (C) is incorrect. French presence in the borderlands would have been a challenge to Iroquois power. Choice (D) is incorrect. It is unsupported by the passage.

19. **(C)** Lines 66–68 indicate that the Iroquois played the game of power politics with effectiveness "by their willingness to use their power against one or the other nation." In other words, they were ready to fight either side.

20. **(B)** The French believed that the Iroquois were *jeopardizing* or undermining the system of Iroquois neutrality by making decisions that favored the English. Choices (A), (C), and (D) are incorrect. Although "compromising" can mean *embarrassing* ("compromising evidence of an affair"), *accepting lower standards* ("compromising on safety"), or *striking a balance* ("compromising on an issue"), that is not how it is used here.

21. **(A)** The opening paragraph describes the changing state of relationships between the European powers and the tribes of the interior during the eighteenth century. As more and more French and English settlers moved into the interior, the Indian nations had to find new ways of dealing with the encroaching French and English populations. The paragraph concludes by stating: "The history of the reorientation of Iroquois policy toward the Europeans may serve as an example of the process that all the interior nations experienced in the eighteenth century." Thus, the next three paragraphs, which sum up the Iroquois' experience, provide *an instance of a state of relationships described earlier.*

22. **(D)** Use information contained in the italicized introduction to help you with the passage. The introduction tells you that this passage has been taken from a novel. The

novelist-author is not a researcher, a prospector, or an advocate for purely synthetic oil. He simply is someone *knowledgeable about oil deposits and the oil-mining industry.*

23. **(C)** In acting upon rock, the weather elements *have a particular effect* on it, reducing it "to its tiniest possible constituents—rock particles or, simply, dust."

24. **(B)** The author mentions the Grand Canyon while speaking of rivers as "immensely powerful destructive agencies." The dramatic canyon illustrates the *devastating impact* a river can have.

25. **(D)** Use the process of elimination to answer this question. Is our understanding of the process by which oil is created *adequate* (sufficient)? No. There is a "gray and disputatious area" (line 55) about which we do not yet know enough. You can eliminate choice (A). Is our understanding of the process *systematic* (structured or organized according to a fixed plan or system)? Nothing in the passage suggests that it is. You can eliminate choice (B). Is our understanding of the process *erroneous* (incorrect)? Our knowledge is not necessarily false; it is merely incomplete. You can eliminate choice (C). Is our understanding of the process *deficient* (inadequate; lacking)? Yes. We still need to learn more about just what causes decayed vegetation and dead aquatic life to turn into oil. The correct answer is choice (D).

26. **(C)** Lines 56–58 explicitly state that we do not know what causes decomposed organic matter to metamorphose or change into oil. This assertion clearly supports the claim that our understanding of the process by which oil is created is deficient.

27. **(A)** The last sentence states that oil is always found "on the sites of ancient seas and lakes." This suggests that prospectors should search for oil deposits *wherever former seas existed.*

28. **(D)** The author describes several processes (erosion, rock formation, oil formation). He states the possibility that a chemical catalyst is involved in oil formation. He mentions the limitation of our ability to produce oil synthetically. However, he never *proposes a solution* to any problem.

29. **(B)** The "conditions necessary for the formation of oil" are the circumstances that must exist before oil becomes possible. In other words, they are the *prerequisites* for oil's formation.

30. **(B)** The "cause of the metamorphosis (of decayed vegetation, etc., into oil) is not [known]." In other words, it is *an unexplained phenomenon,* an observable fact whose cause remains mysterious.

31. **(C)** In lines 58–60, the author indicates that some form of chemical catalyst may be involved in the metamorphosis of decayed vegetation and dead aquatic life into oil. However, he goes on to state that no one has yet isolated such a catalyst. Until such a catalyst is found or another way to explain oil's metamorphosis can be verified, the cause of the metamorphosis of oil will remain unexplained.

32. **(B)** Choice (B) is correct. The slaves' day of freedom came after the Civil War had *ended.* Choice (A) is incorrect. Although "closed" can mean *shut,* as in "She closed the door," that is not how it is used here. Choice (C) is incorrect. Although "closed" can mean *grew nearer,* as in "Her pursuer was closing fast," that is not how it is used here. Choice (D) is

incorrect. Although "closed" can mean *blocked off*, as in "The road works crew closed the street to traffic," that is not how it is used here.

33. **(C)** Choice (C) is correct. The historic moment is "the day of freedom," the day on which Washington and his family learned they were no longer slaves.

34. **(C)** Lines 34–48 clearly provide evidence that the author is recollecting a historic moment, the day on which a white stranger read the gathered slaves what the author presumes was the Emancipation Proclamation and told them they were free. Note the repeated use of the word *recall*: "As I now recall"; "The most distinct thing that I now recall." This repetition backs up the claim that, in the first two paragraphs, *A man recollects a historic moment that changed his life and the lives of everyone he knew.*

35. **(B)** Look at the context in which the word "mask" appears. The sentence immediately previous states that the slaves "had been careful to explain that the 'freedom' in these songs referred to the next world, and had no connection with life in this world." The slaves' explanation was a pretense, a mask they wore to disguise the fact that these spiritual songs expressed their longing to be physically free of the bonds of slavery. Thus, the mask that the slaves gradually threw off was *the pretense that the freedom they sang about was purely spiritual.*

36. **(D)** By throwing off the mask, the slaves show that they "were not afraid to let it be known that the 'freedom' in their songs meant freedom of the body in this world." This supports the claim that the mask they gradually threw off was *the pretense that the freedom they sang about was purely spiritual.*

37. **(D)** To have charge of themselves is to have *the duty of being responsible for* themselves and for their families. Choices (A), (B), and (C) are incorrect. Although charge can mean *a formal accusation* ("a charge of murder"), *a headlong rush forward* ("a cavalry charge"), or *the price asked for goods or services* ("an admission charge"), that is not how it is used here.

38. **(C)** Look at the context in which the word *light* appears. "Besides, deep down in their hearts there was a strange and peculiar attachment to 'old Marster' and 'old Missus,' and to their children, which they found it hard to think of breaking off. With these they had spent in some cases nearly a half-century, and it was no light thing to think of parting." It was hard for some of these elderly slaves to break away from all they had known. It was not a light or *trivial* (unimportant) thing for them to consider leaving. Choices (A), (B), and (D) are incorrect. Although light can mean *indistinct* ("light handwriting"), *pale* ("light blue"), or *agile* ("light on her feet"), that is not how it is used here.

39. **(B)** Throughout the passage, the narrator is struck by the lack of bitterness displayed on this occasion both by the plantation owner's family and by the newly emancipated slaves. About his master's family, Washington writes, "There was a feeling of deep interest, or perhaps sadness, on their faces, but not bitterness." About the slaves he writes: "For some minutes there was great rejoicing, and thanksgiving, and wild scenes of ecstasy. But there was no feeling of bitterness." Thus, he clearly chooses to emphasize the *absence of any ill will expressed by either the slaves or their masters.*

40. **(A)** The narrator opens the final paragraph by recounting the slaves' initial reactions "great rejoicing," "thanksgiving," "wild scenes of ecstasy"—in other words, *jubilation* (joyous exultation). However, this jubilation does not last: "The wild rejoicing on the

part of the emancipated colored people lasted but for a brief period, for I noticed that by the time they returned to their cabins there was a change in their feelings." It is only *momentary*. What follows this brief rejoicing? It is followed by sober and *sobering reflection* (serious thought) *on problems to be faced*, major problems that include the need to find shelter, the need for a way to make one's living, etc.

41. **(D)** The older slaves who visit their former masters at the big house have begun to think about the problems they now face as free men and women. They have *apprehensions* (fears) *about their uncertain future*. They are accustomed to having their masters tell them what to do. Thus, their fear and uncertainty inspires them to turn to their masters for advice.

42. **(A)** Phrases in the opening paragraphs of Passage 1 ("researchers report April 7 in *Nature Communications*," "the researchers say," "study coauthor") support the claim that the passage's main purpose is to *present a recent study*. The passage later cites the study coauthor's assertion that "[b]eing able to rebuild humans' metabolic memory could help control diseases such as obesity and diabetes." Thus, the recent study has *possible implications for humans*.

43. **(A)** To be wired to count calories is to be *equipped* or prepared biologically to distinguish high-calorie foods from normal-calorie foods. Choices (B), (C), and (D) are incorrect. Although wired can mean *tense* ("wired and edgy"), *strengthened* ("wired papier-mâché sculpture"), or *tied* ("wired bales of hay"), that is not how it is used here.

44. **(B)** As the fruit flies learn to tell apart normal-calorie and high-calorie foods, they become able to remember the type of food they prefer, "the healthier option." Their metabolic memory of their preference for moderate-calorie food enables them to choose this healthier option. Thus, it is reasonable to infer that metabolic memories *are involved in the process of food selection*. Choice (A) is incorrect. Although both mice and fruit flies apparently make metabolic memories, nothing in the passage suggests that these memories encourage the absorption of sorbitol and yeast. Choice (C) is incorrect. The passage says nothing about other forms of memory. Choice (D) is incorrect. Nothing in the passage suggests that metabolic memories are *solely* dependent on the sense of smell.

45. **(A)** Although lines 3–7 do not specifically mention metabolic memories, they do deal with the effects of memories on food selection: the flies learn to distinguish between normal-calorie and high-calorie foods, in process making what the next sentence refers to as metabolic memories. The flies "remember to choose the healthier option later." Thus, lines 3–7 provide evidence that metabolic memories are involved in the process of food selection.

46. **(B)** In line 65, the author specifically states that "Scheer was not involved in the fruit fly study." He was *unconnected with the study being discussed*, but as a neuroscientist and physiologist at Harvard Medical School he possessed *relevant expertise* about the disruption of circadian rhythms in humans.

47. **(B)** If mice do not get heart disease the way people do, then mice would not be good subjects for cardiovascular research on heart problems such as irregular heartbeats. Fruit flies "develop irregular heartbeats and other heart problems" in the course of aging; this suggests that they would be appropriate subjects for such research.

48. **(C)** These two sentences sum up the reasons that fruit flies are preferable to mice as subjects for cardiovascular research. The first points out why mice don't work as subjects for studies about heart problems associated with poor diet. The second states why fruit flies *do* work as subjects for such studies. Note the use of the phrase "on the other hand" to signal the contrast between mice and fruit flies as experimental subjects.

49. **(C)** To address a problem is to begin to *deal with* it or confront it. Choices (A), (B), and (D) are incorrect. Although address can mean *speak to* ("address an audience"), *protest* ("address your complaints to"), or *call* ("Please address him as Doctor Who."), that is not how it is used here.

50. **(B)** Middle age for fruit flies is 5 weeks old. A quick glance at the "Heart function in fruit flies" chart shows that at 5 weeks the heartbeat of the flies with restricted eating time (the lower line) maintained a steady pace, with each beat lasting about a second. In contrast, the heartbeats of the flies with unrestricted eating time varied markedly, with some contractions lasting a full 2 seconds, and others so brief that they barely registered on the chart.

51. **(B)** The opening sentence of the second paragraph states that "Fruit flies that limited eating to 12-hour stints had steadier heartbeats in old age than flies that ate whenever they wanted." These fruit flies did not choose voluntarily to limit their eating time. The researchers in Passage 2 set up a test to see what effect limiting or regulating *the amount of time groups of fruit flies had for eating* would have. Choice (A) is incorrect. Panda and his colleagues were involved in the study described in Passage 2. It was in the study described in Passage 1 that the researchers *fed one group of fruit flies a more highly calorific diet than they fed the other.* Choice (C) is incorrect. Panda and his colleagues did not restrict *the amount of calories the fruit flies were allowed to consume.* Lines 88–91 specifically state that they limited the amount of time the fruit flies ate *without* cutting back on calories. Choice (D) is incorrect. Nothing in the passage suggests that Panda and his colleagues *failed to develop high levels of sugar and fat in their test subjects.*

52. **(D)** Both the fruit flies following the high-calorie diet and the fruit flies following the anytime eating schedule *suffered more severe health problems* than did the fruit flies allowed to follow a moderate-calorie diet or the fruit flies on a 12-hour eating schedule. The fruit flies on the high-calorie diet lost the ability to tell the difference between moderate-calorie and high-calorie foods; their bodies accumulated higher levels of sugar and fat. The fruit flies on the anytime eating schedule developed irregular heart rhythms and slept poorly at night.

Section 2: Writing and Language Test

1. **(A)** The sentence first mentions 20th-century dramatists and then states that they owe a great deal to those who preceded them in the 19th century, making "forebears" the most sensible option. "Elders" in choice (B) and "seniors" in choice (C) refer to older groups of people but without the connotation of paving the way for current generations. "Historians" in choice (D) refers to those who study history, not to those who are studied by historians.

2. **(C)** Choices (A) and (B) have inverted word order, and choice (D) is too vague. Choice (C) puts the words in a logical sequence and uses precise wording.

3. **(C)** To express that this relationship went well beyond a typical rivalry, the phrase "impassioned artistic adversaries" works since it indicates the intensity of Strindberg's and Ibsen's feelings toward one another. Choices (A) and (D) are too violent in meaning, and choice (B) is the opposite of what is required.

4. **(A)** The dashes properly set aside a parenthetical phrase. Choice (B) does not work since a complete sentence does not appear after the semicolon. Choice (C) interrupts the thought right in the middle. Choice (D) uses inconsistent punctuation on either side of the parenthetical phrase.

5. **(B)** "Subtle" indicates "indirect," and "overt" indicates "direct," making choice (B) the best option for the required task. Choices (A), (C), and (D) all give irrelevant possibilities.

6. **(D)** "Respective" means "belonging separately to" different entities, which makes sense in reference to the two different writers. The other options all use some form of "respect" in the sense of "admiration."

7. **(D)** Someone who has both translated the works of these authors and written biographies about them would be intimately familiar with both the writing and histories of them. As such, Meyer would definitely be qualified to assert his opinion on this topic. Choices (A), (B), and (C) all show some familiarity with playwriting or history but do not indicate the level of expertise evident in choice (D).

8. **(A)** "Nonetheless" means "in spite of," which makes sense given the fact that these writers had similar backgrounds yet ended up having very different worldviews. "Consequently," in choice (B), indicates cause and effect. "Also," in choice (C), indicates the continuation of thought. "Divergently," in choice (D), could apply toward the differences in their views but does not work as a transition to show a logical contrast.

9. **(C)** The commas set aside the phrase "as drama continues to evolve into the postmodern era" that leads into the rest of the sentence. Choice (A) lacks a needed comma. Choice (B) breaks up the phrase "continues to evolve." Choice (D) gives no breaks whatsoever.

10. **(A)** This is the only option that puts quotation marks around a direct quote from Bernard Shaw. Choices (B) and (C) have no quotation marks. Choice (D) would work if this phrase were inside another quotation.

11. **(D)** "Germinal" indicates that it is in its earliest stage of development. "Outset," in choice (A), has the right general meaning but is the wrong part of speech since it is a noun instead of an adjective. "Germinating," in choice (B), and "floral," in choice (C), refer to plant life.

12. **(B)** "Eminent" means "noteworthy," which makes sense in reference to a famous concept like that of gravity. "Imminent," choice (A), means "about to happen." "Complimentary," choice (C), is associated with praise. "Complementary," choice (D), is associated with combining things together so they improve the quality of each other.

13. **(A)** The colon sets off the clarification that follows, and the commas set aside the nonessential yet descriptive phrase, "regardless of their mass." Choice (B) causes a run-on sentence. Choices (C) and (D) are both missing needed pauses.

14. **(C)** This is the only choice that is parallel to the other items listed in this sentence. Not only are the other options not parallel, they also have confused word orders.

15. **(B)** The passage indicates that Newton built on the ideas of Kepler, so "filling in the blanks" correctly indicates that Newton was attempting to solve previously mysterious questions. Choice (A) incorrectly indicates that Newton disagreed with all previous findings instead of trying to build on them. Choices (C) and (D) do not work. Newton's discoveries were intellectual in that he came up with revolutionary explanatory systems that were not grounded primarily in observation or exploration.

16. **(B)** Newton is explaining the cause for the apple falling, so "because" is the only option that makes sense. The other options do not indicate cause and effect.

17. **(A)** "In fact" means that Newton's explanation could account for why the moon didn't fall and crash into Earth, demonstrating a contrast between intuitive assumptions and the "fact" of the matter. Choices (B) and (D) are too wordy, and choice (C) is too casual in tone.

18. **(A)** The key phrase in the question is "human-influenced space activities." Astronauts and satellites are clearly human-influenced space activities. Choices (B) and (C) are not associated with human influence. Choice (D) is not a space activity but a theory.

19. **(D)** This is the only option that gives a logical comparison between the theory of Einstein and the theory of Newton. Be sure to compare the same sorts of objects to one another.

20. **(C)** This option uses construction parallel to that in the first part of the sentence and puts the words in a logical order. Choice (A) uses passive voice. Choice (B) confuses the intended meaning. Choice (D) is not parallel.

21. **(D)** "Yet," is the only option that indicates a contrast between the limitations of Newton's theory mentioned in the previous paragraph and the continuing applicability it has to this day.

22. **(B)** This choice most clearly indicates the "lasting relevance" of Newton's theory since it has been relevant for more than three centuries. Choice (A) asserts the irrelevance of Newton's theory. Choice (C) focuses on only a small part of Newton's theory (a part that was actually disproven by experimental observation according to the previous paragraph). Choice (D) is too vague.

23. **(B)** "Continues" matches with the singular subject "question." Choices (A) and (D) are plural. Choice (C) might work if it said "is continuing" instead of "is continue."

24. **(A)** This choice uses the proper singular possessive form of "institute" and uses a colon to give an appropriate pause before the clarification. Choices (B) and (C) do not show possession with "institutes," and choice (D) uses "its'," which is always incorrect.

25. **(C)** According to the graph, in 1998, the amount of state and local funding was roughly $10,000 per student. By 2008, it was a bit more than $9,000 per student. This is best characterized as "nearly a 10 percent" drop.

26. **(C)** The first paragraph introduces the topic of college rankings, and the second goes in-depth into evaluating their shortcomings. Choice (C) gives a highly specific, logical transition between the two paragraphs. Choices (A) and (D) are vague, and choice (B) is not relevant to the topic of rankings.

27. **(D)** "His or her" correctly refers to the singular "student" mentioned earlier in the sentence, given that we do not know the student's gender. Choices (A) and (C) are

plural, and choice (B) is inconsistent with the third-person "student" mentioned in this sentence.

28. **(D)** This is the third item listed in this sentence. To differentiate it from the others, using "still" makes the most sense. The other options do not indicate a third item in this sequence.

29. **(A)** The previous paragraph highlights the problems with college rankings, and the current paragraph highlights ways that colleges are making their programs more appealing beyond easily quantifiable criteria. Choice (A) provides a logical link between these themes. Choice (B) is irrelevant. Choices (C) and (D) are too specific.

30. **(D)** This option places commas such that they lead to a logical meaning. "In such programs" is an introductory phrase, and "just like required classes" is a parenthetical phrase. Choices (A), (B), and (C) do not have needed breaks, making for jumbled meanings.

31. **(D)** Since an alumnus is by definition someone who has graduated from a school, choices (A), (B), and (C) are needlessly repetitive, making choice (D) the best option.

32. **(A)** It is implied that someone would most likely be considering from among more than two universities, so "best" gives the needed superlative. Choices (C) works for comparing. Choices (B) and (D) do not work in the phrase "will . . . foster."

33. **(D)** The subject of the sentence is "rankings," so the plural verb "leave" is needed. Choices (A) and (C) are singular, and choice (B) refers to tree parts.

34. **(D)** This choice uses commas to set aside the appositive since Mrs. Wabash is the same as the "teacher." The other options do not use appropriate punctuation to set aside an appositive.

35. **(A)** This option correctly uses the present perfect tense to indicate that the narrator has forgotten this exercise. Choice (B) incorrectly uses "forgot," choice (C) incorrectly uses "has," and choice (D) is nonsensical.

36. **(D)** "But" gives a logical contrast between what the narrator clearly remembers in the previous sentence and what is more cloudy in this sentence. The other options do not express this contrast.

37. **(B)** This choice maintains the narrator's focus on trying to remember sensory details. Choice (A) is philosophical. Choice (C) is irrelevant. Choice (D) contradicts the feeling of ignorance.

38. **(C)** The proper phrasing is to copy something "onto" paper—one cannot copy something "in," "into," or "within" paper.

39. **(C)** "Entered" concisely expresses the intended idea. Choice (A) is repetitive since the narrator has already indicated that he is the one visiting these places. Choice (B) is too wordy, and choice (D) means "to predict" instead of "to perceive."

40. **(A)** The colon correctly sets off this list of the buildings, and the commas in this choice separate each item. Choice (B) would need a complete sentence after the semicolon. Choice (C) does not have the needed commas. Choice (D) does not have a complete sentence for the second part.

41. **(B)** The commas in this choice separate each item from the next. Choice (A) lacks any commas. Choice (C) requires one to separate "buildings" and "homes." Choice (D) breaks apart the unified "other structures."

42. **(A)** Stating that architecture is both "rewarding" and "demanding" clearly indicates the positive and negative aspects of this field. Choice (B) has two negative adjectives, choice (C) has two positive adjectives, and choice (D) has two neutral adjectives.

43. **(D)** "His or her" is needed to refer to the singular, gender-neutral architect. Choice (A) is wrong, because "there" is used for places. Choices (B) and (C) are both plural.

44. **(C)** Early in the paragraph, the narrator states that he is a "professional architect." Choice (C) ties this professional path to the early inspiration from Mrs. Wabash's class. Choice (A) is far too negative. Choices (B) and (D) are inconsistent with the fact that the narrator is indeed a professional architect.

Section 3: Math Test (No Calculator)

1. **(A)** Since multiplying both sides of the equation $2x + 3y = 4$ by 2 yields $4x + 6y = 8$, the lines are the same.

2. **(D)** From the given information, we have that $d + 4w = 60$ and $d + 8w = 85$. Subtracting the first equation from the second gives $4w = 25$. So $w = 6.25$. By replacing $4w$ by 25 in the first equation, we get that $d + 25 = 60 \Rightarrow d = 35$. So Bill's initial deposit was $35, and each week he deposited $6.25 into his account. After x weeks, the value of the account was $35 + 6.25x$ dollars.

3. **(B)** $x^2 - 8x = -16 \Rightarrow x^2 - 8x + 16 = 0 \Rightarrow (x - 4)(x - 4) = 0 \Rightarrow x - 4 = 0 \Rightarrow x = 4$. So the equation has at most one solution. Replacing x by 4 in the given equation confirms that 4 is a solution. So the equation has exactly 1 solution.

4. **(A)** $a + 10\%(a) = a + 0.1a = 1.1a$, and $b - 10\%(b) = b - 0.1b = 0.9b$. Since it is given that $1.1a = 0.9b$, we have $\frac{a}{b} = \frac{0.9}{1.1} = \frac{9}{11}$.

   Note: If after increasing a and decreasing b the results are equal, a must be smaller than b, so *the ratio of a to b must be less than 1*. Eliminate choices (C) and (D). Now test choices (A) and (B). To test (B), pick two numbers in the ratio of 9 to 10 (90 and 100, for example). Then 90 increased by 10% is 99, and 100 decreased by 10% is 90.

   The results are not equal, so eliminate (B). The answer must be (A), $\frac{9}{11}$. (90 increased by 10% and 110 decreased by 10% are both 99.)

5. **(D)** The x-intercepts of any graph are the points on the graph whose y-coordinates are 0. To find where the line $y = 3x - 6$ crosses the x-axis, let $y = 0$:

   $$0 = 3x - 6 \Rightarrow 3x = 6 \Rightarrow x = 2$$

   Of the four choices, only in (D), $y = 2x - 4$, is $x = 2$ when $y = 0$.

6. **(A)** If (a, b) is a point of intersection of the two graphs, then $b = a^2 + 2$ and $b = \frac{1}{2}a^2 + 1$. So $a^2 + 2 = \frac{1}{2}a^2 + 1 \Rightarrow \frac{1}{2}a^2 = -1$. This is impossible since $\frac{1}{2}a^2$ cannot be negative. So there are no points of intersection. **The two graphs do not intersect.**

Note that each graph is a parabola. Even a quick rough sketch will show that one graph is always above the other.
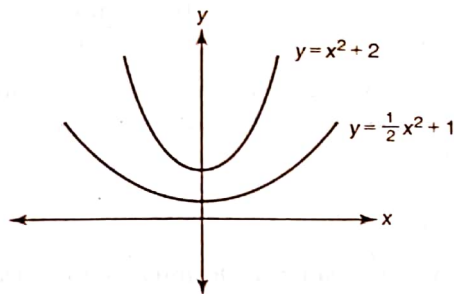
7. **(C)** In order for the equation $ax + b = cx + d$ to have no solutions, it must be that $a = c$ and $b \neq d$.

$$3(x + 2) + 2(x + 3) = 6(x + 1) - n(x + 5) \Rightarrow$$
$$3x + 6 + 2x + 6 = 6x + 6 - nx - 5n \Rightarrow$$
$$5x + 12 = (6 - n)x + 6 - 5n$$

For the given equation to have no solutions, it must be that $5 = 6 - n$. So $n = 1$. When $n = 1$, the last equation becomes $5x + 12 = 5x + 1$, which has **0** solutions.

8. **(D)** Subtract 11 from both sides of the given equation to put it in the standard form for a quadratic equation: $x^2 + 2x - 11 = 0$. Looking at the answer choices should make it clear that this equation cannot be solved by factoring. So use the quadratic formula:

$$x = \frac{-2 \pm \sqrt{4 - (-44)}}{2} = \frac{-2 \pm \sqrt{48}}{2} = \frac{-2 \pm 4\sqrt{3}}{2} = -1 \pm 2\sqrt{3}$$

So the two solutions are $-1 + 2\sqrt{3}$ and $-1 - 2\sqrt{3}$.

9. **(C)** In triangle ABC, draw in altitude BD.
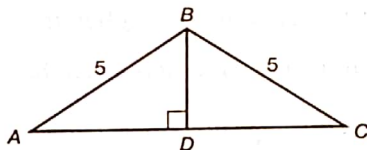
We know that $\cos A = \dfrac{AD}{5}$. Since it is given that $\cos A = 0.8$, we have $\dfrac{AD}{5} = 0.8$. Therefore $AD = 5 \times 0.8 = 4$. Since an altitude to the base of an isosceles triangle is also a median, $DC = AD = 4$, and $AC = 8$. You should see immediately that triangle ABD is a 3-4-5 right triangle. So $BD = 3$. (If you don't recognize the 3-4-5 triangle, use the Pythagorean theorem to get that $BD = 3$.)

Finally, the area of triangle ABC is $\dfrac{1}{2} bh = \dfrac{1}{2}(8)(3) = \mathbf{12}$.

10. **(C)** Note that it is irrelevant how much each pencil costs, so the correct answer cannot contain p. Elaine used $\dfrac{60}{100} d$ dollars to buy pencils and $\dfrac{40}{100} d$ dollars to buy markers. To find out how many markers she bought, divide the number of dollars she spent on

markers, $\frac{40}{100}d = \frac{40d}{100}$, by the cost in dollars of each marker. Each marker costs m cents or $\frac{m}{100}$ dollars. Then $\frac{40d}{100} \div \frac{m}{100} = \frac{40d}{100} \times \frac{100}{m} = \frac{40d}{m}$.

Alternative solution. Plug in numbers. Assume Elaine had $100 and she spent $60 on pencils and the other $40 on markers, which cost $2 or 200 cents each. Then she bought 20 markers. Which answer choice is equal to 20 when $d = 100$ and $m = 200$? Only choice (C): $\frac{40d}{m} = \frac{40 \times 100}{200} = 20$.

11. **(A)** Since $C = 2\pi r$, then $r = \frac{C}{2\pi}$. Since the formula for the area of a circle is $A = \pi r^2$,
$$\pi r^2 = \pi \left(\frac{C}{2\pi}\right)^2 = \pi \left(\frac{C^2}{4\pi^2}\right) = \frac{C^2}{4\pi}.$$

12. **(D)** The probability that the student chosen was a boy is
$$\frac{\text{the number of boys in the chorus}}{\text{total number of students in the chorus}}$$
After the auditions, the number of boys in the chorus was $b + 3$ and the number of girls was $g + 5$. So the total number of students in the chorus was $b + 3 + g + 5 = b + g + 8$. The desired probability is $\frac{b+3}{b+g+8}$.

13. **(C)** Since $f(x) = xg(x)$, $f(0) = 0g(0) = 0$. From the definition of $f(x)$, we see that
$$f(0) = 2(c) - 3(3) = 2c - 9. \text{ So } 2c - 9 = 0 \Rightarrow 2c = 9 \Rightarrow c = 4.5$$

14. **(B)** The graph of $y = f(x - 2)$ is obtained by shifting the graph of $y = f(x)$ 2 units to the right. Therefore the x-intercept $(-3, 0)$ shifts 2 units to $(-1, 0)$; the **only** x-coordinate is -1.

15. **(A)** If r represents the radius of the sphere, and R and h represent the radius and height of the cone, respectively, the formulas for the volumes of the sphere and the cone are $V = \frac{4}{3}\pi r^3$ and $V = \frac{1}{3}\pi R^2 h$, respectively. Remember: these formulas are given to you on the first page of every math section. Since it is given that $R = 2r$, we have
$$\frac{4}{3}\pi r^3 = \frac{1}{3}\pi R^2 h = \frac{1}{3}\pi(2r)^2 h = \frac{1}{3}\pi 4r^2 h \Rightarrow r^3 = r^2 h \Rightarrow r = h \Rightarrow h = \frac{1}{2}R \Rightarrow \frac{h}{R} = \frac{1}{2}$$

16. **132** If in 2015, the nine club members read an average of 52 books, then in total they read $9 \times 52 = 468$ books. Since the eight club members other than Mary read an average of 42 books during the year, collectively they read $8 \times 42 = 336$ books. This means that in 2015, Mary read $468 - 336 = 132$ books.

17. $\frac{4}{3}$ **or 1.33** Mentally, or by using a Venn diagram, determine the number of girls who play only one sport.

Basketball   Volleyball

40   (10)   30
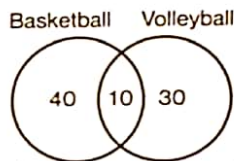
40 play only basketball and 30 play only volleyball. The ratio is 40:30. Grid in $\frac{4}{3}$ or 1.33.

NEW SAT

18. $\frac{1}{3}$ **or any number between .3 and .4** Adding 3 to each term of the given inequality gives:

$$\frac{5}{2} < x < \frac{10}{3} \Rightarrow 2.5 < x < 3.33$$

So a possible value of x is 3, in which case $\frac{1}{x} = \frac{1}{3}$.

**Since $\frac{5}{2} < x < \frac{10}{3}$, we have $\frac{2}{5} > \frac{1}{x} > \frac{3}{10}$. So $0.3 < \frac{1}{x} < 0.4$.

**Pick a value for $x - 3$ that satisfies the original inequality. For example, if $x - 3 = 0$, then $x = 3$ and $\frac{1}{x} = \frac{1}{3}$.

19. **4** If $2 + i$ is a solution of the equation $x^2 - bx + 5 = 0$, then

$$(2 + i)^2 - b(2 + i) + 5 = 0 \Rightarrow (4 + 4i + i^2) - 2b - bi + 5 = 0 \Rightarrow 4 + 4i - 1 - 2b - bi + 5 = 0$$

So $8 - 2b + (4 - b)i = 0 + 0i$, and so $8 - 2b = 0$ and $4 - b = 0$. So $b = 4$.

20. $\frac{1}{3}$ The relationship between the radian measure of a central angle (θ), the radius (r), and the length of the arc intercepted by the angle (s) is $s = r\theta$. So, $2 = 6\theta \Rightarrow \theta = \frac{1}{3}$.

Section 4: Math Test (Calculator)

1. **(B)** While driving at 40 miles per hour, Brigitte took 3 hours to get to her parents' house. So the distance she drove was $40 \times 3 = 120$ miles. To make the trip in 2.5 hours, she would have had to drive at $120 \div 2.5 = 48$ miles per hour.

2. **(B)** From the given information, we have that the weighted average of the men's and women's grades was $\frac{80m + 90w}{m + w} = 86$. By cross-multiplying, we get that

$$80m + 90w = 86m + 86w \Rightarrow 4w = 6m \Rightarrow \frac{m}{w} = \frac{4}{6} = \frac{2}{3}$$

**If you got stuck on this, be sure to guess. Make it an educated guess, though. Since the class average was closer to the women's average than to the men's average, there must be more women than men in the course. So the ratio of the number of men to the number of women in the course must be less than 1. Therefore, the answer must be choice (A) or choice (B).

3. **(D)** Test each statement to see if it is true.

- Choice (A): In 1960, there were 12 million households with 5 or more persons. In 2000 there were only 11.4 million such households. Statement (A) is true.
- Choice (B): From 1940 to 2000, the percent of 1-person households more than tripled from 7.7% to 25.8%. Statement (B) is true.
- Choice (C): In 1970, 17.6% of the households had 1 person and 29.6% of the households had 2 people. So 47.2% of the households had 2 or fewer people. Since the median is at the 50th percentile, the median was 3. Statement (C) is true.
- Choice (D): From the 1950 census to the 1960 census, the percent of 2-person households decreased from 28.1% to 28%. Statement (D) is false.

4. **(B)** The easiest way to answer this question is to assign numbers to the original width and length such that the length is twice the width, say the length is 20 and the width is 10. Then the new length would be 40 and the new width would be 5. The original perimeter would be 60 and the new perimeter would be 90, an increase of 50%. The original area would be 20 × 10 = 200, and the new area would be 40 × 5 = 200; the area would not change. **So P would increase by 50%, and A would not change.**

5. **(C)** Set up a proportion:

$$\frac{2.2 \text{ pounds}}{1 \text{ kilogram}} = \frac{120 \text{ pounds}}{x \text{ kilograms}}$$

Then $2.2x = 120 \Rightarrow x = \dfrac{120}{2.2} = 54.54\ldots.$

Therefore, the **3** students weighing more than 120 pounds are the 3 who weigh more than 54.54 kilograms.

··Quickly multiply by 2.2: 56 × 2.2 =123.2, so 56, 57, and 61 kilograms are all more than 120 pounds. The other two weights are less.

6. **(B)** Since the 180 freshmen make up 15% of the total number of students:

$$0.15t = 180 \Rightarrow t = \frac{180}{0.15} = 1{,}200$$

7. **(B)** From the solution to question 6, we know that the total number of students on teams is 1,200. Then there are 480 juniors on teams (40% of 1,200). So z, the number of seniors on teams, is 1,200 – (180 + 120 + 480) = 1,200 – 780 = **420**.

··The sophomores account for $\dfrac{120}{1{,}200} = \dfrac{1}{10} = 10\%$ of the students on teams, so the percentage, w, of seniors is 100 – (15 + 10 + 40) = 100 – 65 = 35, and finally, 35% of 1,200 is **420**.

8. **(A)** Rewrite the given equation as $y = \dfrac{a}{a+1}\, x + 1$. We see that the graph is a straight line whose y-intercept is 1. So the correct answer choice must be (A) or (B). Since $a < -1$, that means $a + 1 < 0$. So $\dfrac{a}{a+1}$, the slope of the line, is positive (the numerator and denominator are both negative). So the answer is choice (A).

9. **(C)** Just set up a simple proportion:

$$\frac{22 \text{ feet}}{\text{second}} = \frac{22 \times 60 \text{ feet}}{60 \text{ seconds}} = \frac{1{,}320 \text{ feet}}{\text{minute}} = \frac{1{,}320 \times 60 \text{ feet}}{60 \text{ minutes}} = \frac{79{,}200 \text{ feet}}{\text{hour}}$$

Finally, 79,200 ÷ 5,280 = 15. So Naveed's speed is **15** miles per hour.

10. **(C)** By TACTIC E1, if the average of 5 numbers is 70, their sum is 5 × 70 = 350. The median of the 5 numbers is the middle one when they are listed in increasing order. To make the third one as large as possible, make the others as small as possible. Since the numbers are not necessarily *different* positive integers, the two smallest could both be 1: 1, 1, ___, ___, ___. That leaves 348 for the remaining 3 integers. Since the fourth and fifth numbers must be at least as large as the third, the most the median could be is 348 ÷ 3 = 116. The five numbers could be 1, 1, 116, 116, 116.

11. **(B)** Let x represent the number of precincts that have fewer than 1,000 registered voters and to which 3 volunteers have been assigned. Let y represent the number of precincts with 1,000 or more registered voters and to which 5 volunteers have been assigned. Then

$$x + y = 20 \quad \text{and} \quad 3x + 5y = 84$$

Multiplying the first equation by 3 gives $3x + 3y = 60$. Subtracting $3x + 3y = 60$ from $3x + 5y = 84$ gives $2y = 24$. So $y = 12$. Therefore, $x = 20 - 12 = 8$. So 8 out of 20, or **40%**, of the precincts have fewer than 1,000 registered voters.

12. **(A)** Of course, you should draw a diagram and label it.
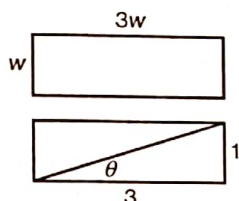
You could label the sides w and $3w$, but it is even easier to label them 1 and 3. Now you have two choices:

(1) Since $\tan \theta = \dfrac{1}{3}$, $\theta = \tan^{-1}\left(\dfrac{1}{3}\right) = 18.430$. Then $\sin \theta = \sin(18.430) = 0.316$.

(2) Use the Pythagorean theorem to find the hypotenuse x.

$(x)^2 = 3^2 + 1^2 = 10 \Rightarrow x = \sqrt{10}$. Then $\sin \theta = \dfrac{1}{\sqrt{10}} = \mathbf{0.316}$.

13. **(C)** Read the sales figures in the bar graph on the left for each of the eight years, add them, and then divide by 8. Rather than that, you could visualize the situation. Where could you draw a horizontal line across the graph so that there would be the same amount of gray area above the line as white area below it? Imagine a horizontal line drawn through the 7 on the vertical axis. The portions of the bars above the line for 1993 and 1996–1998 are just about exactly the same size as the white areas below the line for 1991, 1992, and 1994. The answer is **(C)**.

14. **(C)** Looking at the Earnings bar graph, it is clear that the only possible answers are 1992, 1994, and 1995, the three years in which there was a significant increase in earnings from the year before. From 1993 to 1994 expenditures doubled, from $200 million to $400 million—an increase of 100%. From 1991 to 1992 expenditures increased by $400 million (from $500 million to $900 million), but that is less than a 100% increase. From 1994 to 1995 expenditures increased by $300 million (from $400 million to $700 million); but again, this is less than a 100% increase. The answer is **(C)**.

15. **(D)** In answering question 15, observe that earnings are given in millions, while sales are in billions. If you answer too quickly, you might say that in 1993 earnings were 200 and sales were 8, and conclude that the desired ratio is $\dfrac{200}{8} = \dfrac{25}{1}$. You will avoid this mistake if you keep track of units: earnings were 200 *million* dollars, whereas sales were 8 *billion* dollars. The correct ratio is

$$\frac{200{,}000{,}000}{8{,}000{,}000{,}000} = \frac{2}{80} = \frac{1}{40}$$

16. **(C)**

- The formula for the volume of a cylinder is $V = \pi r^2 h$, where r is the radius and h is the height. The volume of the cylinder is $\pi(3^2)(6) = 54\pi$.

- The formula for the volume of a sphere of radius r is $V = \frac{4}{3}\pi r^3$. The volume of a sphere of radius 3 is $\frac{4}{3}\pi(3)^3 = 36\pi$. Therefore, the volume of the hemisphere of radius 3 is $\left(\frac{1}{2}\right)36\pi = 18\pi$.

- Therefore, the total volume of the solid is $54\pi + 18\pi = \mathbf{72\pi}$.

17. **(B)** If during any week Sally's sales are \$5,000, her commission would be 10% of that amount, or \$500 and her total earnings would be \$800. Since during the week in question, she earned more than \$800, her sales exceeded \$5,000. So her commission was 12%. Of her earnings of \$1,080, \$300 was her base pay and the other \$780 was her commission. So if V represents the dollar value of her sales, $0.12V = \$780$ and $V = \$780 \div 0.12 = \mathbf{\$6,500}$.

**Note: this is an easy question to answer by backsolving. Start with choice (B) or choice (C). Add 12% of the value you are testing to \$300 and see if the total is \$1,080. If the total is less than \$1,080, try a larger number. If it's more than \$1,080, try a smaller number.

18. **(B)** The bar representing underweight adult females who perceive themselves to be underweight extends from about 70% to about 95%, a range of approximately **25%**.

19. **(A)** Almost all overweight females correctly considered themselves to be overweight; and more than half of all females of normal weight correctly considered themselves "about right." But nearly 70% of **underweight** adult females inaccurately considered themselves "about right."

20. **(B)** To find Henry's average speed, in kilometers per hour, divide the distance he went, in kilometers (198), by the time it took, in hours. Henry drove for 3 hours and 40 minutes, which is $3\frac{2}{3}$ hours (40 minutes $= \frac{40}{60}$ hour $= \frac{2}{3}$ hour). Henry's average speed, in kilometers per hour, was $198 \div 3\frac{2}{3} = 198 \div \frac{11}{3} = 198 \times \frac{3}{11} = \mathbf{54}$.

21. **(D)** On January 1, 2001, the value of the CD was $765 + 0.06(765) = (1.06)(765)$. On January 1 of each year, the value of the CD was (1.06) times its value on January 1 of the preceding year. After 12 years, the value of the CD was $(1.06)^{12}(765) = \mathbf{1,539}$.

22. **(D)** $(a + bi)(1 + i) = a + ai + bi + bi^2 = (a - b) + (a + b)i$.

So $(a - b) + (a + b)i = 3 + 5i \Rightarrow a - b = 3$ and $a + b = 5$.

Adding these two equations gives $2a = 8$. So $a = 4$ and $b = 1$. That means $a + bi = 4 + i$.

**$(a + bi)(1 + i) = 3 + 5i \Rightarrow a + bi = \frac{3 + 5i}{1 + i} = \frac{3 + 5i}{1 + i} \cdot \frac{1 - i}{1 - i} = \frac{3 - 3i + 5i - 5i^2}{1 + 1} = \frac{8 + 2i}{2} = 4 + i$

23. **(B)** The two given equations are each the equation of a line. If two lines do not intersect, they are parallel. So by KEY FACT N6, they have equal slopes.

    By solving for y to put $3x + 4y + 5 = 0$ into slope-intercept form, we get $y = -\frac{3}{4}x - \frac{5}{4}$. So the slope is $-\frac{3}{4}$. Similarly, by rewriting $kx + 6y + 7 = 0$ as $y = -\frac{k}{6}x - \frac{7}{6}$, we see that its slope is $-\frac{k}{6}$. So $-\frac{3}{4} = -\frac{k}{6} \Rightarrow -4k = -18 \Rightarrow k = \mathbf{4.5}$.

24. **(D)** Let $x = $ the number of children who have both a dog and a cat. Then $211 - x$ children have a dog but no cat, and $174 - x$ children have a cat but no dog. This is illustrated in the Venn diagram below.
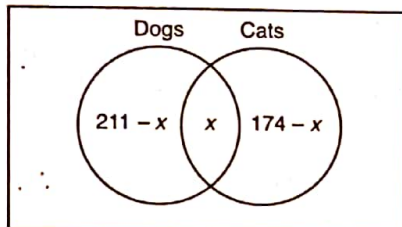
    Since 83 children have neither a dog nor a cat, $326 - 83 = 243$ children have a dog, a cat, or both. So $(211 - x) + x + (174 - x) = 243 \Rightarrow 385 - x = 243 \Rightarrow x = 385 - 243 - \mathbf{142}$.

25. **(C)** The formula for the volume of a sphere is $V = \frac{4}{3}\pi r^3$.

    (Remember that this formula is given to you on the first page of each Math section.) The formula for the volume of a cube is $V = e^3$. So:

    $$e^3 = \frac{4}{3}\pi r^3 \Rightarrow \frac{e^3}{r^3} = \frac{4}{3}\pi \Rightarrow \frac{e}{r} = \sqrt[3]{\frac{4}{3}\pi} = \sqrt[3]{4.19} = \mathbf{1.61}$$

26. **(C)** $|f(x)| = 3$ if $f(x) = 3$ or $f(x) = -3$. There is only one value of x for which $f(x) = -3$, namely 0: $(0, 3)$ is the only point on the graph of $y = f(x)$ whose y-coordinate is -3. There are 5 values of x for which $f(x) = 3$, the 5 values where the graph of $y = f(x)$ crosses at the horizontal line $y = 3$. So, in total there are $1 + 5 = 6$ values of x between -6 and 7 for which $|f(x)| = \mathbf{3}$.
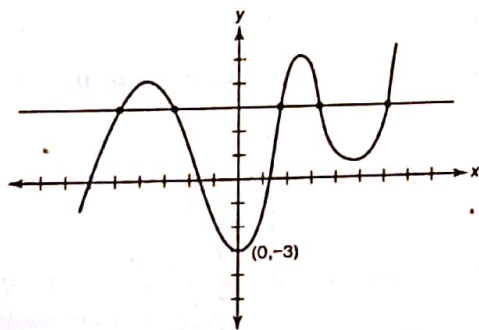
27. **(B)** The disease afflicts 0.1% of the population. Of the 1,000,000 people tested $0.001 \times 1,000,000 = 1,000$ people had the disease and the other 999,000 didn't have it. Of the 1,000 people who had the disease, 990 of them (99% of 1,000) tested positive and the other 10 erroneously tested negative. Of the 999,000 people who didn't have the disease,

989,010 of them (99% of 999,000) tested negative, and 9,990 of them (1% of 999,000) erroneously tested positive. So in total, 9,900 + 990 = 10,980 people tested positive, of whom 990 actually had the disease. Finally, 990 ÷ 10,980 = 0.09 = **9%**. Therefore, even though the test is 99% accurate, only 9% of the people who tested positive for the disease actually had it.

28. **(B)** The median of a set of data is the number for which 50% of the data is smaller than that number and 50% of the data is greater than that number. The students who studied less than 60 minutes per day account for only 30% of the data. Because the students who studied 60 to 119 minutes account for the next 25% of the data, the student at exactly the 50th percentile lies in this second group. Only choice (B) (**100** minutes) lies in this group.

29. **(C)** At University A, 4,500 students (30% of 15,000) studied less than one hour per day. At University B, 10,500 students (42% of 25,000) studied less than one hour per day. So 10,500 – 4,500 = 6,000 more students at University B studied for less than one hour per day.

30. **(D)** At University A, 1,500 students (10% of 15,000) study at least three hours (180 minutes) per day. At University B, 2,000 students (8% of 25,000) study at least three hours (180 minutes) per day. In total, 3,500 of the 40,000 students in both universities study at least three hours per day. Finally, 3,500 ÷ 40,000 = **0.0875**.

Note that since 8% of the students at University B study at least three hours per day, if 8% of the students at University A also study at least three hours per day, the answer would be 8% = 0.08. Since at University A the figure is 10%, the weighted average is raised a little and so the answer must be a bit more than 0.08.

31. **3.8** In 50 minutes, 5 × 50 = 250 liters of water flow through the faucet into the vat. Since at the end of the 50 minutes the vat is full, there are 60 liters of water in the vat and the other 250 – 60 = 190 liters left the vat through the drain. So the rate of flow through the drain is 190 liters ÷ 50 minutes = **3.8** liters per minute.

32. **15**

- To go 2,954 miles at 543 miles per hour takes 2,954 ÷ 543 = 5.44 hours.
- To go 2,954 miles at 569 miles per hour takes 2,954 ÷ 569 = 5.19 hours.
- The faster plane took 5.44 – 5.19 = 0.25 hours less time.
- Finally, 0.25 hours = 0.25 hours × 60 minutes per hour = **15** minutes.

33. **.95** Sketch the line $y = 3x - 3$, which goes through the points (0, –3), (1, 0), and (2, 3).
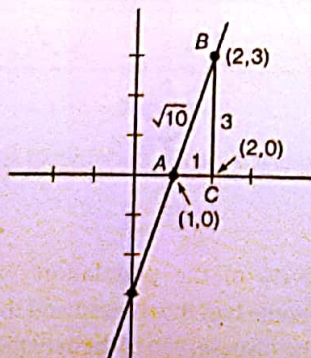
Use the Pythagorean theorem to find the length of AB:

$$(AB)^2 = 1^2 + 3^2 = 10 \Rightarrow AB = \sqrt{10} \approx 3.162$$

Then, $\sin \angle CAB = \dfrac{\text{opposite}}{\text{hypotenuse}} = \dfrac{3}{3.162} = 0.95$.

34. **200** The second job cost $45 dollars more than the first because it took 45 minutes, or 0.75 hours, longer. So the plumber's hourly rate, h, is $45 \div 0.75$ hours = $60 per hour. Her charge of $290 for the first job consisted of her flat fee of f dollars plus $60 per hour for the 2.5 additional hours:

$$290 = f + 2.5(60) = f + 150 \Rightarrow f = 140$$

So $f + h = 140 + 60 = $ **200**.

**Alternatively, to get the values of f and h, we could have solved the following system of equations:

$$355 = f + 3.25h \quad \text{and} \quad 290 = f + 2.5h$$

Subtracting the second equation from the first gives $45 = 0.75h$. Now proceed as above: $h = 45 \div 0.75 = 60$. Replace h with 60 in either of the equations to get $f = $ **140**.

35. **152** The two bar graphs show that in 1950, 8.1% of the population was age 65 and over and that the number of people age 65 and above was 12.3 million. So if P represents the total population in 1950, then

$$0.081P = 12,300,000. \text{ So } P = 12,300,000 \div 0.081 = 151,851,852 \approx 152,000,000$$

So grid in **152**.

36. **7** From the top chart, we can just read that in 2000 the number of people living in the United States age 85 and above was 4.2 million, or 4,200,000. In 1950, there were 12.3 million people age 65 and above. Of those, 8.4 million were 65–74 and 3.3 million were 75–84. So $8.4 + 3.3 = 11.7$ million people were between 65 and 84 and the remaining $12,300,000 - 11,700,000 = 600,000$ were 85 and above. Since $4,200,000 \div 600,000 = 7$, there were 7 times as many people 85 and above in 2000 than in 1950.

37. **37.5** On her first $20,000 of income, Michelle's tax was $4,000 (20% of $20,000). So $9,250 - $4,000 = $5,250 represents the 30% tax she paid on her income in excess of $20,000.

$$9,250 = 4,000 + 30\%(N - 20,000) \Rightarrow 5,250 = 0.30(N - 20,000) \Rightarrow$$

$$\frac{5,205}{0.30} = N - 20,000 \Rightarrow N = 17,500 + 20,000 = 37,500$$

So $\dfrac{N}{1,000} = $ **37.5**.

38. **2250** From the solution to question 37, we know that Michelle's income was $37,500. If 20% of that had been exempt from taxation, her taxable income would have been reduced by $7,500 (20% of $37,500). So her tax would have been reduced by **$2,250** (30% of $7,500).

SCORE ANALYSIS

Reading and Writing Test

Section 1: Reading $\dfrac{}{\text{\# correct}} = \dfrac{}{\text{raw score}}$ (A)

Section 2: Writing $\dfrac{}{\text{\# correct}} = \dfrac{}{\text{raw score}}$ (B)

To find your Reading and Writing test scores, consult the chart below: find the ranges in which your raw scores lie and read across to find the ranges of your test scores.

$$\dfrac{}{\substack{\text{range of reading}\\\text{test scores}}} + \dfrac{}{\substack{\text{range of writing}\\\text{test scores}}} = \dfrac{}{\substack{\text{range of reading + writing}\\\text{test scores}}}\;(C)$$

To find the range of your Reading and Writing Scaled Score, multiply (C) by 10.

Test Scores for the Reading and Writing Sections

Reading Raw Score	Writing Raw Score	Test Score
44–52	39–44	35–40
36–43	33–38	31–34
30–35	28–32	28–30
24–29	22–27	24–27
19–23	17–21	21–23
14–18	13–16	19–20
9–13	9–12	16–18
5–8	5–8	13–15
less than 5	less than 5	10–12

Math Test

Section 3: $\dfrac{}{\text{\# correct}} = \dfrac{}{\text{raw score}}$ (D)

Section 4: $\dfrac{}{\text{\# correct}} = \dfrac{}{\text{raw score}}$ (E)

Total Math raw score: (D) + (E) = _____

To find your Math Scaled Score, consult the chart below: find the range in which your raw score lies and read across to find the range for your scaled score.

Scaled Scores for the Math Test

Raw Score	Scaled Score	Raw Score	Scaled Score
50–58	700–800	20–25	450–490
44–49	650–690	15–19	400–440
38–43	600–640	11–14	350–390
32–37	550–590	7–10	300–340
26–32	500–540	less than 7	200–290

ANSWER SHEET
Model Test 4

Section 1: Reading

1. Ⓐ Ⓑ Ⓒ Ⓓ	14. Ⓐ Ⓑ Ⓒ Ⓓ	27. Ⓐ Ⓑ Ⓒ Ⓓ	40. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓐ Ⓑ Ⓒ Ⓓ	15. Ⓐ Ⓑ Ⓒ Ⓓ	28. Ⓐ Ⓑ Ⓒ Ⓓ	41. Ⓐ Ⓑ Ⓒ Ⓓ
3. Ⓐ Ⓑ Ⓒ Ⓓ	16. Ⓐ Ⓑ Ⓒ Ⓓ	29. Ⓐ Ⓑ Ⓒ Ⓓ	42. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓐ Ⓑ Ⓒ Ⓓ	17. Ⓐ Ⓑ Ⓒ Ⓓ	30. Ⓐ Ⓑ Ⓒ Ⓓ	43. Ⓐ Ⓑ Ⓒ Ⓓ
5. Ⓐ Ⓑ Ⓒ Ⓓ	18. Ⓐ Ⓑ Ⓒ Ⓓ	31. Ⓐ Ⓑ Ⓒ Ⓓ	44. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓐ Ⓑ Ⓒ Ⓓ	19. Ⓐ Ⓑ Ⓒ Ⓓ	32. Ⓐ Ⓑ Ⓒ Ⓓ	45. Ⓐ Ⓑ Ⓒ Ⓓ
7. Ⓐ Ⓑ Ⓒ Ⓓ	20. Ⓐ Ⓑ Ⓒ Ⓓ	33. Ⓐ Ⓑ Ⓒ Ⓓ	46. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓐ Ⓑ Ⓒ Ⓓ	21. Ⓐ Ⓑ Ⓒ Ⓓ	34. Ⓐ Ⓑ Ⓒ Ⓓ	47. Ⓐ Ⓑ Ⓒ Ⓓ
9. Ⓐ Ⓑ Ⓒ Ⓓ	22. Ⓐ Ⓑ Ⓒ Ⓓ	35. Ⓐ Ⓑ Ⓒ Ⓓ	48. Ⓐ Ⓑ Ⓒ Ⓓ
10. Ⓐ Ⓑ Ⓒ Ⓓ	23. Ⓐ Ⓑ Ⓒ Ⓓ	36. Ⓐ Ⓑ Ⓒ Ⓓ	49. Ⓐ Ⓑ Ⓒ Ⓓ
11. Ⓐ Ⓑ Ⓒ Ⓓ	24. Ⓐ Ⓑ Ⓒ Ⓓ	37. Ⓐ Ⓑ Ⓒ Ⓓ	50. Ⓐ Ⓑ Ⓒ Ⓓ
12. Ⓐ Ⓑ Ⓒ Ⓓ	25. Ⓐ Ⓑ Ⓒ Ⓓ	38. Ⓐ Ⓑ Ⓒ Ⓓ	51. Ⓐ Ⓑ Ⓒ Ⓓ
13. Ⓐ Ⓑ Ⓒ Ⓓ	26. Ⓐ Ⓑ Ⓒ Ⓓ	39. Ⓐ Ⓑ Ⓒ Ⓓ	52. Ⓐ Ⓑ Ⓒ Ⓓ

Section 2: Writing and Language

1. Ⓐ Ⓑ Ⓒ Ⓓ	12. Ⓐ Ⓑ Ⓒ Ⓓ	23. Ⓐ Ⓑ Ⓒ Ⓓ	34. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓐ Ⓑ Ⓒ Ⓓ	13. Ⓐ Ⓑ Ⓒ Ⓓ	24. Ⓐ Ⓑ Ⓒ Ⓓ	35. Ⓐ Ⓑ Ⓒ Ⓓ
3. Ⓐ Ⓑ Ⓒ Ⓓ	14. Ⓐ Ⓑ Ⓒ Ⓓ	25. Ⓐ Ⓑ Ⓒ Ⓓ	36. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓐ Ⓑ Ⓒ Ⓓ	15. Ⓐ Ⓑ Ⓒ Ⓓ	26. Ⓐ Ⓑ Ⓒ Ⓓ	37. Ⓐ Ⓑ Ⓒ Ⓓ
5. Ⓐ Ⓑ Ⓒ Ⓓ	16. Ⓐ Ⓑ Ⓒ Ⓓ	27. Ⓐ Ⓑ Ⓒ Ⓓ	38. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓐ Ⓑ Ⓒ Ⓓ	17. Ⓐ Ⓑ Ⓒ Ⓓ	28. Ⓐ Ⓑ Ⓒ Ⓓ	39. Ⓐ Ⓑ Ⓒ Ⓓ
7. Ⓐ Ⓑ Ⓒ Ⓓ	18. Ⓐ Ⓑ Ⓒ Ⓓ	29. Ⓐ Ⓑ Ⓒ Ⓓ	40. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓐ Ⓑ Ⓒ Ⓓ	19. Ⓐ Ⓑ Ⓒ Ⓓ	30. Ⓐ Ⓑ Ⓒ Ⓓ	41. Ⓐ Ⓑ Ⓒ Ⓓ
9. Ⓐ Ⓑ Ⓒ Ⓓ	20. Ⓐ Ⓑ Ⓒ Ⓓ	31. Ⓐ Ⓑ Ⓒ Ⓓ	42. Ⓐ Ⓑ Ⓒ Ⓓ
10. Ⓐ Ⓑ Ⓒ Ⓓ	21. Ⓐ Ⓑ Ⓒ Ⓓ	32. Ⓐ Ⓑ Ⓒ Ⓓ	43. Ⓐ Ⓑ Ⓒ Ⓓ
11. Ⓐ Ⓑ Ⓒ Ⓓ	22. Ⓐ Ⓑ Ⓒ Ⓓ	33. Ⓐ Ⓑ Ⓒ Ⓓ	44. Ⓐ Ⓑ Ⓒ Ⓓ

ANSWER SHEET
Model Test 4

Section 3: Math (No Calculator)

1. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓐ Ⓑ Ⓒ Ⓓ
3. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓐ Ⓑ Ⓒ Ⓓ

5. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓐ Ⓑ Ⓒ Ⓓ
7. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓐ Ⓑ Ⓒ Ⓓ

9. Ⓐ Ⓑ Ⓒ Ⓓ
10. Ⓐ Ⓑ Ⓒ Ⓓ
11. Ⓐ Ⓑ Ⓒ Ⓓ
12. Ⓐ Ⓑ Ⓒ Ⓓ

13. Ⓐ Ⓑ Ⓒ Ⓓ
14. Ⓐ Ⓑ Ⓒ Ⓓ
15. Ⓐ Ⓑ Ⓒ Ⓓ

16.

17.

18.

19.

20.

ANSWER SHEET
Model Test 4

Section 4: Math (Calculator)

1. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓐ Ⓑ Ⓒ Ⓓ
3. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓐ Ⓑ Ⓒ Ⓓ
5. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓐ Ⓑ Ⓒ Ⓓ
7. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓐ Ⓑ Ⓒ Ⓓ

9. Ⓐ Ⓑ Ⓒ Ⓓ
10. Ⓐ Ⓑ Ⓒ Ⓓ
11. Ⓐ Ⓑ Ⓒ Ⓓ
12. Ⓐ Ⓑ Ⓒ Ⓓ
13. Ⓐ Ⓑ Ⓒ Ⓓ
14. Ⓐ Ⓑ Ⓒ Ⓓ
15. Ⓐ Ⓑ Ⓒ Ⓓ
16. Ⓐ Ⓑ Ⓒ Ⓓ

17. Ⓐ Ⓑ Ⓒ Ⓓ
18. Ⓐ Ⓑ Ⓒ Ⓓ
19. Ⓐ Ⓑ Ⓒ Ⓓ
20. Ⓐ Ⓑ Ⓒ Ⓓ
21. Ⓐ Ⓑ Ⓒ Ⓓ
22. Ⓐ Ⓑ Ⓒ Ⓓ
23. Ⓐ Ⓑ Ⓒ Ⓓ
24. Ⓐ Ⓑ Ⓒ Ⓓ

25. Ⓐ Ⓑ Ⓒ Ⓓ
26. Ⓐ Ⓑ Ⓒ Ⓓ
27. Ⓐ Ⓑ Ⓒ Ⓓ
28. Ⓐ Ⓑ Ⓒ Ⓓ
29. Ⓐ Ⓑ Ⓒ Ⓓ
30. Ⓐ Ⓑ Ⓒ Ⓓ

31.
32.
33.
34.
35.
36.
37.
38.

READING TEST

65 MINUTES, 52 QUESTIONS

Turn to Section 1 of your answer sheet to answer the questions in this section.

> **Directions:** Following each of the passages (or pairs of passages) below are questions about the passage (or passages). Read each passage carefully. Then, select the best answer for each question based on what is stated in the passage (or passages) and in any graphics that may accompany the passage.

Questions 1–11 are based on the following passage.

The following passage is an excerpt from Henry James's short story "The Pupil." In this section, Pemberton, the young British tutor, describes some of the hasty trips around Europe during which he came to know his pupil, Morgan Moreen, and Morgan's family.

A year after he had come to live with
them Mr. and Mrs. Moreen suddenly gave
up the villa at Nice. Pemberton had got used
Line to suddenness, having seen it practiced on
(5) a considerable scale during two jerky little
tours—one in Switzerland the first summer,
and the other late in the winter, when they
all ran down to Florence and then, at the
end of ten days, liking it much less than they
(10) had intended, straggled back in mysterious
depression. They had returned to Nice "for
ever," as they said; but this didn't prevent
their squeezing, one rainy muggy May night,
into a second-class railway-carriage—you
(15) could never tell by which class they would
travel—where Pemberton helped them to
stow away a wonderful collection of bundles
and bags. The explanation of this maneuver
was that they had determined to spend the
(20) summer "in some bracing place"; but in
Paris they dropped into a small furnished
apartment—a fourth floor in a third-rate
avenue, where there was a smell on the
staircase and the *portier*[1] was hateful—
(25) and passed the next four months in blank
indigence.

The better part of this forced temporary
stay belonged to the tutor and his pupil, who,
visiting the Invalides[2] and Notre Dame, the
(30) Conciergerie and all the museums, took a
hundred rewarding rambles. They learned to
know their Paris, which was useful, for they
came back another year for a longer stay, the
general character of which in Pemberton's
(35) memory today mixes pitiably and confusedly
with that of the first. He sees Morgan's shabby
knickerbockers—the everlasting pair that
didn't match his blouse and that as he grew
longer could only grow faded. He remembers
(40) the particular holes in his three or four pairs
of colored stockings.

Morgan was dear to his mother, but he
never was better dressed than was absolutely
necessary—partly, no doubt, by his own fault,
(45) for he was as indifferent to his appearance
as a German philosopher. "My dear fellow,
so are you! I don't want to cast you in the
shade." Pemberton could have no rejoinder
for this—the assertion so closely represented
(50) the fact. If however the deficiencies of his
own wardrobe were a chapter by themselves
he didn't like his little charge to look too

GO ON TO THE NEXT PAGE

poor. Later he used to say "Well, if we're poor,
why, after all, shouldn't we look it?" and he
(55) consoled himself with thinking there was
something rather elderly and gentlemanly
in Morgan's disrepair—it differed from the
untidiness of the urchin who plays and
spoils his things. He could trace perfectly the
(60) degrees by which, in proportion as her little
son confined himself to his tutor for society,
Mrs. Moreen shrewdly forbore to renew his
garments. She did nothing that didn't show,
neglected him because he escaped notice,
(65) and then, as he illustrated this clever policy,
discouraged at home his public appearances.
Her position was logical enough—those
members of her family who did show had to
be showy.
(70)   During this period and several others
Pemberton was quite aware of how he and
his comrade might strike people; wandering
languidly through the Jardin des Plantes[3]
as if they had nowhere to go, sitting on the
(75) winter days in the galleries of the Louvre, so
splendidly ironical to the homeless, as if for
the advantage of the steam radiators. They
joked about it sometimes: it was the sort
of joke that was perfectly within the boy's
(80) compass. They figured themselves as part of
the vast vague hand-to-mouth multitude of
the enormous city and pretended they were
proud of their position in it—it showed them
"such a lot of life" and made them conscious
(85) of a democratic brotherhood. If Pemberton
couldn't feel a sympathy in destitution with
his small companion—for after all Morgan's
fond parents would never have let him really
suffer—the boy would at least feel it with
(90) him, so it came to the same thing. He used
sometimes to wonder what people would
think they were—to fancy they were looked
askance at, as if it might be a suspected case
of kidnapping. Morgan wouldn't be taken

(95) for a young patrician with a tutor—he wasn't
smart enough—though he might pass for his
companion's sickly little brother.

[1]Hall porter or custodian.
[2]Famous Paris monument; site of the tomb of
Napoleon.
[3]Botanical garden.

1. The primary purpose of the passage is to

   (A) denounce the ill treatment of an
       exceptional child.
   (B) describe a boy's reactions to his
       irresponsible parents.
   (C) portray a selfish and unfeeling mother
       and son.
   (D) recount an outsider's impressions of an
       odd family.

2. It can most reasonably be inferred from the
    passage that the reason for the Moreens'
    sudden departure from Nice had to do with

   (A) ill health.
   (B) shifts of mood.
   (C) educational opportunities.
   (D) financial problems.

3. Which choice provides the best evidence for
    the answer to the previous question?

   (A) Lines 3–11 ("Pemberton . . . depression")
   (B) Lines 11–18 ("They had . . . bags")
   (C) Lines 18–26 ("The explanation . . .
       indigence")
   (D) Lines 31–36 ("They learned . . . first")

GO ON TO THE NEXT PAGE

4. It can be most reasonably inferred from the passage that the narrator is making these comments about Pemberton's travels with the Moreen family

    (A) on Pemberton's return with the Moreens to Nice.
    (B) in response to visiting Paris for the first time.
    (C) some time after Pemberton's wanderings with the Moreens.
    (D) in an effort to write down his memoirs.

5. Which choice provides the best evidence for the answer to the previous question?

    (A) Lines 31–36 ("They learned . . . the first")
    (B) Lines 42–46 ("Morgan was dear . . . philosopher")
    (C) Lines 59–63 ("He could trace . . . garments")
    (D) Lines 77–85 ("They joked . . . brotherhood")

6. The tone of Morgan's speech to his tutor (lines 46–49) can best be described as

    (A) apathetic.
    (B) bitter.
    (C) teasing.
    (D) self-righteous.

7. As described in lines 42–69, Mrs. Moreen's approach toward Morgan can best be described as

    (A) stern but nurturing.
    (B) fond but pragmatic.
    (C) cruel and unfeeling.
    (D) doting and overprotective.

8. It can most reasonably be inferred from lines 63–69 that Mrs. Moreen most likely ceases to spend money on new clothing for Morgan because

    (A) she and her husband have grown increasingly miserly with the passage of time.
    (B) the child is so small for his age that he needs little in the way of clothing.
    (C) she is unwilling to offend Pemberton by dressing his pupil in finer clothes than Pemberton can afford.
    (D) she has only enough money to buy clothes for the family members who must appear in polite society.

9. As used in line 72, "strike" most nearly means

    (A) appear to.
    (B) run into.
    (C) achieve.
    (D) hit.

10. It can be inferred from the passage that Morgan and Pemberton regard the "hand-to-mouth multitude" of Paris (line 81) with a sense of

    (A) amusement.
    (B) condescension.
    (C) indifference.
    (D) identification.

11. As used in line 96, "smart" most nearly means

    (A) intelligent.
    (B) brisk.
    (C) fashionable.
    (D) impertinent.

MODEL TEST 4

Questions 12–22 are based on the following passage.

In this excerpt from an essay on the symbolic language of dreams, the writer Erich Fromm explores the nature of symbols.

One of the current definitions of a symbol is that it is "something that stands for something else." We can differentiate
Line between three kinds of symbols: the
(5) *conventional*, the *accidental*, and the *universal* symbol.

The *conventional* symbol is the best known of the three, since we employ it in everyday language. If we see the word
(10) "table" or hear the sound "table," the letters t-a-b-l-e stand for something else. They stand for the thing "table" that we see, touch, and use. What is the connection between the *word* "table" and the *thing* "table"? Is there
(15) any inherent relationship between them? Obviously not. The *thing* table has nothing to do with the *sound* table, and the only reason the word symbolizes the thing is the convention of calling this particular thing by
(20) a name. We learn this connection as children by the repeated experience of hearing the word in reference to the thing until a lasting association is formed so that we don't have to think to find the right word.
(25)   There are some words, however, in which the association is not only conventional. When we say "phooey," for instance, we make with our lips a movement of dispelling the air quickly. It is an expression of disgust
(30) in which our mouths participate. By this quick expulsion of air we imitate and thus express our intention to expel something, to get it out of our system. In this case, as in some others, the symbol has an inherent
(35) connection with the feeling it symbolizes.

But even if we assume that originally many or even all words had their origins in some such inherent connection between symbol and the symbolized, most words no longer have this
(40) meaning for us when we learn a language.

Words are not the only illustration for conventional symbols, although they are the most frequent and best known ones. Pictures also can be conventional symbols. A flag, for
(45) instance, may stand for a specific country, and yet there is no intrinsic connection between the specific colors and the country for which they stand. They have been accepted as denoting that particular country,
(50) and we translate the visual impression of the flag into the concept of that country, again on conventional grounds.

The opposite to the conventional symbol is the *accidental* symbol, although they have
(55) one thing in common: there is no intrinsic relationship between the symbol and that which it symbolizes. Let us assume that someone has had a saddening experience in a certain city; when he hears the name of that
(60) city, he will easily connect the name with a mood of sadness, just as he would connect it with a mood of joy had his experience been a happy one. Quite obviously, there is nothing in the nature of the city that is either
(65) sad or joyful. It is the individual experience connected with the city that makes it a symbol of a mood.

The *universal* symbol is one in which there is an intrinsic relationship between
(70) the symbol and that which it represents. Take, for instance, the symbol of fire. We are fascinated by certain qualities of fire in a fireplace. First of all, by its aliveness. It changes continuously, it moves all the time,
(75) and yet there is constancy in it. It remains the same without being the same. It gives the impression of power, of energy, of grace

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and lightness. It is as if it were dancing, and had an inexhaustible source of energy. (80) When we use fire as a symbol, we describe the *inner experience* characterized by the same elements which we notice in the sensory experience of fire—the mood of energy, lightness, movement, grace, gaiety, (85) sometimes one, sometimes another of these elements being predominant in the feeling.

The universal symbol is the only one in which the relationship between the symbol and that which is symbolized is not (90) coincidental, but intrinsic. It is rooted in the experience of the affinity between an emotion or thought, on the one hand, and a sensory experience, on the other. It can be called universal because it is shared by all (95) men, in contrast not only to the accidental symbol, which is by its very nature entirely personal, but also to the conventional symbol, which is restricted to a group of people sharing the same convention. The (100) universal symbol is rooted in the properties of our body, our senses, and our mind, which are common to all men and, therefore, not restricted to individuals or to specific groups. Indeed, *the language of the universal symbol* (105) *is the one common tongue developed by the human race, a language which it forgot before it succeeded in developing a universal conventional language.*

12. The primary purpose of the passage is to

(A) refute an argument about the nature of symbolism.
(B) describe the process of verbalization.
(C) summarize the findings of a long-term research project.
(D) refine the definition of a technical term.

13. As used in lines 11–12, "stand for" most nearly means

(A) tolerate.
(B) represent.
(C) support.
(D) rise.

14. According to lines 25–35, "table" and "phooey" differ in that

(A) only one is a conventional symbol.
(B) "table" is a more commonly used symbol than "phooey."
(C) "phooey" has an intrinsic natural link with its meaning.
(D) children learn "phooey" more readily than they learn "table."

15. It can be inferred from the passage that another example of a word with both inherent and conventional associations to its meaning is

(A) hiss.
(B) hike.
(C) hold.
(D) candle.

16. Which of the following would the author be most likely to categorize as a conventional symbol?

(A) a patchwork quilt
(B) a bonfire
(C) the city of London
(D) the Statue of Liberty

17. Which choice provides the best evidence for the answer to the previous question?

(A) Lines 20–24 ("We learn . . . word")
(B) Lines 33–35 ("In this case . . . symbolizes")
(C) Lines 36–40 ("But even . . . language")
(D) Lines 44–52 ("A flag . . . grounds")

18. According to the author's argument, a relationship between Disneyland and the mood of joy can best be described as

(A) innate.
(B) immutable.
(C) elemental.
(D) coincidental.

19. Which choice provides the best evidence for the answer to the previous question?

(A) Lines 36–40 ("But even . . . language")
(B) Lines 44–48 ("A flag . . . stand")
(C) Lines 57–63 ("Let us . . . one")
(D) Lines 68–70 ("The *universal* . . . represents")

20. According to the passage, a major factor that distinguishes a universal symbol from conventional and accidental symbols is

(A) its origins in sensory experience.
(B) its dependence on a specific occasion.
(C) the intensity of the mood experienced.
(D) its appeal to the individual.

21. By saying "Take . . . the symbol of fire" (line 71), the author is asking the reader to

(A) grasp it as an element.
(B) consider it as an example.
(C) accept it as a possibility.
(D) assume it as a standard.

22. As used in line 100, "properties" most nearly means

(A) possessions.
(B) attributes.
(C) premises.
(D) assets.

Questions 23–32 are based on the following passage.

The following passage is taken from a classic study of tarantulas published in Scientific American *in 1952.*

A fertilized female tarantula lays from 200 to 400 eggs at a time; thus it is possible for a single tarantula to produce several
Line thousand young. She takes no care of them
(5) beyond weaving a cocoon of silk to enclose the eggs. After they hatch, the young walk away, find convenient places in which to dig their burrows and spend the rest of their lives in solitude. Tarantulas feed mostly on
(10) insects and millipedes. Once their appetite is appeased, they digest the food for several days before eating again. Their sight is poor, being limited to sensing a change in the intensity of light and to the perception of
(15) moving objects. They apparently have little or no sense of hearing, for a hungry tarantula will pay no attention to a loudly chirping cricket placed in its cage unless the insect happens to touch one of its legs.
(20)   But all spiders, and especially hairy ones, have an extremely delicate sense of touch. Laboratory experiments prove that tarantulas can distinguish three types of touch: pressure against the body wall, stroking of the body
(25) hair and riffling of certain very fine hairs on the legs called trichobothria. Pressure against the body, by a finger or the end of a pencil, causes the tarantula to move off slowly for a short distance. The touch excites
(30) no defensive response unless the approach is from above, where the spider can see the motion, in which case it rises on its hind legs, lifts its front legs, opens its fangs and holds this threatening posture as long as the object
(35) continues to move. When the motion stops,

the spider drops back to the ground, remains quiet for a few seconds, and then moves slowly away.

The entire body of a tarantula, especially
(40) its legs, is thickly clothed with hair. Some of it is short and woolly, some long and stiff. Touching this body hair produces one of two distinct reactions. When the spider is hungry, it responds with an immediate and swift
(45) attack. At the touch of a cricket's antennae the tarantula seizes the insect so swiftly that a motion picture taken at the rate of 64 frames per second shows only the result and not the process of capture. But when the spider is not
(50) hungry, the stimulation of its hairs merely causes it to shake the touched limb. An insect can walk under its hairy belly unharmed.

The trichobothria, very fine hairs growing from disklike membranes on the legs, were
(55) once thought to be the spider's hearing organs, but we now know that they have nothing to do with sound. They are sensitive only to air movement. A light breeze makes them vibrate slowly without disturbing the
(60) common hair. When one blows gently on the trichobothria, the tarantula reacts with a quick jerk of its four front legs. If the front and hind legs are stimulated at the same time, the spider makes a sudden jump. This
(65) reaction is quite independent of the state of its appetite.

These three tactile responses—to pressure on the body wall, to moving of the common hair, and to flexing of the trichobothria—are
(70) so different from one another that there is no possibility of confusing them. They serve the tarantula adequately for most of its needs and enable it to avoid most annoyances and dangers. But they fail the spider completely
(75) when it meets its deadly enemy, the digger wasp *Pepsis.*

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23. The primary purpose of the passage is to

(A) report on controversial new discoveries about spider behavior.
(B) summarize what is known about the physical and social responses of tarantulas.
(C) challenge the findings of historic laboratory experiments involving tarantulas.
(D) discuss the physical adaptations that make tarantulas unique.

24. It can most reasonably be inferred from the opening paragraph that tarantulas

(A) become apprehensive at sudden noises.
(B) depend on their mothers for nourishment after hatching.
(C) must consume insects or millipedes daily.
(D) are reclusive by nature.

25. Which choice provides the best evidence for the answer to the previous question?

(A) Lines 1–6 ("A fertilized . . . eggs")
(B) Lines 6–9 ("After . . . solitude")
(C) Lines 9–12 ("Tarantulas . . . again")
(D) Lines 12–15 ("Their sight . . . objects")

26. As used in line 29, "excites" most nearly means

(A) enlivens.
(B) inflames.
(C) stimulates.
(D) awakens.

27. The author's attitude toward tarantulas would best be described as one of

(A) nervous fascination.
(B) reluctant curiosity.
(C) marked ambivalence.
(D) objective appreciation.

28. The description of what happens when one films a tarantula's reaction to the touch of a cricket (lines 45–49) primarily is intended to convey a sense of the tarantula's

(A) omnivorous appetite.
(B) graceful movement.
(C) quickness in attacking.
(D) indifference to stimulation.

29. As used in line 65, "independent" most nearly means

(A) self-sufficient.
(B) self-governing.
(C) impartial.
(D) regardless.

30. In the passage, the author does all of the following EXCEPT

  (A) deny a possibility.
  (B) define a term.
  (C) correct a misapprehension.
  (D) pose a question.

31. In the paragraphs immediately following this passage, the author most likely will

  (A) explain why scientists previously confused the tarantula's three tactile responses.
  (B) point out the weaknesses of the digger wasp that enable the tarantula to subdue it.
  (C) describe how the digger wasp goes about attacking tarantulas.
  (D) demonstrate how the tarantula's three tactile responses enable it to meet its needs.

32. Which choice provides the best evidence for the answer to the previous question?

  (A) Lines 53–58 ("The trichobothria . . . movement")
  (B) Lines 64–66 ("This reaction . . . appetite")
  (C) Lines 67–71 ("These three . . . them")
  (D) Lines 74–76 ("But . . . *Pepsis*")

Questions 33–42 are based on the following passage.

This passage is adapted from John Locke, Second Treatise of Civil Government, *originally published in 1689. Locke's* Two Treatises of Civil Government *had a profound effect on the framers of the US Declaration of Independence and Constitution.*

    [I]t will be said that, the people being ignorant and always discontented, to lay the foundation of government in the unsteady
Line opinion and uncertain humor of the people
(5) is to expose it to certain ruin; and no government will be able long to subsist if the people may set up a new legislative whenever they take offense at the old one. To this I answer: Quite the contrary. People are not so
(10) easily got out of their old forms as some are apt to suggest. They are hardly to be prevailed with to amend the acknowledged faults in the frame they have been accustomed to. And if there be any . . . defects, . . . it is not an
(15) easy thing to get them changed, even when all the world sees there is an opportunity for it. This slowness and aversion in the people to quit their old constitutions has, in the many revolutions which have been seen in
(20) this kingdom, in this and former ages still kept us to, or after some interval of fruitless attempts still brought us back again to, our old legislative of Kings, Lords, and Commons. And whatever provocations have made the
(25) crown be taken from some of our princes' heads, they never carried the people so far as to place it in another line.
    But it will be said, this hypothesis lays a ferment for frequent rebellion. To which
(30) I answer: First, no more than any other hypothesis. For when the people are made miserable, and find themselves exposed to the ill-usage of arbitrary power . . . the same

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will happen. The people generally ill-treated,
(35) and contrary to right, will be ready upon
any occasion to ease themselves of a burden
that sits heavy upon them. They will wish
and seek for the opportunity, which in the
change, weakness, and accidents of human
(40) affairs seldom delays long to offer itself. He
must have lived but a little while in the world
who has not seen examples of this in his
time, and he must have read very little who
cannot produce examples of it in all sorts of
(45) governments in the world.

Secondly, I answer, such revolutions
happen not upon every little
mismanagement in public affairs. Great
mistakes in the ruling part, many wrong
(50) and inconvenient laws, and all the slips of
human frailty will be borne by the people
without mutiny or murmur. But if a long
train of abuses, prevarications and artifices,
all tending the same way, make the design
(55) visible to the people—and they cannot but
feel what they lie under, and see whither
they are going—it is not to be wondered
that they should then rouse themselves and
endeavor to put the rule into such hands
(60) which may secure to them the ends for which
government was at first erected. . . .

Thirdly, I answer that this power in the
people of providing for their safety anew by
a new legislative when their legislators have
(65) acted contrary to their trust by invading their
property, is the best fence against rebellion,
and the probablest means to hinder it.
For rebellion being an opposition, not to
persons, but authority, which is founded
(70) only in the constitutions and laws of the
government, those whoever they be who
by force break through, and by force justify
their violation of them, are truly and properly
rebels. For when men by entering into society

(75) and civil government have excluded force,
and introduced laws for the preservation
of property, peace, and unity amongst
themselves, those who set up force again
in opposition to the laws . . . are properly
(80) rebels; which they who are in power . . .
being likeliest to do, the properest way to
prevent the evil is to show them the danger
and injustice of it who are under the greatest
temptation to run into it.

33. As used in line 4, "humor" most nearly means

(A) wit.
(B) skepticism.
(C) amusement.
(D) temperament.

34. According to Locke, which of the following
will NOT occur as a result of basing
government on the will of the people?

(A) Governments will be unstable because
the people will rebel whenever they are
dissatisfied.
(B) Governments will be stable because
people are averse to change.
(C) The people will not rebel frequently.
(D) A government will be overturned when a
long history of abuse cannot be tolerated
by the people.

MODEL TEST 4

35. Which choice best describes the structure of the first paragraph?

(A) A principle is stated, an opposing principle is stated, and a synthesis is reached.
(B) A position is stated, an opposing position is stated, and examples supporting the latter position are given.
(C) A question is posed, a method of analysis is recommended, and the question is answered.
(D) A historical period is introduced, and events from the period are reviewed.

36. Locke's primary argument in the second paragraph is that

(A) rebellion is inevitable, regardless of whether the power to govern is placed in the hands of the people.
(B) history is filled with examples of rulers using their power to halt rebellions.
(C) violent rebellion is a poor strategy for changing the government's treatment of the people.
(D) rebellions will increase if the power to govern is given to the people.

37. Which choice provides the best evidence for the answer to the previous question?

(A) Lines 30–34 ("First, no more . . . will happen")
(B) Lines 34–37 ("The people . . . upon them")
(C) Lines 37–40 ("They will . . . offer itself")
(D) Lines 40–45 ("He must . . . the world")

38. The author uses "abuses, prevarications and artifices, all tending the same way" (lines 53–54) as examples of

(A) actions the people take when rebelling against the government.
(B) historical events.
(C) things that prevent the government from performing its proper functions.
(D) government behavior that justifies the people's rebellion.

39. As used in line 60, "ends" most nearly means

(A) purposes.
(B) conclusions.
(C) extremities.
(D) segments.

40. Locke argues that the best check on rebellion is

(A) providing the government with absolute authority.
(B) giving the people the power to replace an abusive government.
(C) a strong military.
(D) a divided government made up of Kings, Lords, and Commons.

41. Which choice provides the best evidence for the answer to the previous question?

(A) Lines 17–23 ("This . . . Commons")
(B) Lines 34–37 ("The people . . . upon them")
(C) Lines 62–67 ("this power . . . hinder it")
(D) Lines 71–74 ("those . . . properly rebels")

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42. Based on the passage, what is Locke's argument for why the government, rather than the people, should at times be viewed as a rebel?

(A) Government is founded on the will of the people; therefore, the people are always right.

(B) The people will never rise up to overthrow the government because they are afraid of change.

(C) Most governments do not protect the natural rights of the people.

(D) Rebellion is opposition to the authority of the law; therefore, the government is a rebel when it violates the legal limits of its power.

Questions 43–52 are based on the following passages.

Largely unexplored, the canopy or treetop region of the tropical rainforest is one of the most diverse plant and animal communities on Earth. Passage 1 is an excerpt from a 1984 Scientific American article on the rain forest canopy; in it, the naturalist Donald R. Perry shares his research team's observations of epiphytes, unusual plants that flourish in this treetop environment. Passage 2, "Elucidating Epiphyte Diversity" by Andrew Sugden is taken from the 6 May 2011 issue of Science.

PASSAGE 1

The upper story of the rain forest, which we investigated, incorporates two-thirds of its volume. This region can be divided
Line arbitrarily into a lower canopy, extending
(5) from 10 to 25 meters above the ground, an upper canopy, reaching a height of 35 meters, and an emergent zone that encompasses the tops of the tallest trees, which commonly grow to heights of more
(10) than 50 meters. The canopy is well lighted, in contrast to the forest understory, which because of thick vegetation above receives only about 1 percent of the sunlight that falls on the treetops. In the canopy all but
(15) the smallest of the rain forest trees put forth their leaves, flowers and fruit. It also contains many plants that exist entirely within its compass, forming vegetative communities that in number of species and complexity of
(20) interactions surpass any others on the earth.
Among the most conspicuous features of vegetation in the canopy of the tropical rain forest are epiphytes. About 28,000 species in 65 families are known worldwide, 15,500
(25) of them in Central and South America; they

Layering of environments in the rain forest fosters species diversity. In the understory, or basement, light is dim, humidity rarely drops below 95 percent, and temperature varies little. In the canopy, sunlight is abundant and humidity and temperatures fluctuate. Each level of the forest has its own array of plants and animals, including pollinating insects.

include species of orchids, bromeliads, and arboreal cacti as well as lower plants such as lichens, mosses, and ferns. Thousands more epiphyte varieties remain unidentified.

(30)   The Greek meaning of the word epiphyte is "plant that grows on a plant," and they carpet tree trunks and branches. Epiphytes sprout from seeds borne by the wind or deposited by animals, their roots holding

(35) tight to the interstices of the bark. Yet they are nonparasitic; their hosts provide them with nothing more than a favorable position in the brightly lighted canopy. For nourishment epiphytes depend on soil particles and

(40) dissolved minerals carried in rainwater, and on aerial deposits of humus. The deposits are the product of organic debris, such as dead leaves from epiphytes and other plants, that lodges among epiphyte roots.

(45)   Water is directly available to epiphytes only when it rains; other plants have continuous access to moisture trapped in the soil. As a result many epiphytes have

developed features that collect and retain

(50) rainwater. Some, including orchids and arboreal cacti, have succulent stems and leaves, with spongy tissues that store water, as well as waxy leaf coatings that reduce the loss of moisture through transpiration.[1]

(55) Many orchids have bulbous stem bases; other families of epiphytes impound water in tanks formed by tight rosettes of leaves or in cups shaped by the junctions of broadened petioles[2] and stems. Some species possess

(60) absorbent, spongelike root masses that soak up and hold water. Bromeliads, a Central and South American family, can hold reserves of several gallons within their cisternlike bases, forming "arboreal swamps" that attract

(65) insects of many species, earthworms, spiders, sow bugs, scorpions, tree frogs, and insect-eating birds.

[1]Passage of water through a plant to the atmosphere.
[2]Slender stalks that attach a leaf to the stem.

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PASSAGE 2

In tropical forests, an important fraction of the total plant species diversity is composed (70) of epiphytes: plants that are rooted for part or all their life on the trunks and branches of trees and lianas. The patterns of epiphyte diversity are still poorly understood relative to those of trees, however, because of (75) logistical challenges, such as tree height. Benavides et al. performed a comparative analysis of the epiphyte communities in lowland forest in Colombian Amazonia, aiming to understand how landscape unit (80) (swamp forest, floodplain forest, and well-drained upland) and host tree species influenced the composition of their epiphyte communities, using a combination of collecting by tree climbing and binocular (85) observations. They recorded 154 epiphyte species on 411 tree species. There were clear associations between tree/liana species assemblages and epiphyte species assemblages, but there were few significant (90) associations between individual host species and epiphyte species. The high diversity of both groups of plants in the sampled plots made testing for individual host preferences difficult, suggesting the need for further (95) studies.

43. The author of Passage 1 characterizes the floor or understory of the rain forest as relatively

   (A) insignificant.
   (B) voluminous.
   (C) illuminated.
   (D) obscure.

44. Which choice provides the best evidence for the answer to the previous question?

   (A) Lines 1–3 ("The upper . . . volume")
   (B) Lines 10–14 ("The canopy . . . treetops")
   (C) Lines 16–20 ("It also . . . earth")
   (D) Lines 21–29 ("Among . . . unidentified")

45. As used in line.18, "compass" most nearly means

   (A) a curved arc.
   (B) directions.
   (C) parameters.
   (D) enclosing limits.

46. It can most reasonably be inferred from Passage 1 that which of the following is true of epiphytes?

   (A) They lack an adequate root system.
   (B) They cannot draw moisture from tree trunks.
   (C) They are incapable of transpiration.
   (D) They are hard to perceive in the dense rain forest canopy.

47. As used in line 27, "lower" most nearly means

   (A) below average.
   (B) relatively primitive.
   (C) less tall.
   (D) more sparse.

MODEL TEST 4

48. Epiphytes have direct access to water only when it rains because

(A) they lack the ability to collect moisture.
(B) dead leaves and other organic debris cover their roots.
(C) the thick canopy protects them from rainstorms.
(D) they lack connections to water in the ground.

49. In line 64, the quotes around the phrase "arboreal swamps" indicate that

(A) the author is quoting a standard technical term.
(B) the term is intended to have a humorous effect.
(C) the term is being used in a special sense.
(D) the author means the term literally.

50. What information discussed in Passage 2 is clarified by referring to the infographic accompanying Passage 1?

(A) The information in lines 68–72 ("In tropical . . . lianas")
(B) The information in lines 72–75 ("The patterns . . . height")
(C) The information in lines 85–86 ("They recorded . . . species")
(D) The information in lines 91–95 ("The high . . . studies")

51. Which choice best states the relationship between the two passages?

(A) Passage 2 draws alternative conclusions from the observations shared in Passage 1.
(B) Passage 1 proposes a hypothesis that is confirmed in Passage 2.
(C) Passage 1 introduces a concept that is elaborated on in Passage 2.
(D) Passage 2 restates in less vivid terms the information presented in Passage 1.

52. The authors of both passages would most likely agree with which of the following statements about epiphyte studies?

(A) They are most efficiently conducted by means of binocular observation.
(B) They need to focus on observations of epiphytes in the understory.
(C) They necessarily entail certain challenges for researchers.
(D) They should primarily be considered an untapped resource.

STOP

If there is still time remaining, you may review your answers.

WRITING AND LANGUAGE TEST

35 MINUTES, 44 QUESTIONS

Turn to Section 2 of your answer sheet to answer the questions in this section.

Directions: Questions follow each of the passages below. Some questions ask you how the passage might be changed to improve the expression of ideas. Other questions ask you how the passage might be altered to correct errors in grammar, usage, and punctuation. One or more graphics accompany some passages. You will be required to consider these graphics as you answer questions about editing the passage.

There are three types of questions. In the first type, a part of the passage is underlined. The second type is based on a certain part of the passage. The third type is based on the entire passage.

Read each passage. Then, choose the answer to each question that changes the passage so that it is consistent with the conventions of standard written English. One of the answer choices for many questions is "NO CHANGE." Choosing this answer means that you believe the best answer is to make no change in the passage.

Questions 1–11 are based on the following passage and supplementary material.

The Online Job Hunt

More and more, technology is changing the ways people find jobs and employers select candidates. Think back to the days when the job hunter ❶ chose his or her most precious qualities, wrote them out on one sheet of paper, and sold the best version of ❷ themselves to a prospective employer. No longer is it that simple. Google and various social media sites like Facebook and Twitter mean that your control over exactly how you come across to an employer is very different from the traditional resume model. In fact, research shows that approximately ❸ one-half of all employers are taking to online searches in the hiring process. What does Google say about you?

1. (A) NO CHANGE
    (B) choose
    (C) has chose
    (D) had choose

2. (A) NO CHANGE
    (B) yourself
    (C) himself or herself
    (D) oneself

3. Which choice offers the most accurate interpretation of the data in the chart?

    (A) NO CHANGE
    (B) one-fourth
    (C) two-thirds
    (D) four-fifths

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The good news is technology can work in your favor **④ if you recognize the challenges of using technology properly.** If you approach the World Wide Web as a tool, it can be **⑤ valuable in a way not witnessed heretofore.** Indeed, there are more ways than ever to market yourself and your skills, and to network with other professionals in your field. First, you will want to make sure you are competing in the online job hunt. Career websites like LinkedIn, Dice, and Monster make it simple to get started. **⑥ Within your online, profiles it is critical that you include information, about your educational background, previous** work experience, intern or research positions, and volunteer efforts. **⑦ Now is not the time to be modest.**

What's more—you don't have to stop there. **⑧ Whereas** the old resume needed to be concise and fit in the scopes of one or two pages,

4. Which choice provides the most logical and relevant conclusion to the sentence?

   (A) NO CHANGE
   (B) since technology has made unbelievable strides.
   (C) despite the dangers of downloading computer viruses.
   (D) just as methodically as it can work against you.

5. (A) NO CHANGE
   (B) unprecedentedly valuable.
   (C) precious beyond your wildest dreams.
   (D) helpful.

6. (A) NO CHANGE
   (B) Within your online profiles it is critical that you include information about your educational background, previous
   (C) Within your online profiles, it is critical that you include information about your educational background, previous
   (D) Within your online profiles, it is critical that you include information about: your educational background, previous

7. Which choice most logically reinforces the statement in the previous sentence?

   (A) NO CHANGE
   (B) Be careful to keep it short and sweet.
   (C) Remember—your application gets accepted, not your personality.
   (D) Good things happen to those who wait.

8. (A) NO CHANGE
   (B) Since
   (C) Because
   (D) Moreover
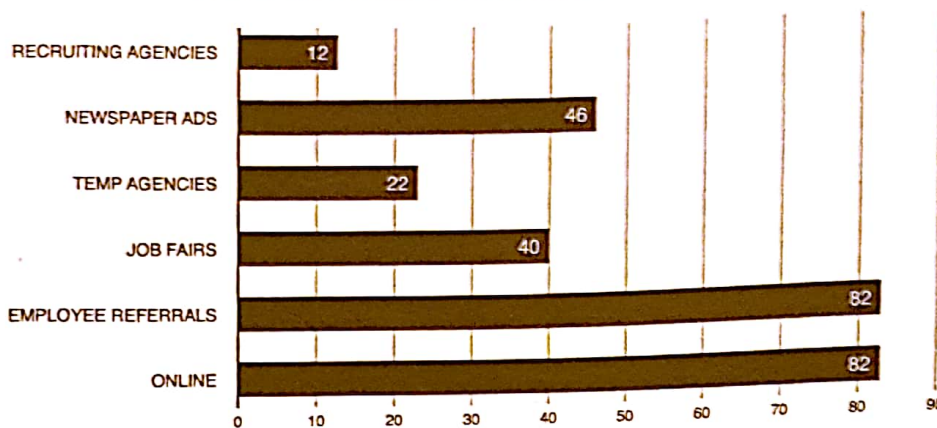
Percent Using Recruiting Methods to Fill Jobs

Percent Using Recruiting Methods to Fill Jobs:
- RECRUITING AGENCIES: 12
- NEWSPAPER ADS: 46
- TEMP AGENCIES: 22
- JOB FAIRS: 40
- EMPLOYEE REFERRALS: 82
- ONLINE: 82

(x-axis: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90)

■ Percent Using Recruiting Methods to Fill Jobs*

*100 Human Resource Departments were randomly selected and asked which recruiting methods they currently use to fill their job openings.

your online profile can be much more thorough. Make sure to post a **❾ professional picture, this allows the employer to see that you are a real person** with real skills and makes you more likely to be interviewed. Include any awards or achievements that can relate to the job position and depict your broader talents. Don't forget to mention any particular leadership responsibilities you've been granted in previous experience. Have you taken the initiative to attend conferences or events? Do tell. **❿ Be sure to supplement your job search with the tried-and-true methods of newspaper ads and recruiting agencies.**

9. (A) NO CHANGE
   (B) professional picture: this
   (C) professional; picture this
   (D) professional picture this

10. Which choice offers an accurate interpretation of the data in the chart by emphasizing one of the most popular recruiting methods?

   (A) NO CHANGE
   (B) Additionally, polish your interpersonal networking skills before you head to a job fair to "wow" potential employers.
   (C) There is even room in most online career profiles for positive feedback from colleagues, supervisors, or mentors.
   (D) And while it may not be ideal, working temporarily at a job in a part-time capacity can be a great way to get your foot in the door.

GO ON TO THE NEXT PAGE

While many argue that job hunting has changed for the worse, it doesn't have to be that way. Never before have recent graduates, career changers, and the unemployed ever had such a plethora of resources at their disposal. ⓫ <u>Employers are able to find prospective candidates at the click of a button, while job hunters can meet and connect with career professionals that were previously unreachable.</u> Don't let Google—in all its magnitude—be your disadvantage.

11. Should the underlined sentence be kept or deleted?

(A) Kept. It provides specific details in support of the paragraph's argument.

(B) Kept. It gives the essay's first statement about the importance of online job hunting.

(C) Deleted. It contradicts information elsewhere in the passage.

(D) Deleted. It distracts from the primary argument of the paragraph.

Questions 12–22 are based on the following passage.

The Glass Menagerie

Among artists living and influential, few rival the famous American classical composer Phillip Glass. He is celebrated for his wide-ranging collaborations with literary figures such as Allen Ginsberg, film directors such as Woody Allen, and **⑫** David Bowie whom is a producer of records. His broad range in operas, symphonies, and compositions has contributed to his **⑬** unparalleled popularity within multigenerational audiences. Perhaps no other composer has appealed to such an expansive fan base, allowing Glass's influence in opera houses, dance halls, and popular culture to go uncontested. His operas continue to play internationally and rarely leave an open seat.

With music that is highly repetitive, Glass has been **⑭** referred to as a minimalist and aligned with the work of other composers like La Monte Young, Terry Riley, and Steve Reich. **⑮** Minimalism a term that Glass has taken strides to distance himself from, is marked by a nonnarrative and nonrepresentational conception of a work in progress, and represents a new approach to the activity of listening to music by focusing on the internal processes of the music. Tom Johnson **⑯** , a self-identifying minimalist, defines it this way: "It [minimalism] includes, by definition, any music that works with limited or minimal materials: pieces that use only a few notes, pieces that use only a few words of text, or pieces written for very limited instruments, such as antique cymbals, bicycle wheels, or whiskey glasses." Glass prefers, instead, to refer to himself as a classicist with repetitive structures.

12. (A) NO CHANGE
    (B) David Bowie who is best known as a record producer.
    (C) a person who has the career of being a record producer, like David Bowie.
    (D) record producers such as David Bowie.

13. The author wants to show that Bowie has great popularity. Which word best expresses this notion?

    (A) NO CHANGE
    (B) solid
    (C) decent
    (D) voracious

14. Which word, if inserted at this point, would best express that Glass's music is not universally admired?

    (A) understandably
    (B) logically
    (C) controversially
    (D) repeatedly

15. (A) NO CHANGE
    (B) Minimalism: a term that Glass has taken strides to distance himself from is
    (C) Minimalism—a term from which Glass has taken strides to distance himself—is
    (D) Minimalism, a term from which Glass has taken strides to distance himself—is

16. The writer would like to express that Tom Johnson is a relevant person to provide commentary on this topic. Which choice best accomplishes this?

    (A) NO CHANGE
    (B) , an admirer of all things Phillip Glass,
    (C) , an American historian of the eighteenth and nineteenth centuries,
    (D) , an expert in operatic costume design,

GO ON TO THE NEXT PAGE

17 To his highest achievements, Glass has been nominated for several Academy Awards and won a Golden Globe award in 1999 for his score in *The Truman Show*. He has been the topic of a series of documentaries and has **18** writing more then one autobiography. In his most recent, *Words Without Music,* Glass discusses his influences, beginning with his Jewish father who ran a record shop in Baltimore. His father's love for Schubert, Shostakovich, and Bartok **19** took in Glass a love for music; by the time he was fifteen years old, he had become the classical-music buyer for the record shop. He studied at the University of Chicago and the Julliard School, before moving to Paris to study technique under the infamous Nadia Boulanger. It was only with the success of his opera "Einstein on the Beach" in 1976 that Glass made a prominent name **20** for himself.

Coinciding with his return to New York, Glass formed the Phillip Glass Ensemble, seven musicians whose music is amplified and fed through a mixer. The rest is history. In the last two decades, Glass **21** had composed numerous operas, symphonies, concertos, and soundtracks; his prolific works are so common that **22** they are occasionally encountered by the populace.

17. (A) NO CHANGE
    (B) On
    (C) Between
    (D) Among

18. (A) NO CHANGE
    (B) writing more than
    (C) written more then
    (D) written more than

19. (A) NO CHANGE
    (B) spurred
    (C) used
    (D) inspire

20. (A) NO CHANGE
    (B) through oneself.
    (C) by yourself.
    (D) in oneself.

21. (A) NO CHANGE
    (B) had been composing
    (C) has composed
    (D) have composed

22. Which choice would most clearly and specifically support the statement immediately beforehand in the sentence?

    (A) NO CHANGE
    (B) even a layperson would recognize his tunes.
    (C) one can even find them performed in the elite symphonic halls of high society.
    (D) it is relatively effortless for a nonexpert to recognize their quality.

Questions 23–33 are based on the following passage and supplementary material.

For Richer or For Poorer

Everyone is familiar with Robin Hood's plight to take from the rich and give to the poor. However, the debate of economic redistribution is far from archaic and rarely confined to folklore, especially given that between 1980 and 2010, incomes for the ❷ <u>top 20 percent nearly doubled while incomes in the bottom 10 percent measurably increased.</u> One of the latest arguments for redistribution comes from French economist

23. Which choice gives the most accurate interpretation of the data in the graph?

   (A) NO CHANGE
   (B) top 10 percent nearly doubled while incomes in the bottom 20% barely changed.
   (C) top 10 percent nearly tripled while incomes in the middle 10% barely changed.
   (D) top 10 percent nearly quadrupled while incomes in the bottom 20% decreased.

U.S. Median Annual Income

•••• Bottom 20%   ——— Middle 20%   — — Top 10%
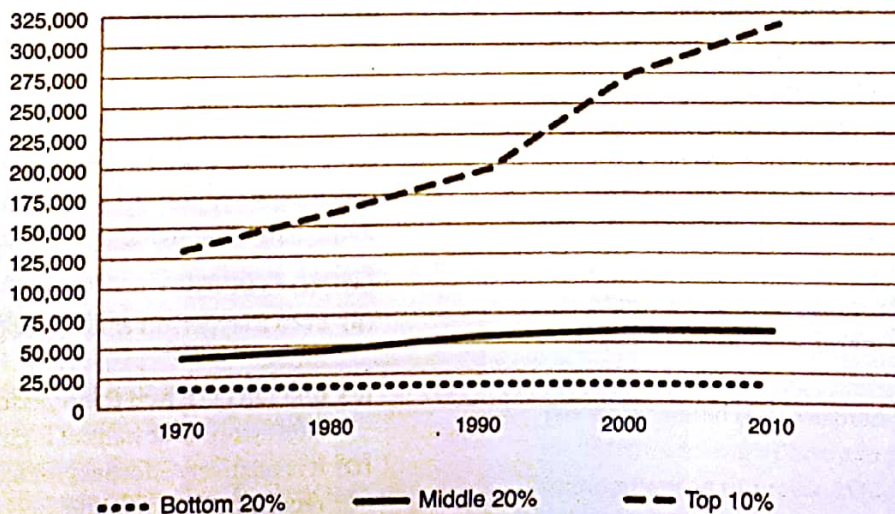
Thomas Piketty, who has gathered and studied tax records over a 200-year span. **24** Piketty argues that inequality is an inherent feature of capitalism that threatens democracy.

In his recent best seller, *Capital in the Twenty-First Century*, Piketty uses data gathered from 20 countries to posit that the rate of return in developed countries is **25** persistently greater than economic growth—this lasting trend is the main driver of inequality and will only widen the gap further in the future. His work shows that return has been steady even during years of recession when growth has plummeted. While many consider his book esoteric— **26** especially given its old age and questionable modern-day applicability—it is indisputably attracting wide attention. Piketty's data on the wealthy elite makes it somewhat pioneering despite its foundations in age-old economics. **27** Piketty even offers a solution; economic redistribution through a progressive global tax on wealth.

24. The writer is considering inserting this sentence at this point in the passage:

"His research considers the questions of long-term inequality, concentration of wealth, and potential economic growth, and ultimately concludes that the ever-rising concentration of wealth is not self-correcting."

Should she make this insertion?

(A) Yes. It elaborates on Piketty's background and connects to the next sentence.
(B) Yes. It provides helpful details about Piketty's research methodology.
(C) No. It gives irrelevant information to the paragraph's argument.
(D) No. It repeats the general idea from the previous sentence.

25. (A) NO CHANGE
(B) chronically more massive
(C) consistently more expensive
(D) often large

26. Which choice best elaborates on the first part of this sentence?

(A) NO CHANGE
(B) since beautiful illustrations are just as helpful to my understanding as is polished prose
(C) given the often controversial ideas presented in this work
(D) a trait that may explain why the 600+ page tome sits unread on library bookshelves

27. (A) NO CHANGE
(B) Piketty, even offers a solution, economic
(C) Piketty even offers a solution: economic
(D) Piketty even offers, a solution economic

Piketty faces many **㉘** observers. Matthew Rognlie, a graduate student at MIT, has become a media sensation with his paper that points out what he sees as several flaws in Piketty's argument. Rognlie argues that, according to the law of diminishing returns, the rate of return will eventually **㉙** decrease; goes on to say that Piketty has an inflated idea of current return and doesn't consider depreciation. Rognlie **㉚** points at housing wealth as the cause of worsening inequality and shows that Piketty's conclusions are based on the assumption that capital can be substituted for the working class, which is untrue in the housing market. According to Rognlie, the solution put forth in *Capital in the Twenty-First Century,* since it will do little to limit **㉛** homeowners' returns on assets, is no solution at all.

But, if Rognlie's argument holds, do all homeowners benefit? Surely not. Working-class families will continue to buy only in neighborhoods where they can afford homes and where home values are unpredictable. **㉜** Unexpectedly, they will face further financial instability; meanwhile, the privileged few who can afford to purchase real estate in New York, Chicago, London, and so on will see their returns peak. **㉝** Whether or not you agree or disagree with Piketty is not as important as whether you recognize the severity and possible implications of his argument.

28. Which word choice is most logically supported by the information in the sentence that follows?

   (A) NO CHANGE
   (B) scholars.
   (C) enemies.
   (D) critics.

29. (A) NO CHANGE
   (B) decrease, goes
   (C) decrease; he goes
   (D) decrease, he goes

30. (A) NO CHANGE
   (B) points to
   (C) points on
   (D) point through

31. (A) NO CHANGE
   (B) homeowner's
   (C) the home owner's
   (D) homeowners

32. (A) NO CHANGE
   (B) Paradoxically,
   (C) Typically,
   (D) Hence,

33. (A) NO CHANGE
   (B) Whether you agree or disagree with
   (C) Whether you are agreeing
   (D) OMIT the underlined portion.

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Questions 34–44 are based on the following passage.

Hypocrisy of Hippocratic Humorism

Sometimes, scientific paradigm shifts in the name of innovation are anything but innovative. The revolutionary theory of the four bodily humors (i.e., the idea that disease results from a physical imbalance in the bodily "humors") **34** had popularized in 400 B.C.E. in ancient Greece and has been a major obstacle to scientific advancement ever since.

The theory of the humors cannot even be described as a paradigm shift (and certainly not one contributing to medical science) for **35** it revolutionized the way that medical practitioners approached their craft. The couching of the humors in the physical world as opposed to the spiritual world did not make it any less mystical but made it more **36** intellectualized entrenched. We of course know today that humorism is abjectly bunk; one of the four humors—specifically black bile—does not exist in nature but was added to tidily complement classical theories of the four natural elements. From a scientific perspective, black bile has every bit as much to do with cancer as **37** demons do with epilepsy.

Even a cursory **38** analysis of Western medicine's history will reveal that the single greatest obstacle to the advent of evidence-based

34. (A) NO CHANGE
(B) have
(C) was
(D) were

35. Which choice would most logically and relevantly justify the statement made in the first part of the sentence?

(A) NO CHANGE
(B) it merely trades one baseless system of mystical superstition for another.
(C) it does not attempt to provide a theoretical understanding of bodily functions.
(D) while it was influential in ancient Greece, it did not have influence beyond this limited geographic area.

36. (A) NO CHANGE
(B) intellectually
(C) intelligent
(D) intellectual

37. The writer wants to use an applicable analogy to establish the absurdity of using black bile to justify cancer. Which choice best accomplishes this goal?

(A) NO CHANGE
(B) ice does with water.
(C) cartoons do with teenage violence.
(D) drugs do with addiction.

38. (A) NO CHANGE
(B) analyses of Western medicines' history
(C) analysis of the history of the medicine of the West
(D) analyzing of the history of medical science in Western society

medical science was not—as has often been posited—religion but Hippocratic humorism itself. **39** One's tendency to linearize progress retrospectively—particularly in the sciences—has contributed to the fallacious belief that the discovery that lightning results not from the fury of an angry God **40** and from an atmospheric electrical discharge, and the transition of the accepted source of epilepsy from mischievous Roman deities to an imaginary bodily fluid are in some way equivalently significant to the development of modern science.

Humorism held medical discovery back for centuries at a time when the pure sciences **41** were conducting medical research; it established a systemic insularity in the field that cut medicine off from discoveries in biology, chemistry, and physics, and generated a remarkably long-lived illusion of comprehensiveness that categorically rejected revision and innovation. **42** Somewhat, humorism was a far more persistent enemy of medical science than was superstition because it wore the guise of

39. (A) NO CHANGE
    (B) Ones
    (C) The
    (D) They're

40. (A) NO CHANGE
    (B) but from
    (C) because of
    (D) with

41. The writer would like to emphasize how humorism prevented medical discovery from advancing. Which choice best accomplishes this goal?

    (A) NO CHANGE
    (B) were shifting from the foreground to the background;
    (C) were about to develop further scientifically;
    (D) were preparing for a renaissance;

42. (A) NO CHANGE
    (B) In contrast,
    (C) Further,
    (D) Because of this,

GO ON TO THE NEXT PAGE

naturalism. By pretending to possess a physical basis for its tenets, humorism ❸ <u>contributed to a deep-seeded belief, among physicians well, into the nineteenth century that pathology was not only independent</u> of supernatural influences but of essentially all external influences. This notion of corporeal isolation—established by the theory of humoral imbalances—laid the foundation for the staunch medical opposition encountered by advocates of the germ theory of disease, and ❹ <u>conducted a paucity of help to the geometric growth of the sciences.</u>

43.   (A) NO CHANGE
     (B) contributed to a deep-seeded belief among physicians, well into the nineteenth century, that pathology was not, only independent
     (C) contributed to a deep-seeded belief among physicians well into the nineteenth century that pathology, was not only independent
     (D) contributed to a deep-seeded belief among physicians well into the nineteenth century that pathology was not only independent

44. Which choice most specifically elaborates on the long-term negative impact that the belief in corporeal isolation had on medical science?

     (A) NO CHANGE
     (B) delayed understanding of microbial pathogens for at least three centuries.
     (C) viral pathogens cannot be treated by antibiotics but must run their natural course.
     (D) germs continue to plague patients and medical practitioners up to the present day.

STOP

If there is still time remaining, you may review your answers.

MATH TEST (NO CALCULATOR)

25 MINUTES, 20 QUESTIONS

Turn to Section 3 of your answer sheet to answer the questions in this section.

Directions: For questions 1–15, solve each problem and choose the best answer from the given choices. Fill in the corresponding circle on your answer sheet. For questions 16–20 solve each problem and enter your answer in the grid on your answer sheet.

Notes:
- Calculators are **NOT PERMITTED** in this section.
- All variables and expressions represent real numbers unless indicated otherwise.
- All figures are drawn to scale unless indicated otherwise.
- All figures are in a plane unless indicated otherwise.
- Unless indicated otherwise, the domain of a given function is the set of all real numbers x for which the function has real values.

REFERENCE INFORMATION

Area Facts   Volume Facts   Triangle Facts

$A = \ell w$

$A = \frac{1}{2}bh$

$A = \pi r^2$
$C = 2\pi r$

$V = \ell wh$

$V = \pi r^2 h$

$V = \frac{4}{3}\pi r^3$

$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}\ell wh$

$a^2 + b^2 = c^2$

The arc of a circle contains 360°.
The arc of a circle contains 2π radians.
The sum of the measures of the angles in a triangle is 180°.

MODEL TEST 4

1. Max purchased some shares of stock at $10 per share. Six months later the stock was worth $20 per share. What was the percent increase in the value of Max's investment?

   (A) 20%
   (B) 50%
   (C) 100%
   (D) 200%

2. The median annual salary of all the employees at Hartley's Home Supplies is $45,000, whereas the range of their salaries is $145,000. Which of the following is the most logical explanation for the large difference between the median and the range?

   (A) Half of the employees earn less than $45,000.
   (B) There is at least one employee who earns more than $150,000.
   (C) The average salary of the employees is between $45,000 and $145,000.
   (D) More employees earn over $100,000 than earn less than $25,000

3. Which of the following expressions is equivalent to $\frac{a+b}{3+4}$?

   (A) $\frac{a}{3}+\frac{b}{4}$
   (B) $\frac{a}{7}+\frac{b}{7}$
   (C) $\frac{a+b}{3}+\frac{a+b}{4}$
   (D) $\frac{a+b}{7}+\frac{a+b}{7}$

4. Two cylindrical tanks have the same height, but the radius of the larger tank equals the diameter of the smaller tank. If the volume of the larger tank is $k\%$ more than the volume of the smaller tank $k=$

   (A) 100
   (B) 200
   (C) 300
   (D) 400
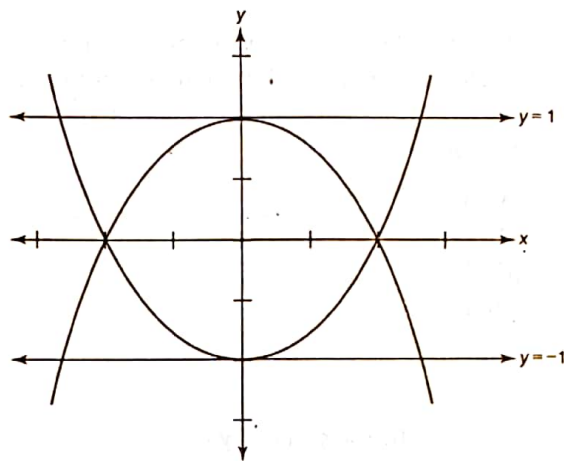
$y=x^2-1$
$y=-x^2+1$
$y=1$
$y=-1$

5. A system of four equations and their graphs are shown above. How many solutions does this system of equations have?

   (A) 0
   (B) 2
   (C) 4
   (D) 8

6. Barbara and Marc each rolled a single die 50 times. The frequency distributions for each of them are given below.

Distribution of Barbara's 50 Rolls

Number	1	2	3	4	5	6
Frequency	4	10	8	8	8	12

Distribution of Marc's 50 Rolls

Number	1	2	3	4	5	6
Frequency	7	11	13	3	8	8

If the two distributions are combined into a single frequency distribution representing all 100 rolls, what is the median value of those 100 rolls?

(A) 3
(B) 3.25
(C) 3.5
(D) 4

$$[(2x + y) + (x + 2y)]^2$$

7. Which of the following expressions is equivalent to the expression above?

(A) $3(x^2 + y^2)$
(B) $9(x^2 + y^2)$
(C) $3(x + y)^2$
(D) $9(x + y)^2$

8. To get to a business meeting, Joanna drove m miles in h hours, and arrived $\frac{1}{2}$ hour early. At what rate should she have driven to arrive exactly on time?

(A) $\dfrac{2m + h}{2h}$

(B) $\dfrac{2m - h}{2h}$

(C) $\dfrac{2m}{2h - 1}$

(D) $\dfrac{2m}{2h + 1}$

9. How many points of intersection are there of the graphs whose equations are $y = -(x - 3)^2 + 3$ and $y = (x + 3)^2 - 3$?

(A) 0
(B) 1
(C) 2
(D) More than 2

10. If f and g are functions such that $f(x) = (2x + 3)g(x)$, which of the following statements must be true?

(A) The graph of $f(x)$ crosses the x-axis at $-\dfrac{2}{3}$.

(B) The graph of $f(x)$ crosses the x-axis at $-\dfrac{3}{2}$.

(C) The graph of $f(x)$ crosses the x-axis at $\dfrac{2}{3}$.

(D) The graph of $f(x)$ crosses the x-axis at $\dfrac{3}{2}$.

MODEL TEST 4

11. Lee purchased a 7-year $1,000 certificate of deposit (CD) at his local savings bank. As a special incentive, the bank offered an introductory interest rate of 5% for the first year and then paid its regular 3% interest per year for the next 6 years. Which of the following gives the value V, in dollars, of the CD n years after Lee purchased it, where $1 < n \leq 7$?

(A) $V(n) = 1,050(0.97)^{n-1}$
(B) $V(n) = 1,050(1.03)^{n-1}$
(C) $V(n) = 1,050(0.97)^{n}$
(D) $V(n) = 1,050(1.03)^{n}$

12. If $i = \sqrt{-1}$ and $(1 + i) \div (1 - i) = (a + bi)$, where a and b are real numbers, what are the values of a and b?

(A) $a = 0$ and $b = 1$
(B) $a = 0$ and $b = -1$
(C) $a = 1$ and $b = 0$
(D) $a = 2$ and $b = -2$
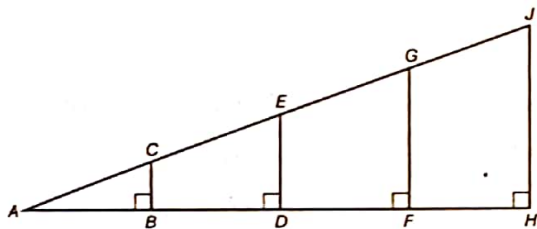
13. In the figure above, if $AB = BD = DF = FH = 1$, what is the ratio of the area of trapezoid $FHJG$ to the area of trapezoid $BCED$?

(A) 2:1
(B) 3:1
(C) 4:1
(D) 7:3

14. If the amount, a, in Alan's retirement account is $\frac{1}{10}$ percent of b, the amount in his boss's retirement account, then b is what percent of a?

(A) 100%
(B) 1,000%
(C) 10,000%
(D) 100,000%

15. If a is a constant, for what values of a does the line whose equation is $x + y = a(x - y)$ have a positive slope?

(A) $a = 1$
(B) $a \neq -1$
(C) $-1 < a < 1$
(D) $a < -1$ or $a > 1$

16. What is the value of $4^{\frac{1}{2}} \times 8^{\frac{1}{3}} \times 16^{-\frac{1}{4}}$?

17. If $f(x) = 3 + \dfrac{5}{x}$, what number CANNOT be a value of $f(x)$?

18. For what value of n will the equation
$3(x+2) + 5(x+3) = 2(x+5) + n(x+3) - 7$
have infinitely many solutions?

19. What is the sum of the x-coordinate and y-coordinate of the point where the lines $y = 3x + 2$ and $y = 2x + 3$ intersect?

20. The graph whose equation is

$$(x-4)^2 + (y-2)^2 = 4$$

is a circle. If m represents the number of times the circle intersects the y-axis and if n represents the number of times the circle intersects the x-axis, what is the value of $m + n$?

STOP

If there is still time remaining, you may review your answers.

MATH TEST (CALCULATOR)

55 MINUTES, 38 QUESTIONS

Turn to Section 4 of your answer sheet to answer the questions in this section.

Directions: For questions 1–30, solve each problem and choose the best answer from the given choices. Fill in the corresponding circle on your answer sheet. For questions 31–38, solve each problem and enter your answer in the grid on your answer sheet.
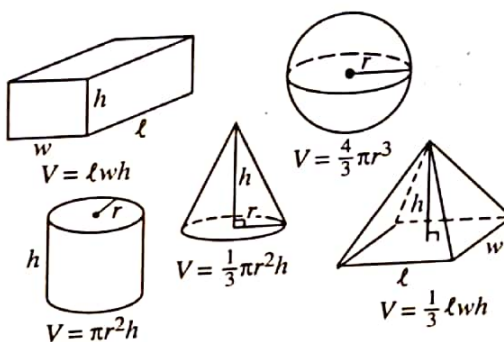
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- Unless indicated otherwise, the domain of a given function is the set of all real numbers x for which the function has real values.

REFERENCE INFORMATION

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$A = \frac{1}{2}bh$

$A = \pi r^2$
$C = 2\pi r$

Volume Facts

$V = \ell wh$

$V = \pi r^2 h$

$V = \frac{4}{3}\pi r^3$

$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}\ell wh$

Triangle Facts

$a^2 + b^2 = c^2$

The arc of a circle contains 360°.

The arc of a circle contains 2π radians.

The sum of the measures of the angles in a triangle is 180°.

GO ON TO THE NEXT PAGE

1. The estate of a wealthy man was distributed as follows: 10% to his wife, 5% divided equally among his three children, 5% divided equally among his five grandchildren, and the balance to a charitable trust. If the trust received $1,000,000, how much did each grandchild inherit?

   (A) $10,000
   (B) $12,500
   (C) $20,000
   (D) $62,500

2. Which of the following statements is true concerning the equation below?

   $$\sqrt{x+6} = x$$

   (A) The equation has no solutions.
   (B) The equation has one positive solution.
   (C) The equation has one negative solution.
   (D) The equation has more than one solution.
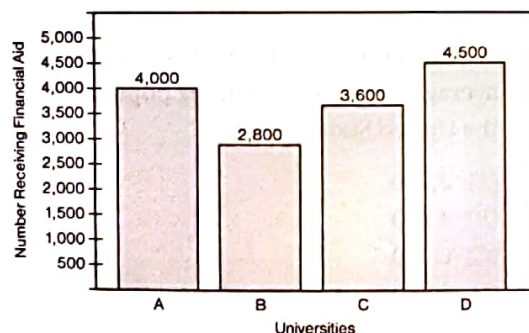
3. The bar graph above shows the number of students in four universities who received financial aid from the university in 2015. The average size of the financial aid package per student at universities A, B, C, and D was $15,500; $21,000; $18,700; and $14,300, respectively. Which university gave out the greatest total amount of financial aid?

   (A) A
   (B) B
   (C) C
   (D) D

4. Marie has a website where she sells CDs and DVDs. She purchases her CDs for $2.75 each and her DVDs for $5.75 each. Marie pays 95¢ to mail each CD and DVD to her customers. She charges $4.99 per CD and $9.99 per DVD plus a postage and handling fee of $1.75 per CD or DVD. Which of the following represents her profit, P, in dollars, on the sale of x CDs and y DVDs?

   (A) $P = 3.04x + 5.04y$
   (B) $P = 2.24x + 4.24y + 0.80$
   (C) $P = 2.24x + 4.24y + 0.80xy$
   (D) $P = 3.00(x + y) + 0.80(x + y)$

5. There are 25 students in Mrs. Wang's first period algebra class. On Monday, five students were absent and the other 20 students took a test. The average grade for those students was 86. The next day after the five absent students took the test, the class average was 88. What was the average of those five students' grades?

   (A) 90
   (B) 92
   (C) 94
   (D) 96

Question 6 is based on the information below.
A survey of 500 registered voters in a certain state was taken to ascertain the number of Democrats, Republicans, and Independents who supported a certain ballot initiative called Proposition 8. The results of that survey are tabulated below.

	Support Proposition 8	Opposed to Proposition 8	Undecided	Total
Democrats	113	32	40	185
Republicans	35	145	30	210
Independents	44	41	20	105
Total	192	218	90	500

6. On Election Day, all of the voters in the survey who had expressed support for the proposition voted for it and all of the voters who had been opposed to the proposition voted against it. If in addition, 80% of those who had been undecided voted for the proposition and 20% voted against it, what percent of the 500 people in the survey voted for the proposition?

   (A) 42.7%
   (B) 47.2%
   (C) 52.8%
   (D) 58.2%

Questions 7–8 are based on the following information.
According to the United States Census Bureau, on average there is a birth in the United States every 8 seconds, a death every 12 seconds, and a net increase of one person due to immigration and emigration every 30 seconds.

7. Which of the following is closest to the average daily increase in the population of the United States?

   (A) 2,280
   (B) 4,260
   (C) 6,480
   (D) 9,520

8. The population of the United States reached 320,000,000 in January of 2015. According to the Census Bureau's analysis, in what year should the country's population reach 350,000,000?

   (A) 2017
   (B) 2022
   (C) 2027
   (D) 2032

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9. In $\triangle ABC$, C is a right angle and $\tan A = 1$. What is the value of $\sin A + \cos A$?

(A) $\dfrac{\sqrt{2}}{2}$

(B) 1

(C) $\sqrt{2}$

(D) $2\sqrt{2}$

10. The members of the French Club conducted a fund-raising drive. The average (arithmetic mean) amount of money raised per member was $85. Then Jean joined the club and raised $50. This lowered the average to $80. How many members were there before Jean joined?

(A) 5

(B) 6

(C) 7

(D) 8

11. The cost of renting a van from ABC Rentals is d dollars per day plus c cents per mile. In June, Samantha rented a van for three days and drove it 200 miles. The rental fee was $210. In July, she paid $245 to rent a van for one day and drove it 300 miles. What would be the total cost, in dollars, if she were to rent a van for five days during which time she drove 480 miles?

(A) $430

(B) $440

(C) $450

(D) $460
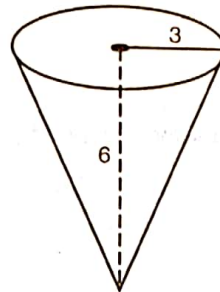
12. The diagram above represents a conical tank whose radius is 3 feet and whose height is 6 feet. If the tank is full of water and if exactly half the water in the tank is poured out, what is the height, to the nearest inch, of the water remaining in the tank?
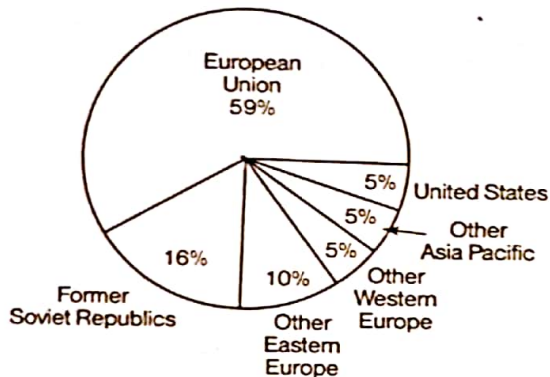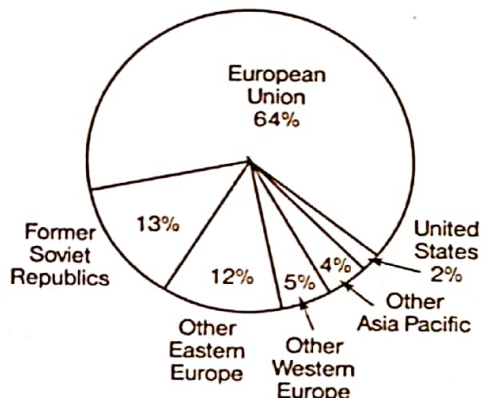
(A) 36

(B) 48

(C) 54

(D) 57

Questions 13–15 are based on the information in the following graphs.

1993
Total Exports to Eastern Europe = $98 Billion

European Union 59%

16% Former Soviet Republics

10% Other Eastern Europe

5% Other Western Europe

5% Other Asia Pacific

5% United States

1996
Total Exports to Eastern Europe = $174 Billion

European Union 64%

13% Former Soviet Republics

12% Other Eastern Europe

5% Other Western Europe

4%

United States 2%

Other Asia Pacific

13. Which of the following statements concerning the value of exports to Eastern Europe from other Eastern European countries from 1993 to 1996 is the most accurate?

(A) They increased by 12%.
(B) They increased by 20%.
(C) They increased by 50%.
(D) They increased by 100%.

14. France is one of the countries in the European Union. If in 1996 France's exports to Eastern Europe were four times those of the United States, then what percent of the European Union's exports to Eastern Europe came from France that year?

(A) 8%
(B) 12.5%
(C) 20%
(D) 25%

15. If from 1996 to 2000 the percent increase in total exports to Eastern Europe was the same as the percent increase from 1993 to 1996, and the percent of exports from the European Union remained the same as in 1996, to the nearest billion, what was the value, in dollars, of exports from the European Union to Eastern Europe in 2000?

(A) 188
(B) 198
(C) 208
(D) 218

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16. The following table shows the hourly wages earned by the 16 employees of a small company and the number of employees who earn each wage.

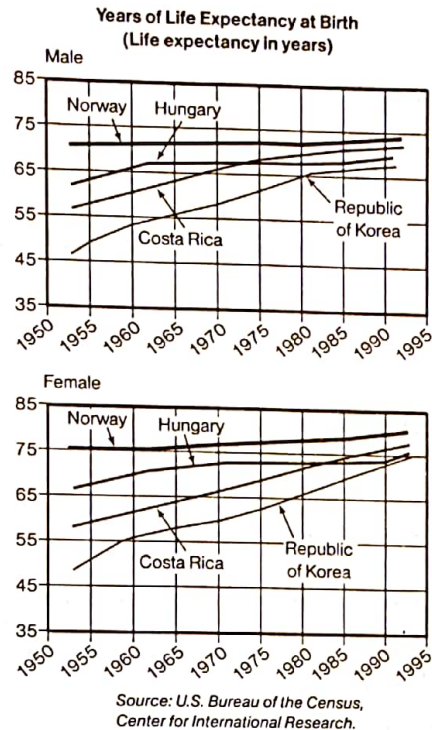| Wages per Hour	Number of Employees
$6	3
8	5
10	4
13	4

What is the average (arithmetic mean) of the median, the mode, and the range of this set of data?

(A) 4.5
(B) 8
(C) 8.5
(D) 9

17. Alan's allowance is three times as much as Bob's and one-third as much as Carol's? If their average (arithmetic mean) allowance is $26, what is Bob's allowance?

(A) $6
(B) $13
(C) $18
(D) $26

Questions 18–19 are based on the information in the following graphs.

Years of Life Expectancy at Birth
(Life expectancy in years)

Source: U.S. Bureau of the Census,
Center for International Research.

18. For how many of the countries listed in the graphs is it true that the life expectancy of a female born in 1955 was higher than the life expectancy of a male born in 1990?

(A) 1
(B) 2
(C) 3
(D) 4

19. By sex and nationality, who had the greatest increase in life expectancy between 1955 and 1990?

(A) Korean females
(B) Korean males
(C) Costa Rican females
(D) Costa Rican males

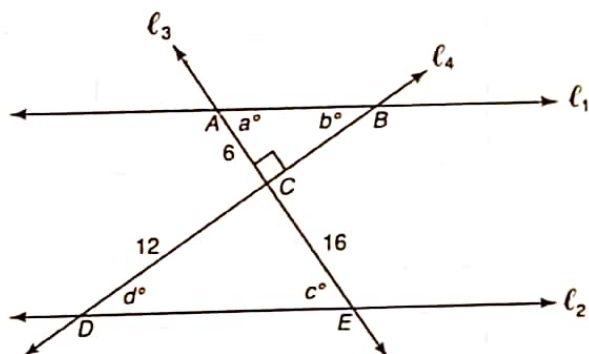**GO ON TO THE NEXT PAGE**

20. If for all real numbers x, $g(3 - x) = x^2 + x + 1$, what is the value of $g(7)$?

(A) 13
(B) 21
(C) 57
(D) 111

Note: Figure not drawn to scale.

21. In the figure above, lines ℓ_1 and ℓ_2 are parallel and lines ℓ_3 and ℓ_4 are perpendicular. What is the perimeter of triangle ABC?

(A) 18
(B) 24
(C) 36
(D) 48

22. If $i = \sqrt{-1}$ and if $i^n = i$, which of the following could be equal to n?

(A) 45
(B) 55
(C) 75
(D) 95

23. How many pounds of peanuts must be added to a mixture of 20 pounds of peanuts and 50 pounds of cashews if the resulting mixture is to be 60% peanuts by weight?

(A) 30
(B) 42
(C) 52
(D) 55

24. If a sphere and a right circular cone have the same radius and equal volumes, what is the ratio of the height of the cylinder to its radius?

(A) 4
(B) $\frac{1}{3}\pi$
(C) $\frac{3}{4}\pi$
(D) $\frac{4}{3}\pi$

25. In 2000, Jennifer invested $1,000 in a seven-year Certificate of Deposit (CD) that paid 2% interest, compounded annually. When that CD matured in 2007, she invested all of the money in another seven-year CD, also paying 2% compounded annually, that matured in 2014. To the nearest dollar, how much more money did Jennifer earn from 2007 to 2014 than she did from 2000 to 2007?

(A) $22
(B) $44
(C) $149
(D) $171

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26. In a survey of 500 families, each family has at least one child. If 345 of the families have at least one boy and 245 of the families have at least one girl, how many families have only one boy?
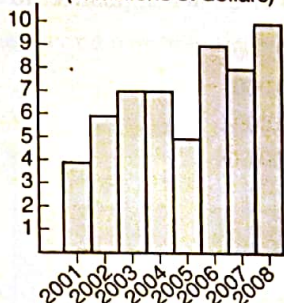
(A) 245
(B) 255
(C) 265
(D) 275
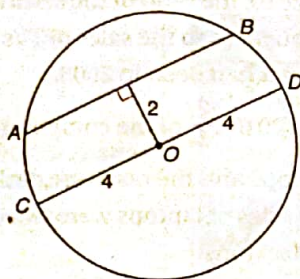
27. In the figure above, chord $\overline{AB}$ is parallel to diameter $\overline{CD}$. If $CD = 8$ and the distance between $\overline{AB}$ and $\overline{CD}$ is 2, to the nearest hundredth what is the length of AB?
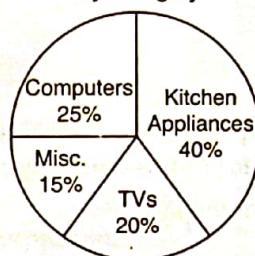
(A) 2.83
(B) 3.46
(C) 5.66
(D) 6.93

Questions 28–30 are based on the information in the following graphs.

Sales of ABC Mega Stores
(in millions of dollars)

2008 Sales of
ABC Mega Stores
by Category

28. In how many years from 2001 through 2008, inclusive, did the sales of ABC Mega Stores exceed the average of the annual sales during that period?

(A) 3
(B) 4
(C) 5
(D) 6

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29. If the retail sales of ABC Mega Stores were 20% higher in 2009 than in 2008 and if in 2009 kitchen appliances accounted for 30% of the total sales, then the sales of kitchen appliances in 2009 were how much less than the sales of kitchen appliances in 2008?

(A) $400,000
(B) $600,000
(C) $800,000
(D) $1,000,000

30. In 2010, the total sales of ABC Mega Stores were exactly the same as in 2008. However, compared with 2008, in 2010 sales of kitchen appliances and TVs were each up by 5% and sales of computers decreased by 10%. Which of the following statements must be true?

(A) In 2010, the sales of TVs were greater than the sales of computers.
(B) In 2010, the sales of miscellaneous items were less than in 2008.
(C) In 2010, the ratio of the sales of kitchen appliances to the sales of TVs was greater than it had been in 2008.
(D) If in 2010, $\frac{2}{3}$ of the computers sold were laptops and the rest were desktops, then the sales of laptops were twice the sales of desktops.

31. A supermarket just increased the price at which it sells a quart of milk by 20%. How many quarts of milk can now be purchased for the amount of money that used to buy 30 quarts of milk?

32. The gas mileage for Ken's car is 22 miles per gallon when his car is traveling at 60 miles per hour and is 25 miles per gallon when his car is traveling at 50 miles per hour. Ken will be driving from Boston to New York on a route that is 209 miles long. Gas costs $3.20 per gallon. How much more, in dollars rounded to the nearest cent, will Ken spend on gas if he drives the entire way at 60 miles per hour than if he drives the entire way at 50 miles per hour?

Frequency of First 12 Digits of ∏

33. The decimal expansion of π begins 3.141592653589. The bar graph shown above shows the frequency distribution of the 12 digits to the right of the decimal point in this portion of the expansion of π. What is the average (arithmetic mean) to the nearest tenth of those digits?

34. John is transferring 128 files of various sizes from his computer to a colleague's computer. If the average size of his files is 256 megabytes and he can transfer 1 gigabyte of data every 12 minutes, how long will it take, in hours, to transfer all of the files? (1 gigabyte = 1024 megabytes)

35. The function f is defined by $f(x) = ax^3 + bx^2 + cx + d$. If the graph of f crosses the x-axis at 1, 2, and 3 and if $a = 1$, what is the value of c?
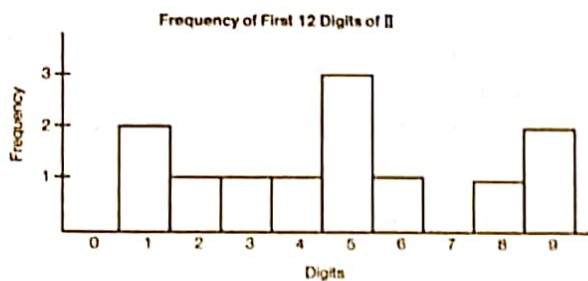
36. What is the cosine of the smallest angle in a right triangle whose smallest side is 5 and whose hypotenuse is 10?
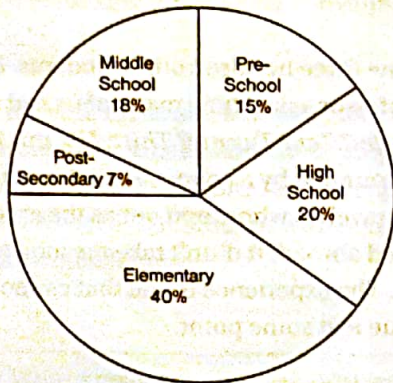
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Questions 37–38 are based on the data in the following graphs, which give information about the 800 participants at last year's Conference of New England Educators.

Distribution of Home State of Participants

New Hampshire 15%

Vermont 15%

Massachusetts 25%

Connecticut 19%

Maine 16%

Rhode Island 10%
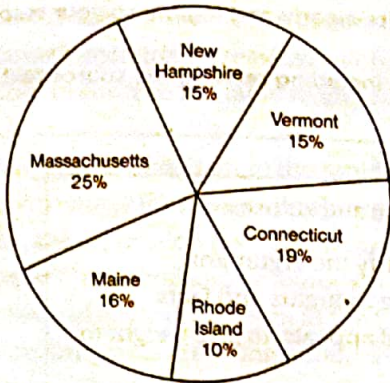
Distribution of Grade Level Taught by Participants from Massachusetts

Middle School 18%

Pre-School 15%

Post-Secondary 7%

High School 20%

Elementary 40%

37. How many of the conference's participants were high school teachers from Massachusetts?

38. If $\frac{4}{15}$ of the participants from states other than Massachusetts were elementary school teachers, what percent of all the participants at the conference taught at the elementary level? (Note: Grid in your answer without the percent sign. For example, if your answer is 15.3%, you should grid in 15.3 on your answer sheet.)

STOP

If there is still time remaining, you may review your answers.

ANSWERS EXPLAINED

Section 1: Reading Test

1. **(D)** The narrator is *recounting* what the tutor Pemberton, who is not related to the Moreens and is therefore an outsider to the family, has told him about *his impressions of an odd family.*

2. **(D)** The Moreens' sudden shifts are apparently motivated by *financial problems,* for the class they travel in and the apartments they stay in vary with their financial state.

3. **(C)** The word *indigence* (extreme poverty) in choice (C) is an immediate clue that financial problems may have caused the Moreens to depart suddenly from Nice. Lines 18–26 reveal that, although the Moreens rationalized their move from Nice as based on a decision to spend the summer in someplace healthful and refreshing, they wound up in Paris staying in cramped, unwholesome lodgings four flights up a malodorous staircase. Clearly, their lack of money has caused them to abandon the villa at Nice until they can recover from their financial difficulties.

4. **(C)** Throughout the passage the narrator describes event after event, all of them set in the past. Thus, it seems reasonable to infer that he is making these comments *some time after Pemberton's wanderings with the Moreens.*

5. **(A)** Lines 33–36 state that the Moreens "came back another year for a longer stay, the general character of which in Pemberton's memory today mixes pitiably and confusedly with that of the first." The narrator's reference to "Pemberton's memory *today*" indicates that he is speaking *some time after* the events recounted in this tale. The narrator is telling the story of events his friend Pemberton remembers from years past.

6. **(C)** In telling his tutor that he does not wish to outshine him or cast him in the shade by dressing better than he does, Morgan is affectionately *teasing* Pemberton.

7. **(B)** Mrs. Moreen loves Morgan ("Morgan was dear to his mother"), but she shrewdly refrains from buying him new clothes when she realizes that nobody "important" will see how he is dressed. Her attitude is *fond* (loving) *but pragmatic* (practical).

8. **(D)** Mrs. Moreen does not spend money for new clothes for Morgan because he does not make public appearances, that is, does not appear in "polite society." She does spend money on new clothes for the family members who move in polite circles. She loves Morgan and does not neglect him intentionally. This suggests that *she has only enough money to buy clothes for the family members who must appear in polite society.*

9. **(A)** Appearances matter to Pemberton. He is highly conscious of his and Morgan's shabbiness and general appearance of poverty. He is extremely aware of how the two of them might *appear to* people. Choices (B), (C), and (D) are incorrect. Although strike can mean *run into* ("striking the curb"), *achieve* ("strike a compromise"), or *hit* ("strike the first blow"), that is not how it is used here.

10. **(D)** Morgan and Pemberton consider themselves "part of the vast vague hand-to-mouth multitude of" Paris and feel conscious of being part of a "democratic brotherhood." Thus, on some levels, even if partly in jest, they *identify* with the poor.

11. **(C)** A young patrician is the child of an aristocratic family. Given Morgan's shabby clothing, he does not look smart or *fashionable* enough for people to consider him a member of the aristocracy. Choices (A), (B), and (D) are incorrect. Although smart can mean *intelligent* ("a smart student"), *brisk* ("a smart pace"), or *impertinent* ("Don't get smart with me!"), that is not how it is used here.

12. **(D)** The author begins by giving a definition of the technical term "symbol" and proceeds to analyze three separate types of symbols. Thus, he is *refining* or further defining his somewhat basic original description.

13. **(B)** For a group of letters to "stand for" an object, the letters must in some way *represent* that object to the people who accept the letters as a conventional symbol for the object. Choices (A), (C), and (D) are incorrect. Although "stand for" can mean *tolerate* ("I won't stand for this nonsense!"), *support* ("I stand for human rights."), or *rise* ("All stand for the honorable Judge!"), that is not how the word is used here.

14. **(C)** In describing the associations of the word "phooey," the author states that "the symbol has an inherent connection with the feeling it symbolizes." In other words, there is a built-in *intrinsic natural link* between the symbol and its meaning.

15. **(A)** When we say "hiss," we expel air in a sibilant manner, making a sharp "s" sound as we thrust our tongue toward the tooth ridge and dispel the air quickly. Thus we express our disapproval of something, our desire to push it away from us, so that the meaning of "hiss" has both inherent and conventional associations.

16. **(D)** To the author, *the Statue of Liberty* would be a conventional symbol, for it is a symbol that has been agreed upon by a group of people to represent the abstract idea of freedom.

17. **(D)** Discussing the flag, the author states that, "there is no intrinsic connection" between the flag's colors and the country it represents. In the same way, there is no intrinsic connection between a statue of a woman holding a lighted torch and the abstract idea of liberty. However, this statue has "been accepted as denoting" or being a sign of that particular abstract idea. Thus "we translate the visual impression of" the statue into the concept of that abstraction, "again on conventional grounds." This discussion of the flag as a conventional symbol supports the claim that the author would consider the Statue of Liberty to be a conventional symbol.

18. **(D)** If by some accident you were to have a memorably joyful time at a theme park, such as Disneyland, it might come to have some symbolic value for you, so that thoughts of Disneyland might bring a sense of joy to your mind. However, the relationship between Disneyland and your joyful mood is not an inherent, built-in one; instead, it is purely *coincidental.*

19. **(C)** Lines 57–63 consider how a city might accidentally take on symbolic value for someone because that person had had a saddening experience there. In the same way, Disneyland might take on symbolic value for someone because that person had had a memorably joyful experience there. There is nothing inherently joyful about Disneyland; one can have happy times there and one can have sad times there. If one associates Disneyland with joy, therefore, the relationship is purely coincidental.

20. **(A)** The author describes how one's inner experience of a universal symbol is rooted in or grows out of one's *sensory experience.*

21. **(B)** The author offers fire as *an example* of a universal symbol and asks the reader to *consider it.*

22. **(B)** The "properties" mentioned here are our body's *attributes* or characteristics. Choices (A), (C), and (D) are incorrect. Although "properties" may mean *possessions* ("stolen property"), *premises* ("commercial properties"), or *assets* ("valuable property"), that is not how it is used here.

23. **(B)** Rather than covering new ground or challenging historic theories, the passage *summarizes* general knowledge.

24. **(D)** Since the passage states that female tarantulas abandon their offspring in cocoons to hatch on their own and that young tarantulas go off to spend their lives in solitude, it follows that tarantulas must be *reclusive* or solitary by nature.

25. **(B)** The statement that "the young walk away, find convenient places in which to dig their burrows and spend the rest of their lives in solitude" supports the claim that tarantulas are *reclusive* or solitary.

26. **(C)** To excite a defensive response is to *stimulate* that kind of reaction. "Excite" here is a technical physiological term, as in "exciting a nerve." Choices (A), (B), and (C) are incorrect. Although "excites" can mean *enlivens* ("live music excites dancers"), *inflames* ("kissing excites him"), or *awakens* ("exciting someone's curiosity"), that is not how it is used here.

27. **(D)** The author's presentation of factual information about tarantulas is evidence of a scientifically *objective* or impartial attitude toward them. In addition, he *appreciates* them, acknowledging their delicacy of touch, swiftness of reaction time, etc. His attitude thus can best be described as one of *objective appreciation.*

28. **(C)** The key words here, "seizes the insect so swiftly," describe the spider's *quickness in attacking.*

29. **(D)** Under the conditions described here, the spider will jump whether or not it is hungry. Thus, its reaction occurs quite *regardless* of the state of its appetite. Choices (A), (B), and (C) are incorrect. Although independent can mean *self-sufficient* ("independent and self-reliant"), *self-governing* ("a fully independent country"), or *impartial* ("an independent investigation"), that is not how it is used here.

30. **(D)** Use the process of elimination to answer this question. In lines 67–71 the author denies the possibility that the viewer could confuse the spider's three tactile responses. You can eliminate choice (A). In lines 53–54, the author defines trichobothria as very fine hairs growing from disklike membranes on the spider's legs. You can eliminate choice (B). In lines 53–57, the author corrects the misapprehension that the trichobothria might be hearing organs. You can eliminate choice (C). Only choice (D) is left. At no time does the author *pose* or ask *a question*. By elimination, choice (D) is the correct answer.

31. **(C)** The concluding sentence of the passage states that the tarantula's tactile responses do not help it when it meets (that is, is attacked by) its deadly enemy, the digger wasp. It follows that subsequent paragraphs will discuss *digger wasp attacks* in more detail.

32. **(C)** Choices (A) and (D) are incorrect. By the end of the passage the author no longer is discussing the spider's three tactile responses. Choice (B) is incorrect. If the spider's three tactile responses fail the spider when it is attacked by digger wasps, then it is unlikely that the spider would be able to subdue the digger wasp, whether or not it was aware of the digger wasp's weaknesses. Only choice (C) is left. The spider's three tactile responses prove unequal to meet the challenge of attacks from digger wasps.

33. **(D)** When Locke writes of concerns regarding the "unsteady opinion and uncertain humor" of the people, he is discussing the fear that some have that the mood of the people will change too frequently to provide a stable basis for government. In this case, "humor" is a synonym for mood or *temperament*, as it is in another common phrase, "ill humor" (a mood of bad temper or irritability). Choice (A) is incorrect. Though some witty comments may be humorous, *wit* is not a synonym for *humor*, nor is it the way the word "humor" is used here. Choice (B) is incorrect. Though some skeptical comments may be humorous, *skepticism* is not a synonym for "humor," nor is it the way the word "humor" is used here. Choice (C) is incorrect. Though the word "humor" often refers to comedy or amusement, there is nothing in the context of this passage to suggest that government might be unstable because of the people's sense of humor.

34. **(A)** Locke's main point in this passage is that the people should have the power to govern and that they should be able to rid themselves of a government that is oppressive. Locke would, therefore, not agree that basing government on the will of the people would cause instability. Choice (B) is incorrect. Locke specifically mentions the "slowness and aversion in the people to quit their old constitutions." In other words, the people are averse to change. Choice (C) is incorrect. Locke specifically mentions that such revolutions happen not upon every little mismanagement in public affairs." In other words, the people will not rebel often, even when the government is performing poorly. Choice (D) is incorrect. Locke agrees that the people will rebel at times. He specifies that this will occur after "a long train of abuses." In other words, it will take a long history of abuse by government to move the people to rebel.

35. **(B)** This passage begins with the straw man (a sham argument set up to be defeated) that the people will overthrow the government whenever the mood takes them. Locke answers immediately, "Quite the contrary," and goes on to make arguments and give examples supporting this position. Choice (A) is incorrect. Though the passage begins with two conflicting propositions, Locke spends the rest of the passage disproving the first proposition and supporting the second. Choice (C) is incorrect. No question is asked, and no method of analysis is proposed. Choice (D) is incorrect. Though Locke discusses history throughout the passage, he does not begin the passage with history.

36. **(A)** In this passage, Locke grants that there will be occasional rebellions. He argues, however, that they will be no more frequent if the people have the power to govern than they are when the people do not have that power. This is what he means when he writes, "no more than any other hypothesis." Choice (B) is incorrect. Locke does not cite any examples of rulers successfully stopping popular rebellions. Choice (C) is incorrect. Locke does not assess the effectiveness of violent rebellion in replacing oppressive governments. Choice (D) is incorrect. Locke argues the contrary; that rebellion will decrease if government knows that the people can replace it if they are abused.

37. **(A)** As stated above, in this passage, Locke grants that there will be occasional rebellions. He argues, however, that such rebellions will be no more frequent if the people have the power to govern than they are when the people do not have that power. Choice (B) is incorrect. This sentence argues that people will rebel against oppressive government, but it does not make the comparison between people with the power to govern and powerless people that is made in choice (A). Choice (C) is incorrect. Like choice (B), it predicts popular rebellion but does not make the comparison found in choice (A). Choice (D) is incorrect. This sentence indicates that historical examples of rebellion are plentiful, but as in choices (B) and (C) above, it makes no comparison between people with the power to govern and people who lack that power.

38. **(D)** Locke uses this language to describe government behavior that justifies popular rebellion. Rebellion is not justified for every individual incidence of mistreatment by government. However, when repeated incidents demonstrate a pattern of abuse, as indicated by the words, "all tending the same way," then rebellion is justified. Choice (A) is incorrect. Locke does not describe the actions that the people can take in attempting to overturn the government. Choice (B) is incorrect. Locke does not point to any specific examples from history. These are generalizations. Choice (C) is incorrect. Locke does not discuss in this passage how popular rebellion might prevent government from fulfilling its proper functions.

39. **(A)** When Locke writes about "the ends for which government was at first erected," he is referring to the reasons or *purposes* for which he believes government was created. The use of the word "for" is an important clue because we often discuss the reasons *for* a thing. Choices (B), (C), and (D) are incorrect. Though "ends" can mean *conclusions* ("beginnings and ends"), *extremities* ("the top and bottom ends"), or *segments* ("all ends of the political spectrum"), that is not how it is used here.

40. **(B)** Locke argues that placing the power to govern in the hands of the people is the best check on rebellion because he believes that the government is more likely to rebel than the people are. He claims that those in power are the most likely to use force in violation of the law and that the best way to prevent this is to show them the danger of violating the law, which is that the people may overturn their power to rule. Choices (A) and (C) are incorrect. Locke's main argument in this passage is that the people should have the power to govern and that this will create the most responsive and stable government. Giving the government absolute power would increase rebellion and decrease stability, according to Locke. Choice (D) is incorrect. Though Locke mentions a government made up of Kings, Lords, and Commons, he uses this as an example of an enduring form of government to which Britain keeps returning, despite rebellions. Locke does not argue that this form of government prevents or discourages rebellion.

41. **(C)** In this sentence Locke argues that the power of the people to replace an abusive government with a "new legislative" is the "probablest" (most likely) means to stop rebellion. Choice (A) is incorrect. This sentence describes the people's aversion to change and preference for returning to familiar forms of government. Choice (B) is incorrect. This sentence argues that the people will attempt to overturn abusive governments regardless of whether they have the authority to do so. Choice (D) is incorrect. In this section Locke attempts to change the reader's understanding of what a rebel is by arguing that when the government violates the law, it is the rebel.

42. **(D)** Locke argues that rebellion is not opposition to government but opposition to the rule of law. When the government acts "contrary to their trust" by violating the rights of the people, the government, rather than the people, should be understood to be rebels. Choice (A) is incorrect. Though Locke argues that government should be based on the will of the people, he never argues that the people cannot be wrong. Choice (B) is incorrect. Though Locke argues that the people do not like (are averse to) change, he also argues that they have risen up against abusive rulers repeatedly throughout history. Choice (C) is incorrect. Though Locke makes frequent reference to governments violating the rights of the people, including a specific reference to their right to property, he never makes any claims as to the extent of this problem. It is unclear, based on this passage, whether some, most, or all governments are guilty of this abuse.

43. **(D)** The shadowy, gloomy understory is dimly lit or *obscure*. Remember, words can have multiple meanings. *Obscure* often means unclear or ambiguous: think of "an obscure sentence." It also can mean not well known or important: think of "an obscure minor poet." Here it means lacking illumination, dark, or dim.

44. **(B)** The key phrase here is "in contrast to the forest understory." Although lines 10–14 begin by mentioning the upper story of the rainforest, the greater part of the sentence describes the understory, stating it "receives only about 1 percent of the sunlight that falls on the treetops." Clearly this supports the claim that the understory is relatively dimly lit or *obscure*.

45. **(D)** The plants that exist only within the compass of the canopy live within its boundaries or *enclosing limits*. Choice (A) is incorrect. A pair of compasses may be used in drawing *a curved arc*; however, that is not how the word is used here. Choice (B) is incorrect. Although a magnetic compass is an instrument for determining *direction*, "compass" does not mean *directions*. Choice (C) is incorrect. *Parameters* are limits or boundaries that define the scope of a process or activity. "Compass" here refers to limits or boundaries that define the scope of a physical space or area.

46. **(B)** The tree trunks provide the epiphytes only with a good location up in the canopy. Because they are nonparasitic, epiphytes *cannot draw moisture* (or any nourishment whatsoever) *from tree trunks*.

47. **(B)** Compared to orchids and bromeliads, the "lower" plants (lichens, mosses, and ferns) are *relatively primitive*. Choices (A), (C), and (D) are incorrect. Although "lower" can mean *below average* ("lower attendance than usual"), *less tall* ("a lower fence"), or *more sparse* ("supplies were even lower"), that is not how it is used here.

48. **(D)** Because epiphytes do not sink their roots into the earth, *they lack connections* to the earth and thus do not have direct access *to water in the ground*. They have direct access to water only when it rains.

49. **(C)** Both desert cacti and arboreal cacti grow in environments in which access to moisture is difficult to achieve. The desert cacti lack access to moisture because the amount of rainfall in desert regions is minimal and little moisture exists in the soil. The arboreal cacti lack access to moisture because they grow high up in the canopy with no root connections to the soil. Thus, both kinds of cacti have had to develop *features to cut down* or reduce *the loss of moisture*.

50. **(D)** The author of Passage 2 speaks of the logistical challenges scientists face when they attempt to observe epiphytes in their native habitats. Among these logistical challenges, the author specifically singles out tree height: the taller the tree, the harder it is for scientists to observe the epiphytes rooted on its topmost branches. The infographic accompanying Passage 1 makes it extremely clear just how hard it would be for scientists to observe epiphytes located in the canopy's upper story or in the emergent layer (the tops of trees that poke up above the rainforest canopy). As the infographic shows, these emergent trees tower as much as 50 meters (roughly 165 feet) above the ground.

51. **(D)** In describing the canopy of the tropical rainforest, the author of Passage 1 expresses himself in vivid, sometimes eloquent language: he writes of plants "forming vegetative communities that in number of species and complexity of interactions surpass any others on the earth." He lists colorful details (succulent stems and leaves, bulbous stem bases, tight rosettes of leaves), and metaphorically describes epiphytes as carpeting trees and branches. The author of Passage 2, in contrast, cites scholarly studies, reporting their specific numerical findings ("154 epiphyte species on 411 tree species"). He is far more analytical than evocative. Both passages convey information about epiphytes, but *Passage 2* clearly *restates in less vivid terms the information presented in Passage 1.*

52. **(C)** In both passages, the authors mention the challenges they face in studying epiphytes. Epiphytes are incredibly numerous: Perry states that "[a]bout 28,000 species in 65 families are known worldwide" and goes on to assert that "[t]housands more epiphyte varieties remain unidentified." Sugden points out the logistical challenges researchers face, "such as tree height." Clearly these authors would most likely agree that epiphyte studies *necessarily entail* or inevitably involve *certain challenges for researchers.*

Section 2: Writing and Language Test

1. **(A)** This option gives the only correct use of a past form of the verb. Choice (B) is in the present tense. Choices (C) and (D) should say "chosen" instead of "chose" or "choose."

2. **(C)** This needs to refer to the singular, gender-neutral "job hunter" making "himself or herself" appropriate. The other options are not consistent with "job hunter."

3. **(D)** The chart states that 82 percent of employers use online methods to fill jobs. This equates to roughly four-fifths since 4 divided by 5 is 0.8, which is close to 82 percent if expressed as a percentage.

4. **(D)** The first paragraph of the essay emphasizes the potential problems that your online presence can have with respect to the job search. The current paragraph emphasizes ways that you can take control of online resources to seek out job opportunities. Therefore, the contrast that choice (D) provides is most appropriate. Choices (A), (B), and (C) are all loosely related to the essay topic but do not provide the needed transition.

5. **(B)** This choice maintains the original meaning while being concise. Choice (A) is too wordy, choice (C) subtly changes the original intent, and choice (D) is too vague.

6. **(C)** This choice separates the introductory phrase, "Within your online profiles" from the independent clause that follows. Choice (A) has confused word order. Choice (B) lacks a comma after the introductory phrase. Choice (D) inserts an unnecessary colon, creating a far too abrupt pause.

7. **(A)** The previous sentence encourages readers to include detailed descriptions of their job qualifications when applying for new positions. Stating that job seekers should not be modest is therefore a logical follow-up. Choice (B) encourages concise wording instead of description. Choices (C) and (D) are irrelevant.

8. **(A)** "Whereas" is the only option that provides a contrast within the sentence between the ideas that a resume should be concise and that an online profile can be more thorough.

9. **(B)** The colon serves to give a needed pause between the independent clause before the colon and the clarifying independent clause after the colon. Choices (A) and (D) each produce a run-on sentence. Choice (C) interrupts "professional picture."

10. **(C)** According to the chart, employee referrals and online searching are the two most popular ways for employers to recruit. Choice (C) is the only option that ties directly to one of these methods, in this case, online searching.

11. **(A)** This sentence gives details to support the statement in the previous sentence, that there is now a "plethora" of resources available to the unemployed. So this sentence should be kept, making choices (C) and (D) incorrect. Choice (B) is incorrect because the second paragraph gives quite a bit of evidence that online job hunting is worthwhile.

12. **(D)** This is the only option that is parallel to the other listed phrases in the sentence: "literary figures such as Allen Ginsberg" and "film directors such as Woody Allen." The other options all violate parallelism in their phrasing, and choice (C) is too wordy.

13. **(A)** To say that something is "unparalleled" emphasizes its excellence since nothing can parallel it. So to show great popularity, this is the best option. Choices (B) and (C) are too mild. Choice (D) more fittingly describes an appetite rather than popularity.

14. **(C)** If there is controversy over this assertion, then there must be detractors who do not believe that Glass is a significant composer. The other options all indicate that these characterizations are widespread.

15. **(C)** The dashes set aside the parenthetical phrase, and the word choice in choice (C) is logical. Choices (A) and (B) do not set aside the parenthetical phrase. Choice (D) uses inconsistent punctuation to set aside the phrase.

16. **(A)** The theme of the paragraph is the minimalism of Glass's compositions. So if Johnson is a minimalist, that would make him more qualified to express his views on this topic. Choice (B) does not directly relate to the quotation that follows. Choice (C) indicates too broad of a background. Choice (D) describes a loosely related field but one that is not directly applicable to speaking authoritatively on musical minimalism.

17. **(D)** "Among" indicates that Glass has multiple awards, which is supported by the rest of the sentence. Choices (A) and (B) give illogical introductions to the sentence. Choice (C) is appropriate for a comparison of only two things.

18. **(D)** "Has written" is the present perfect tense. "Has writing" is incorrect, making choices (A) and (B) wrong. Choice (C) incorrectly uses "then," which refers to time. Choice (D) properly uses the comparative "than."

19. **(B)** Based on the context, "spurred" is most logical since it means "inspired." Choice (D) is in the incorrect tense, and choices (A) and (C) do not convey the precise meaning needed.

20. **(A)** This is the only option that correctly refers to the singular male "Glass."

21. **(C)** Since these actions happened "in the last two decades," they are continuing up to the present day. So the present perfect "has composed" is most logical. Choice (D) is also in the present perfect but is not consistent with the singular subject "Glass." Choices (A) and (B) are not in the present perfect tense and indicate events in the distant past.

22. **(B)** If an ordinary person who is not a music enthusiast recognizes Glass's compositions, that would support the idea that the works are common. Choices (A), (C), and (D) do not indicate widespread recognition.

23. **(B)** Between 1980 and 2010, the median annual incomes of those in the top 10 percent rose from approximately $160,000 to approximately $320,000, which is a doubling. During that same time interval, the median annual incomes of those in the bottom 20 percent remained at around $15,000.

24. **(A)** Having a clear understanding of Piketty's research goals helps make the connection between the two sentences. Choice (B) is not correct because this sentence focuses on Piketty's goals, not on his methods. Choice (C) is not right because the information is relevant. Choice (D) is incorrect; it is not repetitive.

25. **(A)** It is most sensible to use "greater" when referring to economic rates of return. Choice (B) refers to physical objects, choice (C) refers to prices, and choice (D) is too vague.

26. **(D)** The word "esoteric" means "intended for understanding by a select few people." So choice (D) gives a logical elaboration stressing that few people find this book accessible. The other options do not relate to the text being esoteric.

27. **(C)** This option correctly uses a colon to set off a clarification. Choice (B) uses a comma, which does not provide a sufficiently significant pause. Choice (D) has a pause in an awkward spot. Choice (A) needs a complete sentence after the semicolon.

28. **(D)** The paragraph goes on to cite Rognlie as an example of someone who found flaws in Piketty's arguments. Rognlie is best described as a "critic." Choice (A) is too neutral. Choice (B) is true but not specific in describing Rognlie's views. Choice (C) is too negative.

29. **(C)** This option both clarifies the subject and uses a semicolon to give a clear break between the independent clauses. Choice (A) does not have the necessary independent clause after the semicolon. Choice (B) does not give a parallel construction. Choice (D) creates a run-on.

30. **(B)** When referring to ideas, the phrase "points to" is fitting. Choice (A) is for pointing at physical objects, and choices (C) and (D) are not idiomatically correct.

31. **(A)** "Homeowners'" correctly indicates that there are multiple homeowners who possess returns on assets. Choices (B) and (C) are singular, and choice (D) does not indicate possession.

32. **(D)** "Hence" is the only option to indicate a cause-and-effect relationship.

33. **(B)** This option gives a clear statement of the two possible opinions. Choice (A) is too repetitive. Choice (C) improperly uses "agreeing," which is not parallel. Choice (D) makes the sentence illogical, comparing Piketty himself to an understanding of his argument.

34. **(C)** "Was" correctly indicates singular past tense. Choices (A) and (B) need to be used in conjunction with another verb in this context, and choice (D) is plural.

35. **(B)** The overall position of the author is that the theory of the humors has been a major obstacle to scientific advancement. To finish the current sentence, a statement as to the absurdity of the theory is most sensible. Choice (A) has a more positive connotation. Choices (C) and (D) are inconsistent with information elsewhere in the passage.

36. **(B)** This is the only option that properly uses an adverb, "intellectually," to modify the adjective "entrenched."

37. **(A)** The idea behind the analogy is that a mystical, unscientific cause for an illness is not helpful in developing useful cures. Choice (A) is the most applicable since it takes an unscientific cause for an illness and connects it to the illness itself. Choices (B), (C), and (D) all offer analogous reasoning but are irrelevant.

38. **(A)** This choice concisely expresses the needed idea, using the singular possessive apostrophe correctly. Choice (B) uses the plural "analyses." Choices (C) and (D) are too wordy.

39. **(C)** The author is making a general statement about a way of thinking, so "the" is most appropriate. Choice (A) is inconsistent because the passage lacks the word "one." Choices (B) and (D) use incorrect spellings to indicate possession.

40. **(B)** This option finishes the phrase "not from . . . but from." The other options are idiomatically incorrect.

41. **(D)** A "renaissance" is a "rebirth." So choice (D) properly emphasizes the fact that the theory of humors held back society, especially given the advances in science alluded to immediately after this. Choice (A) does not logically lead into the context that follows. Choices (B) and (C) are vague.

42. **(C)** "Further" correctly indicates that what follows in this sentence will build upon the argument already presented. Choice (A) does not make a strong tie to the argument, choice (B) shows contrast, and choice (D) shows cause and effect.

43. **(D)** Although this is a really long phrase, it needs no interruptions from commas. The phrase must remain unified to convey the entire idea.

44. **(B)** The lack of an understanding of germ theory (for which this notion of "corporeal isolation" is partly responsible) is most specifically elaborated upon by choice (B)— holding back medicine for three centuries is quite significant. Choice (A) uses awkward phrasing. Choice (C) is irrelevant. Choice (D) makes an obvious, unhelpful statement.

Section 3: Math Test (No Calculator)

1. **(C)** The percent increase of an investment is $\frac{\text{actual increase}}{\text{original value}} \times 100\%$. Each of Max's share was originally worth $10, and the actual increase in value of each share was $10. Max's percent increase in value was $\frac{10}{10} \times 100\% = \textbf{100\%}$.

2. **(B)** Since the range is the difference between the highest and lowest salaries, the most logical explanation is that at least one employee (perhaps the president of the company)

makes a very high salary. For example, the lowest salary could be $20,000, but the president could earn $165,000. Each of the other statements could be true. In fact by definition of the median, choice (A) must be true. However, choices (A), (C), and (D) do not provide an explanation for the large value of the range.

3. **(B)** $\dfrac{a+b}{3+4} = \dfrac{a+b}{7} = \dfrac{a}{7} + \dfrac{b}{7}$

****The solution is straightforward. However, if you aren't confident that you would do it correctly, plug in numbers and test the choices. For example, if $a = 3$ and $b = 4$, then $\dfrac{a+b}{3+4} = \dfrac{3+4}{3+4} = 1$. Only choice (B) is equal to 1 when $a = 3$ and $b = 4$.

4. **(C)** The volume of the small tank is $\pi r^2 h$, and the volume of the large tank is $\pi(2r)^2 h$, which equals $4\pi r^2 h$, so the large tank is 4 times the size of the small one. *Be careful!* This is an *increase* of 300%, not 400%. (4 is 3 more than 1, so is 300% more than 1.) Therefore, $k = 300$.

5. **(A)** Solutions to a system of equations are those points that lie on each of the graphs. Since the lines whose equations are $y = 1$ and $y = -1$ are parallel, they do not intersect. So no point can lie on all four graphs. Note that each line intersects each parabola and the two parabolas intersect each other in two points. However, 0 points lie on all four graphs.

6. **(A)** Write out the combined frequency distribution.

Combined Distribution of all 100 rolls

Number	1	2	3	4	5	6
Frequency	11	21	21	11	16	20

Since the combined distribution consists of 100 numbers, the median is the average of the middle two, the 50th and 51st numbers. From the distribution above, we see that there are $11 + 21 = 32$ numbers less than 3 (11 ones and 21 twos) and 21 threes, so the 33rd through the 53rd numbers are all 3. In particular, the 50th and 51st numbers are both 3. So the median is **3**.

7. **(D)** $[(2x + y) + (x + 2y)]^2 = [3x + 3y]^2 = [3(x + y)]^2 = 9(x + y)^2$

****Questions such as this one can always be answered by plugging in numbers. For example, if x and y were each 1, then the given expression would be equal to $[3 + 3]^2 = 6^2 = 36$. Of the four choices, only $9(x + y)^2$, choice (D), is equal to 36 when x and y are each equal to 1.

8. **(D)** Joanna needed to drive the m miles in $h + \dfrac{1}{2}$ hours. Since $r = \dfrac{d}{t}$, to find her rate, you divide the distance, m, by the time, $\left(h + \dfrac{1}{2}\right)$: $\dfrac{m}{h + \dfrac{1}{2}} = \dfrac{2m}{2h + 1}$.

9. **(A)** The graphs of the two equations are each parabolas. Even a rough sketch should indicate that they don't intersect. So there are 0 points of intersection.
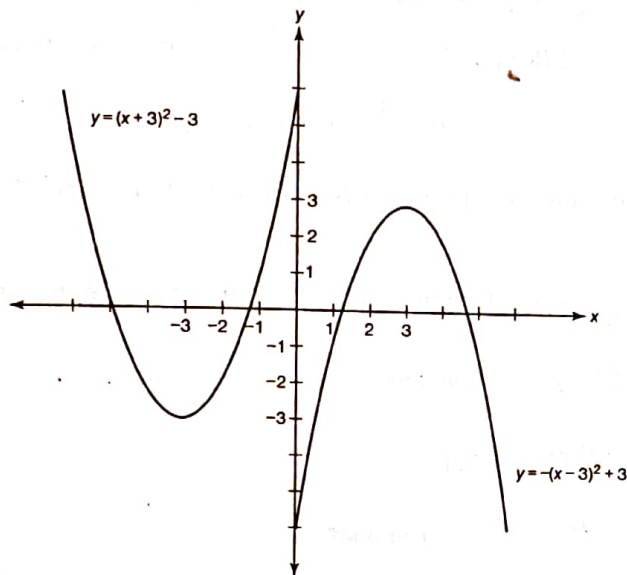
**Alternatively, you can solve the system of equations:

$$-(x-3)^2 + 3 = (x+3)^2 - 3 \Rightarrow$$
$$-(x^2 - 6x + 9) + 3 = x^2 + 6x + 9 - 3 \Rightarrow$$
$$-x^2 + 6x - 6 = x^2 + 6x + 6 \Rightarrow -2x^2 = 12 \Rightarrow x^2 = -6$$

Since x^2 cannot be negative, the system of equations has no solution, and so the two graphs do not intersect.

10. **(B)** The graph of $f(x)$ crosses the x-axis whenever $f(x) = 0$. We have no way of knowing how many times this happens, However, it happens at least once—when $2x + 3 = 0$—which happens when $x = -\frac{3}{2}$. In fact, $f\left(-\frac{3}{2}\right) = (0)g\left(-\frac{3}{2}\right) = 0$.

11. **(B)** During the first year after Lee purchased the CD, the value of the CD increased $50 (5% of its original value of $1,000). So at the end of the first year, the CD was worth $1,050. During each of the next n years, the value of the CD increased by 3%. For example, at the end of the second year, the CD was worth 1.03% of what it was worth at the end of the first year: $1,050(1.03). At the end of the third year, it was worth 1.03% of that: $1,050(1.03)(1.03) ≈ $1,050(1.03)^2$. At the end of n years, it was worth **$1,050(1.03)^{n-1}$**.

12. **(A)** Express the quotient as a fraction. Then multiply the numerator and denominator by the conjugate of the denominator:

$$(1 + i) \div (1 - i) = \frac{1+i}{1-i} = \frac{1+i}{1-i} \cdot \frac{1+i}{1+i} = \frac{1+i+i+i^2}{1+1} = \frac{2i}{2} = i = 0 + 1i$$

So, $a = 0$ and $b = 1$.

13. **(D)** Since $\angle A$ is an angle in each of the four triangles, and since each triangle has a right angle, all the triangles are similar. Since the ratio $AB:AD:AF:AH = 1:2:3:4$, the ratio $BC:DE:FG:HJ$ is also 1:2:3:4. So, if $BC = x$, then $DE = 2x$, $FG = 3x$, and $HJ = 4x$. Therefore, the area of trapezoid $BCED = \frac{1}{2}(1)(x + 2x) = \frac{3x}{2}$, and the area of trapezoid

$$FHJG = \frac{1}{2}(1)(3x + 4x) = \frac{7x}{2}$$

So the ratio of the area of trapezoid $FHJG$ to the area of trapezoid $BCED$ is $\frac{7x}{2}:\frac{3x}{2} = 7:3$.

14. **(D)** $\frac{1}{10}\% = \frac{\frac{1}{10}}{100} = \frac{1}{1,000}$. Therefore, $a = \frac{1}{10}\%$ of $b \Rightarrow a = \frac{1}{1,000}b \Rightarrow b = 1,000a$

Then, $b = \frac{100,000}{100}a \Rightarrow b = 100,000\%$ of a.

**Use the proportion $\frac{is}{of} = \frac{\%}{100}$.

$\frac{a}{b} = \frac{\frac{1}{10}}{100} \Rightarrow \frac{b}{a} = \frac{100}{\frac{1}{10}} = 1,000 = \textbf{100,000\%}$

**Let $b = 100$. Then $a = \frac{1}{10}\%$ of $100 = \frac{1}{10} = 0.1$. So 100 is what percent of 0.1?

$100 = x\%$ of $0.1 \Rightarrow 100 = \frac{x}{100}(0.1) \Rightarrow 10,000 = 0.1x \Rightarrow x = \textbf{100,000}$

15. **(D)** $x + y = a(x - y) \Rightarrow x + y = ax - ay \Rightarrow ay + y = ax - x \Rightarrow y(a + 1) = (a - 1)x \Rightarrow y = \frac{a-1}{a+1}x$

So the slope of the line is $\frac{a-1}{a+1}$, which will be positive if the numerator and the denominator are both negative (which is true whenever $a < -1$) or if the numerator and the denominator are both positive (which is true whenever $a > 1$). So the slope is positive when $a < -1$ or $a > 1$.

16. **2** This problem is trivial with a calculator. Since this is in the noncalculator section, you need to know how to manipulate fractional and negative exponents.

- $4^{\frac{1}{2}} = \sqrt{4} = 2$

- $8^{\frac{1}{3}} = \sqrt[3]{8} = 2$

- $16^{-\frac{1}{4}} = \frac{1}{16^{\frac{1}{4}}} = \frac{1}{\sqrt[4]{16}} = \frac{1}{2}$

So, $4^{\frac{1}{2}} \times 8^{\frac{1}{3}} \times 16^{-\frac{1}{4}} = 2 \times 2 \times \frac{1}{2} = 2$

17. **3** $f(x) = 3 \Rightarrow 3 + \frac{5}{x} = 3 \Rightarrow \frac{5}{x} = 0$, which is impossible, so **3** cannot be a value of $f(x)$. (A fraction can equal 0 only if its numerator is 0.) Note that x cannot be 0, but $f(x)$ can be:

$f(x)$ is 0 if $x = -\frac{5}{3}$.

18. **6** In order for the equation $ax + b = cx + d$ to have infinitely many solutions, it must be that $a = c$ and $b = d$.

$$3(x + 2) + 5(x + 3) = 2(x + 5) + n(x + 3) - 7 \Rightarrow$$
$$3x + 6 + 5x + 15 = 2x + 10 + nx + 3n - 7 \Rightarrow$$
$$8x + 21 = (2 + n)x + (3 + 3n)$$

For the given equation to have infinitely many solutions, it must be that $8 = 2 + n$ and $21 = 3 + 3n$, which is true if $n = 6$. Note that if $n = 6$, the last equation becomes $8x + 21 = 8x + 21$, which is true for every value of x.

19. **6** Since $y = 3x + 2$ and $y = 2x + 3$, then $3x + 2 = 2x + 3 \Rightarrow x = 1$. So the x-coordinate of the point of intersection is 1. To find the y-coordinate, plug $x = 1$ into either equation, say $y = 3x + 2$: $y = 3(1) + 2 = 5$. So the point of intersection of the two lines is (1, 5), and the sum of the x- and y-coordinates is $1 + 5 = 6$.

20. **1** Since the x-coordinate of each point on the y-axis is 0, the circle intersects the y-axis when $x = 0$. By replacing x by 0 in the equation of the circle, we get:

$$(0 - 4)^2 + (y - 2)^2 = 4 \Rightarrow 16 + (y - 2)^2 = 4 \Rightarrow (y - 2)^2 = -12$$

However, $(y - 2)^2$ cannot be negative. So the circle does not touch the y-axis, and $m = 0$. Since the y-coordinate of each point on the x-axis is 0, the circle intersects the x-axis when $y = 0$. By replacing y by 0 in the equation of the circle, we get:

$$(x - 4)^2 + (0 - 2)^2 = 4 \Rightarrow (x - 4)^2 + 4 = 4 \Rightarrow (x - 4)^2 = 0 \Rightarrow x - 4 = 0 \Rightarrow x = 4$$

So the only point where the circle intersects the x-axis is the point (4, 0) and $n = 1$. So $m + n = 0 + 1 = 1$.
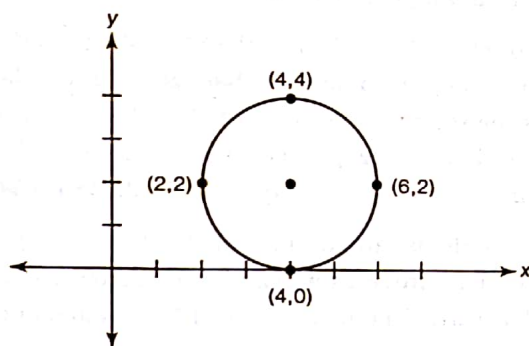
Section 4: Math Test (Calculator)

1. **(B)** The trust received 80% of the estate (10% went to the man's wife, 5% to his children, and 5% to his grandchildren). If E represents the value of the estate, then

$$0.80E = 1,000,000$$

$$E = 1,000,000 \div 0.80 = 1,250,000$$

Each grandchild received 1% (one-fifth of 5%) of the estate, or **$12,500**.

2. **(B)** If $\sqrt{x+6} = x$, then squaring both sides gives $x + 6 = x^2$. So,

$$x^2 - x - 6 = 0 \Rightarrow (x - 3)(x + 2) = 0 \Rightarrow x = 3 \text{ or } x = -2$$

It appears as if the equation has two solutions. However, one or both of them could be extraneous. So check each of them.

- Since $\sqrt{3+6} = \sqrt{9} = 3$, 3 is a solution.
- Since $\sqrt{-2+6} = \sqrt{4} = 2 \neq -2$, –2 is *not* a solution.

The equation has one positive solution.

**Since a square root can never be negative, choice (C) can be eliminated immediately. Once we determine that the only possible solutions are 3 and –2, we have to test only 3; –2 could not possibly be a solution.

3. **(C)** The total amount of financial aid that each university gave out is the product of the number of students receiving financial aid and the average amount of financial aid per student. To compare the universities, make a table.

	A	B	C	D
Number Receiving Financial Aid	4,000	2,800	3,600	4,500
Average Size of Financial Aid	$15,500	$21,000	$18,700	$14,300
Total Amount of Financial Aid	$62,000,000	$58,800,000	$67,320,000	$64,350,000

So university *C* gave out the greatest amount of financial aid.

4. **(A)** Marie's cost to sell one CD is $3.70—the $2.75 she pays for the CD plus the $0.95 she pays to ship it to her customer. On that sale, Marie collects $6.74—her selling price of $4.99 plus the shipping and handling fee of $1.75. This represents a profit of $6.74 – $3.70 = $3.04. Similarly, her profit on a DVD is $5.04. So her profit on the sale of x CDs and y DVDs can be found with the equation $P = 3.04x + 5.04y$.

5. **(D)** The original 20 students earned a total of $20 \times 86 = 1,720$ points. The total number of points earned by all 25 students was $25 \times 88 = 2,200$. Therefore, the five students who took the test late earned a total of $2,200 - 1,720 = 480$ points. So their average was $480 \div 5 = 96$.

**Let x be the average of the five students, and treat this as a weighted average problem:

$$\frac{20(86)+5x}{25} = 88 \Rightarrow 1,720 + 5x = 2,200 \Rightarrow 5x = 480 \Rightarrow x = 96$$

6. **(C)** Of the 192 people who supported the proposition in the survey, all 192 of them voted for the proposition as did 80% of the 90 people who had been undecided. Since 80% of 90 is 72, the total number of people from the survey who voted for the proposition was 192 + 72 = 264. Finally, $264 \div 500 = 0.528 = $ **52.8%**.

7. **(C)** The least common multiple of 8, 12, and 30 is 120. So every 120 seconds:

- The population increases due to births by $120 \div 8 = 15$ people.
- The population decreases due to deaths by $120 \div 12 = 10$ people.
- The population increases due to net immigration by $120 \div 30 = 4$ people.

So every 120 seconds = 2 minutes, the population increases by $15 - 10 + 4 = 9$ people. Therefore, the population increases by 4.5 per minute, $60 \times 4.5 = 270$ per hour, and $24 \times 270 = \textbf{6,480}$ per day.

8. **(C)** The solution to question 7 says that the country's population increases by about 6,480 per day. So the annual increase in population is about

$$6,480 \times 365 = 2,365,200$$

For the population to reach 350,000,000, it has to increase by 30,000,000, which should take

$$30,000,000 \div 2,365,200 = 12.68 \text{ years}$$

So the population should reach 350,000,000 about 12.68 years after January 2015, sometime in 2027.

9. **(C)** Draw right triangle *ABC*.
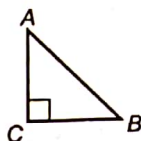
Since $\tan A = 1$, and by KEY FACT S1,

$$\tan A = \frac{\text{opposite}}{\text{adjacent}} = \frac{BC}{AC}, \text{ then } AC = BC$$

Assume *AC* and *BC* are each 1; then by KEY FACT J8, $AB = \sqrt{2}$. So, again by KEY FACT S1:

$$\sin A + \cos A = \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} = \frac{2}{\sqrt{2}}$$
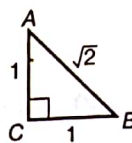
Since $\frac{2}{\sqrt{2}}$ is not an answer choice, you can either:

- Rationalize the denominator:

$$\frac{2}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \sqrt{2}, \text{ or}$$

- Use your calculator: $\frac{2}{\sqrt{2}} = 1.414$.

Only choice (C), $\sqrt{2}$, equals 1.414.

10. **(B)** Let n represent the number of members of the club before Jean joined. These members raised a total of $85n$ dollars (KEY FACT E1). After Jean was in the club, the total raised was $85n + 50$, the average was 80, and the number of members

was $n + 1$:
$$\frac{85n+50}{n+1} = 80$$

Cross-multiply: $\quad 85n + 50 = 80(n + 1)$

Distribute: $\quad 85n + 50 = 80n + 80$

Subtract $80n$ and 50
from each side: $\quad 5n = 30$

Divide by 5: $\quad n = 6$

**Backsolve, starting with 6, choice (B). If there were 6 members, they would have raised $6 \times \$85 = \$510$. After Jean joined and raised \$50, there would have been 7 members who raised a total of $\$510 + \$50 = \$560$. And $\$560 \div 7 = \$80$. Choice (B) works.

11. **(D)** First of all, we have to keep the units consistent. Keeping everything in dollars, we have that the rental rate is d dollars per day, and the mileage rate is $\frac{c}{100}$ dollars per mile. Then we have:

$$3d + 200\left(\frac{c}{100}\right) = 210 \quad \text{and} \quad d + 300\left(\frac{c}{100}\right) = 245$$

So $3d + 2c = 210$ and $d + 3c = 245$.

From the second equation, we have that $d = 245 - 3c$. Replacing d by $245 - 3c$ in the first equation gives

$$210 = 3(245 - 3c) + 2c = 735 - 9c + 2c = 735 - 7c \Rightarrow 7c = 525 \Rightarrow c = 75$$

Then $3d + 2(75) = 210 \Rightarrow 3d + 150 = 210 \Rightarrow 3d = 60 \Rightarrow d = 20$.

Finally, the cost for Samantha to rent a van for five days during which time she drives 480 miles is

$$5(20) + 480\left(\frac{75}{100}\right) = 100 + 480\left(\frac{3}{4}\right) = 100 + 360 = 460$$

12. **(D)** The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$, so the volume of this cone is $\frac{1}{3}\pi 3^2(6) = 18\pi$ cubic feet. When half the water in the tank is poured out, the volume of the remaining water is 9π cubic feet. In the diagram below, the two triangles are similar. If h represents the height of the water, $r = \frac{1}{2}h$.
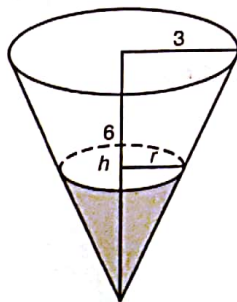
So 9π cubic feet, the volume of the water still in the tank, is equal to

$$\frac{1}{3}\pi\left(\frac{h}{2}\right)^2 h = \frac{1}{12}\pi h^3 \text{ cubic feet}$$

Then,

$$9\pi = \frac{1}{12}\pi h^3 \Rightarrow h^3 = 108 \Rightarrow h = \sqrt[3]{108} = 4.76$$

Finally, 4.76 feet = 4.76 × 12 inches = 57.12 inches.

13. **(D)** Exports to Eastern Europe from other Eastern European countries increased from $9.8 billion (10% of $98 billion) to $20.88 billion (12% of $174 billion)—an increase of slightly more than **100%**.

14. **(B)** If France's exports to Eastern Europe were four times those of the United States, then France accounted for 8% of the total exports. Since 8% is $\frac{1}{8}$ of 64%, France accounted for $\frac{1}{8}$ or **12.5%** of the exports from the European Union.

15. **(B)** The percent increase in total exports to Eastern Europe from 1993 to 1996 was

$$\frac{\text{the actual increase}}{\text{original amount}} \times 100\% = \frac{174 - 98}{98} \times 100\% = \frac{76}{98} \times 100\% = 77.55\%$$

So, in billions of dollars, the increase in total exports to Eastern Europe from 1996 to 2000 was 0.7755 × 174 = 134.94, making total exports 174 + 135 = 309 billion dollars. The value of exports from the European Union was 64% of 309 = 197.76 billion dollars. To the nearest billion, the figure was **198**.

16. **(B)** The mode is 8, since more people earn $8 an hour than any other salary. Since there are 16 employees, the median is the average of the 8th and 9th items of data: $8 and $10, so the median is 9. The range is the difference between the greatest and least values; 13 − 6 = 7. Finally, the average of 8, 9 and 7 is **8**.

17. **(A)** Let A, B, and C represent Alan's, Bob's, and Carol's allowances, respectively. Then $A = 3B$ and $A = \frac{1}{3}C$. So $C = 3A = 3(3B) = 9B$. Then

$$26 = \frac{A+B+C}{3} = \frac{3B+B+9B}{3} = \frac{13B}{3}$$

So $13B = 3 \times 26 = 78 \Rightarrow B = \mathbf{6}$.

**Test the answers starting with choice (C). If $B = 18$, then $A = 54$ and $C = 162$. The average of 54, 18, and 162 is 78, which is too big. Eliminate choices (C) and (D) and try choices (A) and (B). Since choice (C) was much too big, try (A), which works.

18. **(A)** In Norway, the life expectancy of a female born in 1955 was 75 years, which is greater than the life expectancy of a male born in 1990. In Hungary, the life expectancy of a female born in 1955 was 66 years, whereas the life expectancy of a male born in 1990 was greater than 67. In the other two countries, the life expectancy of a female born in 1955 was less than 65 years, and the life expectancy of a male born in 1990 was greater than 65. The answer is **1**.

19. **(A)** The life expectancy of **Korean females** born in 1955 was about 51 and in 1990 it was about 74, an increase of 23 years. This is greater than any other nationality and sex.

20. **(A)** If $7 = 3 - x$, then $x = -4$. So $g(7) = g(3 - (-4)) = (-4)^2 + (-4) + 1 = 16 - 4 + 1 = 13$.

21. **(A)** Since ℓ_1 and ℓ_2 are parallel, $a = c$ and $b = d$ (KEY FACT I6). If the measures of two angles in one triangle are equal to the measures of two angles in another triangle, the two triangles are similar (KEY FACT J17). In addition, since ℓ_3 and ℓ_4 are perpendicular, both triangles are right triangles. Then either by using the Pythagorean theorem or by recognizing that triangle EDC is a $3x$-$4x$-$5x$ triangle with x equal to 4, we get that $DE = 20$. Therefore, the perimeter of triangle EDC is $12 + 16 + 20 = 48$. Since side AC in triangle ABC corresponds to side CE in triangle EDC, the ratio of similitude is $6:16 = 3:8$.

    So the perimeter of triangle ABC is $\frac{3}{8}$ of the perimeter of triangle EDC, and $\frac{3}{8}(48) = 18$.

22. **(A)** The powers of i form a repeating sequence:

$i^1 = i$	($a^1 = a$ for *any* number)
$i^2 = -1$	(by definition)
$i^3 = -i$	$i \cdot i \cdot i = (i \cdot i)(i) = i^2 \cdot i = -1(i) = -i$
$i^4 = 1$	$i^4 = i \cdot i \cdot i \cdot i = (i \cdot i)(i \cdot i) = (-1)(-1) = 1$
$i^5 = i$	$i^5 = i^4 \cdot i = 1 \cdot i = i$
$i^6 = -1$	$i^6 = i^5 \cdot i = i \cdot i = i^2 = -1$
$i^7 = -i$	$i^7 = i^6 \cdot i = (-1)i = -i$
$i^8 = 1$	$i^8 = i^7 \cdot i = (-1)(i) = -i^2 = -(-1) = 1$

Note that the powers of i form a repeating sequence in which the four terms $i, -1, -i, 1$ repeat in that order indefinitely.

So if $i^n = i$, then n is 1 more than a multiple of 4. Only choice (A) satisfies this condition: $45 = 44 + 1$, whereas 55, 75, and 95 are each 3 more than a multiple of 4.

23. **(D)** If x pounds of peanuts are added to the existing mixture, the result will be a mixture whose total weight will be $(70 + x)$ pounds, of which $(20 + x)$ pounds will be peanuts.

    Then, by expressing 60% as $\frac{6}{10}$, we have

    $$\frac{20+x}{70+x} = \frac{6}{10} \Rightarrow 200 + 10x = 420 + 6x \Rightarrow 4x = 220 \Rightarrow x = 55$$

24. **(A)** By KEY FACTS M9 and M7, the volume of a sphere is $\frac{4}{3}\pi r^3$ and the volume of a right circular cone is $\frac{1}{3}\pi r^2 h$. (Remember that both of these formulas are given to you on the first page of each math section.) Then:

    $$\frac{4}{3}\pi r^3 = \frac{1}{3}\pi r^2 h \Rightarrow 4r^3 = r^2 h \Rightarrow 4r = h \Rightarrow \frac{h}{r} = 4$$

    **Use TACTIC 3. Plug in a number for the radius, say $r = 1$. Then the volume of the sphere is $\frac{4}{3}\pi(1)^3 = \frac{4}{3}\pi$, and the volume of the cone is $\frac{1}{3}\pi r^2 h = \frac{1}{3}\pi h$. So $\frac{4}{3}\pi = \frac{1}{3}\pi h \Rightarrow h = 4$.

MODEL TEST 4

25. (A) At the end of the first year, Jennifer's CD was worth:

$$\$1{,}000 + 0.02(\$1{,}000) = 1.02(\$1{,}000)$$

During the second year, that money earned 2% interest. At the end of the second year, the CD was worth $1.02(1.02(\$1{,}000)) = (1.02)^2(\$1{,}000)$. When her first CD matured after 7 years, it was worth $(1.02)^7(\$1{,}000) = \$1{,}148.69$. Jennifer then deposited all of that money into a second CD. When it matured in 2014, that CD was worth $(1.02)^7(\$1{,}148.69) = \$1{,}319.48$. From 2000 to 2007, Jennifer earned \$148.69. From 2007 to 2014, she earned $\$1{,}319.48 - \$1{,}148.69 = \$170.79$. So the second CD earned $\$170.79 - \$148.69 = \$22.10$ more than the first one did. To the nearest dollar, the answer is **\$22**.

26. (B) Let x represent the number of families that had at least one boy and at least one girl, and draw a Venn diagram to illustrate the situation.
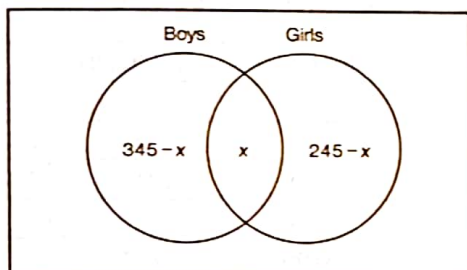
So, $345 - x$ families have only boys and $245 - x$ families have only girls. Therefore $(345 - x) + x + (245 - x) = 500 \Rightarrow 590 - x = 500 \Rightarrow x = 90$. So, $345 - 90 = \mathbf{255}$ familes had only boys.

27. (D) Since the diameter of the circle is 8, its radius is 4. In the diagram below, OE is 2 and radius OB is 4.
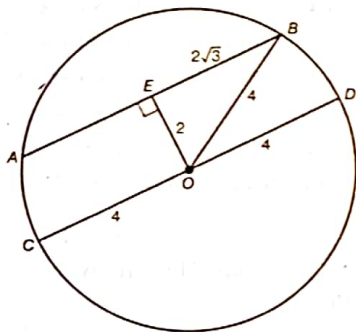
There are several ways to get that $EB = 2\sqrt{3} = 3.464$. Once you have that information you double it to get that $AB = 4\sqrt{3} = 6.928 \approx \mathbf{6.93}$. How do you find EB?

- You could use the Pythagorean theorem: $2^2 + (EB)^2 = 4^2$. So $(EB)^2 = 16 - 4 = 12$, and $EB = \sqrt{12} = 3.464$.
- You could use the fact that if one leg of a right triangle is half the hypotenuse, then that leg is the shorter leg of a 30-60-90 right triangle. To get the length of the longer leg, you multiply the length of the shorter leg by $\sqrt{3}$.
- You could use trigonometry: $\sin B = \dfrac{2}{4} = 0.5$ and $\sin^{-1}(0.5) = 30°$.

  Then $\cos 30 = .866 = \dfrac{EB}{4}$. So $EB = 4(0.866) = 3.464$.

28. (A) To find the average of the annual sales from 2001 through 2008, add up the sales (in millions) for each year and divide by 8:

$$(4 + 6 + 7 + 7 + 5 + 9 + 8 + 10) \div 8 = 56 \div 8 = 7$$

The number of years that sales were greater than $7,000,000 is **3** (2006, 2007, and 2008).

29. (A) From the chart we see that in 2008 total sales were $10,000,000. In 2009, after a 20% increase, total sales were $12,000,000. From the circle graph we see that in 2008 sales of kitchen appliances were $4,000,000 (40% of $10,000,000). In 2009, sales of kitchen appliances were $3,600,000 (30% of $12,00,000)—a decrease of **$400,000**.

30. (B) The simplest way to check the truth of each statement is to make a chart comparing the sales in 2008 and 2010.

For each $100 of sales each year

Category	Sales in 2008	Sales in 2010	
Computers	$25	$22.50	10% of 25 = 2.50
Kitchen Appliances	$40	$42.00	5% of 40 = 2.00
TVs	$20	$21.00	5% of 20 = 1.00
Miscellaneous	$15		
Total	$100	$100	

- From the chart we see that for every $21 of sales of TVs, there were $22.50 of sales of computers. Choice (A) is false.
- In 2010, the total sales in the three categories other than miscellaneous was $85.50, so the sales of miscellaneous items was $14.50. Choice (B) is true.
- In 2008, the ratio of the sales of kitchen appliances to the sales of TVs was 40:20 = 2:1. In 2010, the ratio was 42:21 = 2:1. Choice (C) is false.
- We know that twice as many laptops were sold as desktops, but without knowing the prices of laptops and desktops, we cannot determine how their sales compared. Choice (D) could be true but is not necessarily true.
- Note that since there can be only one correct answer, once you know that choice (B) is tue, you do not have to check choices (C) and (D).

31. 25 Assume that a quart of milk used to cost $1 and that now it costs $1.20 (20% more). Then 30 quarts of milk used to cost $30. How many quarts of milk costing $1.20 each can be bought for $30? 30 ÷ 1.20 = **25**.

32. 3.65

- If Ken drives the 209 miles at 60 miles per hour, his gas mileage will be 22 miles per gallon. So he will use 209 ÷ 22 = 9.5 gallons of gas.
- If Ken drives the 209 miles at 50 miles per hour, his gas mileage will be 25 miles per gallon. So he will use 209 ÷ 25 = 8.36 gallons of gas.
- When driving at 60 miles per hour, Ken will use 9.5 − 8.36 = 1.14 gallons more and will spend 1.14 × $3.20 = $3.648 ≈ **$3.65** more than if had he driven at 50 miles per hour.

33. **4.8** What we want here is the weighted average of the first 12 digits to the right of the decimal point in the expansion of π. The weights are the heights of the bars in the graph.

$$\frac{0\times0+2\times1+1\times2+1\times3+1\times4+3\times5+1\times6+0\times7+1\times8+2\times9}{12}$$

$$=\frac{0+2+2+3+4+15+6+0+8+18}{12}=\frac{58}{12}=\textbf{4.83}$$

Note that since you are given the expansion, you don't need to use the graph at all. You could just add the 12 digits to the right of the decimal point in the expansion and divide by 12.

$$(1+4+1+5+9+2+6+5+3+5+8+9) \div 12 = 58 \div 12 = \textbf{4.83}$$

34. **6.4** Since the average size of his 128 files is 256 megabytes, the total amount of data John has to transfer is $128 \times 256 = 32{,}768$ megabytes, which is equal to $32{,}768 \div 1024 = 32$ gigabytes. Since it takes 12 minutes to transfer 1 gigabyte of data and since 12 minutes is one-fifth of an hour, John can transfer 5 gigabytes of data per hour. So it will take $32 \div 5 = \textbf{6.4}$ hours to transfer all the data.

35. **11** If the graph of a function crosses the x-axis at n, then $(n, 0)$ is a point on the graph, $f(n) = 0$, and $x - n$ is a factor of $f(x)$. So $(x-1)$, $(x-2)$, and $(x-3)$ are all factors of $f(x)$, as is their product:

$$(x-1)(x-2)(x-3) = (x^2-3x+2)(x-3) = x^3-6x^2+11x-6$$

Since $a = 1$, $f(x)$ has to be equal to $x^3-6x^2+11x-6$. Thus $b = -6$, $c = \textbf{11}$, and $d = -6$.

36. **.866** Let x be the length of the third side and use the Pythagorean theorem to find the value of x:

$$5^2 + x^2 = 10^2 \Rightarrow x^2 = 100 - 25 = 75 \Rightarrow x = \sqrt{75} \approx 8.66$$

Then the side opposite the smallest angle is 5, the side adjacent to the smallest angle is 8.66, and the hypotenuse is 10.

So the cosine of the smallest angle $= \dfrac{\text{adjacent}}{\text{hypotenuse}} = \dfrac{8.66}{10} = \textbf{.866}$.

37. **40** From the first graph, we see that 25% of the conference's 800 participants came from Massachusetts. From the second graph, we see that 20% of the Massachusetts participants were high school teachers. So the number of high school teachers from Massachusetts was

$$20\% \text{ of } 25\% \text{ of } 800 = 0.20 \times 0.25 \times 800 = \textbf{40}$$

38. **30** Of the 800 participants, 25% of them, or 200, came from Massachusetts. The other 600 participants came from states other than Massachusetts. Of those 600 non-Massachusetts participants, $\dfrac{4}{15}(600) = 160$ of them were elementary school teachers. In addition, 80 of the delegates from Massachusetts (40% of 200) were elementary teachers. So in total, $160 + 80 = 240$ of the 800 conference delegates were elementary school teachers, and $240 \div 800 = 0.30 = \textbf{30\%}$.

SCORE ANALYSIS

Reading and Writing Test

Section 1: Reading   _____ = _____ (A)
   # correct   raw score

Section 2: Writing   _____ = _____ (B)
   # correct   raw score

To find your Reading and Writing test scores, consult the chart below: find the ranges in which your raw scores lie and read across to find the ranges of your test scores.

_____ + _____ = _____ (C)
range of reading   range of writing   range of reading + writing
  test scores   test scores   test scores

To find the range of your Reading and Writing Scaled Score, multiply (C) by 10.

Test Scores for the Reading and Writing Sections

Reading Raw Score	Writing Raw Score	Test Score
44–52	39–44	35–40
36–43	33–38	31–34
30–35	28–32	28–30
24–29	22–27	24–27
19–23	17–21	21–23
14–18	13–16	19–20
9–13	9–12	16–18
5–8	5–8	13–15
less than 5	less than 5	10–12

Math Test

Section 3:   _____ = _____ (D)
   # correct   raw score

Section 4:   _____ = _____ (E)
   # correct   raw score

Total Math raw score: (D) + (E) = _____

To find your Math Scaled Score, consult the chart below: find the range in which your raw score lies and read across to find the range for your scaled score.

Scaled Scores for the Math Test

Raw Score	Scaled Score	Raw Score	Scaled Score
50–58	700–800	20–25	450–490
44–49	650–690	15–19	400–440
38–43	600–640	11–14	350–390
32–37	550–590	7–10	300–340
26–32	500–540	less than 7	200–290