

Chapter 13
Practice Test 6

Reading Test

65 MINUTES, 52 QUESTIONS

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

DIRECTIONS

Each passage or pair of passages below is followed by a number of questions. After reading each passage or pair, choose the best answer to each question based on what is stated or implied in the passage or passages and in any accompanying graphics (such as a table or graph).

Questions 1–10 are based on the following passage.

The following passage is from Charlotte Brontë, *Shirley*, originally published in 1849. Robert Moore is a mill owner and Reverend Helstone is the local parson.

Cheerfulness, it would appear, is a matter which depends fully as much on the state of things within as on the state of things without and around us. I make this trite remark, because I happen to know that Messrs. Helstone and Moore trotted forth from the mill-yard gates, at the head of their very small company, in the best possible spirits. When a ray from a lantern (the three pedestrians of the party carried each one) fell on Mr. Moore's face, you could see an unusual, because a lively, spark dancing in his eyes, and a new-found vivacity mantling on his dark physiognomy; and when the rector's visage was illuminated, his hard features were revealed all agrin and ashine with glee. Yet a drizzling night, a somewhat perilous expedition, you would think were not circumstances calculated to enliven those exposed to the wet and engaged in the adventure. If any member or members of the crew who had been at work on Stilbro' Moor had caught a view of this party, they would have had great pleasure in shooting either of the leaders from behind a wall: and the leaders knew this; and the fact is, being both men of steely nerves and steady-beating hearts, were elate with the knowledge.

I am aware, reader, and you need not remind me, that it is a dreadful thing for a parson to be warlike; I am aware that he should be a man of peace. I have some faint outline of an idea of what a clergyman's mission is amongst mankind, and I remember distinctly whose servant he is, whose message he delivers, whose example he should follow; yet, with all this, if you are a parson-hater, you need not expect me to go along with you every step of your dismal, downward-tending, unchristian road; you need not expect me to join in your deep anathemas, at once so narrow and so sweeping, in your poisonous rancour, so intense and so absurd, against "the cloth;" to lift up my eyes and hands with a Supplehough, or to inflate my lungs with a Barraclough, in horror and denunciation of the diabolical rector of Briarfield.

He was not diabolical at all. The evil simply was—he had missed his vocation. He should have been a soldier, and circumstances had made him a priest. For the rest, he was a conscientious, hard-headed, hard-handed, brave, stern, implacable, faithful little man; a man almost without sympathy, ungentle, prejudiced, and rigid, but a man true to principle, honourable, sagacious, and sincere. It seems to me, reader, that you cannot always cut out men to fit their profession, and that you ought not to curse them because their profession sometimes hangs on them ungracefully. Nor will I curse Helstone, clerical Cossack as he was. Yet he was cursed, and by many of his own parishioners, as by others he was adored—which is the frequent fate of men who show partiality in friendship and bitterness in enmity, who are equally attached to principles and adherent to prejudices.

CONTINUE

Helstone and Moore being both in excellent spirits, and united for the present in one cause, you would expect that, as they rode side by side, they would converse amicably. Oh no! These two men, of hard, bilious natures both, rarely came into contact but they chafed each other's moods. Their frequent bone of contention was the war. Helstone was a high Tory (there were Tories in those days), and Moore was a bitter Whig—a Whig, at least, as far as opposition to the war-party was concerned, that being the question which affected his own interest; and only on that question did he profess any British politics at all. He liked to infuriate Helstone by declaring his belief in the invincibility of Bonaparte, by taunting England and Europe with the impotence of their efforts to withstand him, and by coolly advancing the opinion that it was as well to yield to him soon as late, since he must in the end crush every antagonist, and reign supreme.

1

Which choice best summarizes the passage?

A) A character becomes increasingly hostile as he travels with his fellow associate.

B) A character describes his reasons for disliking another character.

C) Two characters in the same profession become increasingly competitive.

D) Two characters traveling together eagerly await confrontation.

2

The main purpose of the opening sentence of the passage is to

A) show the contrast between the clergymen's cheerfulness and the narrator's gloom.

B) provide an allegorical representation of the clergymen's journey.

C) issue a general statement that helps to clarify the characters' emotional states.

D) characterize the narrator's perspective on the characters' violent intentions.

3

During the course of the second paragraph, the narrator's focus shifts from

A) assessment of the reader's sentiment to the desire to chastise the clergymen.

B) acknowledgment that clergymen should be peaceful to admonition for anti-clergy prejudices.

C) reflection on the clergymen's behaviors to identification of their manners and appearance.

D) generalization about peaceful men to the details of two particular clergymen.

4

The references to "rancour" and "denunciation" at the end of the second paragraph mainly have which effect?

A) They reflect the narrator's fear of clergymen.

B) They reveal the reader's empathetic understanding of clergymen.

C) They illustrate the narrator's sense of dismay at clergymen.

D) They capture the reader's potential sense of disapproval of clergymen.

5

The passage indicates that Moore's behavior is mainly characterized by

A) attitudes that do not align with his profession.

B) indignation at his travel partner's political views.

C) a willingness to engage in confrontation.

D) impatience with his travel partner's apparent superiority.

CONTINUE

6

The passage indicates that while the narrator acknowledges a certain evil in the third paragraph, Helstone is actually a

A) sympathetic clergyman.

B) harmless soldier.

C) righteous citizen.

D) ruthless warmonger.

7

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

A) Lines 7–14 ("When . . . glee")

B) Lines 24–26 ("I am . . . peace")

C) Lines 42–47 ("For the . . . sincere")

D) Lines 51–56 ("Yet he . . . prejudices")

8

At the end of the third paragraph, the comparison of Helstone to a Cossack mainly has the effect of

A) illustrating his nature as soldier-like.

B) suggesting the likelihood of an altercation.

C) contrasting the natures of the two men.

D) conveying the belligerence of a course of action.

9

The passage indicates that, despite their excellent spirits, the men sometimes found each other's company to be

A) intolerable.

B) mundane.

C) vexing.

D) comforting.

10

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

A) Lines 5–7 ("Helstone . . . spirits")

B) Lines 21–23 ("and the . . . knowledge")

C) Lines 60–62 ("These . . . moods")

D) Lines 63–65 ("Helstone . . . Whig")

CONTINUE

Questions 11–21 are based on the following passage and supplementary material.

This passage is excerpted from John W. Murphy and John T. Pardeck, "The Current Political World-View, Education and Alienation," originally published in 1991.

In American society everything is a commodity and education is no exception. Of course, this means that every aspect of life is assumed to have a cash value and can be purchased for the right price. Also, every person is a consumer, who enters the marketplace searching for a bargain. Although this scenario may be appropriate for describing the sale of shoes, when education is approached as a commodity the learning process may be seriously compromised.

Nonetheless, most students view education to be a product they are buying. Like good customers, students expect their education to meet their needs and assume a form they find palatable. Accordingly, students demand to have a significant amount of control over their education, so as to guarantee the most favorable outcome possible. On the other hand, administrators must offer a competitive product, or revenues will decrease. Yet is the image of a buyer confronting a seller appropriate to describe how students should relate to their school? The claim at this juncture is that education should not be exchanged in a manner similar to other products. Indeed, the worth of education is depreciated by this demarche.

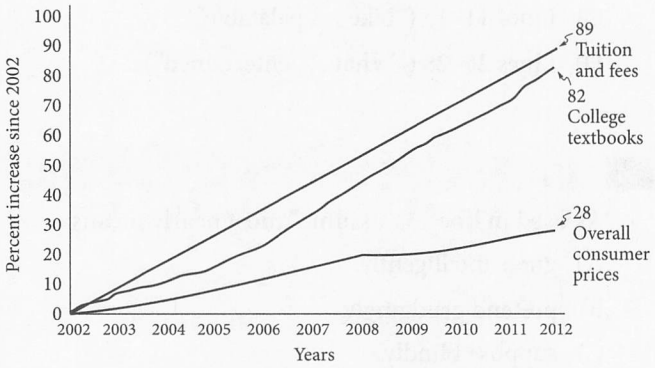
In what ways do students participate in their education? Usually their desires are voiced in the form of teacher evaluations. What is mostly revealed by this process is that students want, and demand, to be entertained. Like a competent sales representative, a teacher must be attractive, witty and capable of gaining and retaining the attention of students. Additionally, material must not be dull or require much effort, or students will quickly become aggravated. For as every astute businessman knows, customers do not want to be hassled. Securing a favorable evaluation, therefore, requires that a teacher adopt the demeanor of the television personalities who are invoked constantly to sell products to students.

Also similar to wise consumers, students strive to make the best deal possible. Translated into economic terms, this means that the greatest rewards should be gained through the least amount of effort. Hence preparing students to take exams, organizing both their work and leisure time and summarizing their reading assignments have become very profitable businesses. Entrepreneurs who provide these and other services are well known to students. On the other hand, cheating has become rampant. Consistent with the ethos of consumerism, achieving some sort of advantage is considered to be essential to beating the competition. Unfortunately the view has been conveyed that only through a series of dubious maneuvers can success be attained. In this climate, why should the message that becoming educated is hard work find a receptive audience?

From an administrative perspective, the curriculum offered by a school must be competitive. Creating an enticing array of courses is considered to be indispensable to attracting students and keeping enrollment figures high. Hence capitalizing on fads has become normative, as witnessed by the recent proliferation of degrees and courses with captivating titles. In fact, many schools hire high paid advertising consultants to develop promotional material and discover untapped markets.

But education is trivialized when it is treated as a commodity. Content, in short, is replaced by form, for flash and glitter sell products. Difficult subjects are avoided, while the term relevant is reserved to describe the trendy courses that administrators have begun to promote. Clearly the integrity of education is jeopardized when educational policies are dictated by the vagaries of the marketplace and ephemeral imagery is used to describe profound ideas that can be understood only through dedicated study.

Estimated Increases in New College Textbook Prices, College Tuition and Fees, and Overall Consumer Price Inflation, 2002–2012



Excerpted from the Government Accountability Office report to Congressional Committees from June 2013.

CONTINUE

11

The main purpose of the passage is to

A) advocate for the marketing of education to students.

B) argue a position on a decidedly complex topic.

C) weigh the merits of educational products in the marketplace.

D) evaluate statistics about treating education as a commodity.

12

In the passage, the author makes which concession to the view that every person is a consumer in the marketplace of life?

A) The implied contract which exists between buyer and seller has educational value.

B) It may be valid when one is discussing the sale of some types of goods.

C) Students and administrators benefit from negotiating over the price of higher education.

D) A person engages with all aspects of a product when he or she assigns it monetary value.

13

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

A) Lines 2–4 ("Of course . . . price")

B) Lines 6–9 ("Although . . . compromised")

C) Lines 11–13 ("Like . . . palatable")

D) Lines 26–28 ("What . . . entertained")

14

As used in line 13, "assume" most nearly means

A) guess intelligently.

B) pretend grudgingly.

C) suppose blindly.

D) take on readily.

15

The main purpose of the 4th paragraph (lines 38–54) is to

A) concede the logic of an attitude with which the author disagrees.

B) demonstrate that cheating results in serious consequences later in life.

C) provide a contrast to the view of teachers as salesmen.

D) argue against cheating or the use of educational preparation businesses.

16

As used in line 57, "enticing" most nearly means

A) pulling.

B) deceptive.

C) appealing.

D) suggestive.

17

Which choice best supports the authors' claim that schools have already begun to incorporate some facets of the popular marketplace into their educational materials?

A) Lines 16–18 ("On the…decrease")

B) Lines 59–62 ("Hence…titles")

C) Lines 65–66 ("But education…commodity")

D) Lines 67–70 ("Difficult…promote")

CONTINUE

18

The main idea of the final paragraph is that

A) focus on profit can undermine the effectiveness of true education.

B) ephemeral imagery cannot lead to an understanding of complex ideas.

C) education seems unimportant when it is present in the economic marketplace.

D) modern educators ignore difficult subjects in favor of trendy topics.

19

Data in the graph about estimated increases in prices from 2002 to 2012 most strongly supports which of the following statements?

A) Overall consumer prices increased the same amount each year.

B) Overall consumer prices have not increased in the

perceptions.

) Content is replaced by flashy slogans.

20

Data in the graph indicate that the greatest difference between the percent increase since 2002 of college tuition and fees and that of overall consumer prices occurred during which period?

A) 2004 to 2005

B) 2008 to 2009

C) 2010 to 2011

D) 2011 to 2012

21

Data in the graph provides most direct support for what idea in the passage?

A) Schools are interested in revenue.

B) Students have an expectation that school should be entertaining.

C) Teacher evaluations reflect the students'

period since 2002.

C) Percent increases in college tuitions and fees exceed those of consumer prices.

D) Prices of college textbooks decreased from 2005 to 2006.

D

CONTINUE

Questions 22–32 are based on the following passages.

Passage 1 is adapted from Connie Weaver, et al., "Contributions to Nutrition." ©2014 by the American Society for Nutrition. Passage 2 is from David Stuckler and Marion Nestle, "Big Food, Food Systems, and Global Health." ©2012 by PLOS Medicine.

Passage 1

Both fresh and processed foods make up vital parts of the food supply. Processed food contributes to both food security (ensuring that sufficient food is available) and nutrition security (ensuring that food quality meets human nutrient needs) . . . .

Nutrition scientists, public health professionals, agricultural economists, food scientists, and other professionals dedicated to meeting the food and nutritional needs of people around the globe recognize that fresh, local foods cannot meet all nutritional requirements. Food processing is necessary . . . .

Although nutritional security (quality) and food security (quantity) both depend on food processing, in recent years there has been considerable public controversy over the nutritional contribution that processed foods make to the American diet . . . .

If enrichment and fortification were not present, large percentages of the population would have had inadequate intakes of vitamins A, C, D, and E, thiamin, folate, calcium, magnesium, and iron. When nutrients from enrichment and fortification were included, the percentages of the population with inadequate intakes decreased substantially for vitamin A, vitamin D, folate, and iron . . . .

Clearly, this type of food processing, of adding nutrients to foods, has greatly benefitted nutrient intakes in the United States . . . .

Thus, processed foods are nutritionally important to American diets. How, then, do we enhance the contribution of processed food to nutritional security and food security? . . .

Rather than limiting processed foods in the diet, it may be more productive to encourage the best available food options, namely, those that provide fewer constituents to limit and more nutrients to encourage for the calories consumed . . . .

One disadvantage of commercial food processing techniques is that they are poorly understood. Commercial food processing involves techniques that are difficult for the general public to grasp and that are out of their control, thus introducing a lack of transparency and generating suspicion and concerns about safety in some individuals . . . .

In addition, concerns about the nutritional content and other aspects of the production of processed foods, such as sustainability and cost, have led to criticisms of processed foods as "ultra-processed" and not compatible with good nutrition. However, the type and extent of processing do not necessarily correlate with the nutritional content of the product.

Passage 2

Global food systems are not meeting the world's dietary needs. About one billion people are hungry, while two billion people are overweight. Underlying both is a common factor: food systems are not driven to deliver optimal human diets but to maximize profits.

To understand who is responsible for these nutritional failures, it is first necessary to ask: *Who rules global food systems?* By and large it's "Big Food," by which we refer to multinational food and beverage companies with huge and concentrated market power. Three-fourths of world food sales involve processed foods, for which the largest manufacturers hold over a third of the global market.

We see three possible ways to view this debate. The first favors voluntary self-regulation, and requires no further engagement by the public health community. The second view favors partnerships with industry.

The third approach is critical of both. It recognizes the inherent conflicts of interest between corporations that profit from unhealthy food and public health collaborations. Because growth in profit is the primary goal of corporations, self-regulation and working from within are doomed to fail.

We support the critical view, for several reasons. Any partnership *must* create profit for the industry, which has a legal mandate to maximize wealth for shareholders. We also see no obvious, established, or legitimate mechanism through which public health professionals might increase Big Food's profits.

Big Food attains profit by expanding markets to reach more people, increasing people's sense of hunger so that they buy more food, and increasing profit margins through encouraging consumption of

CONTINUE

products with higher price/cost surpluses. Although in theory minimal processing of foods can improve nutritional content, in practice most processing is done so to increase palatability, shelf-life, and transportability, processes that reduce nutritional quality.

To promote health, industry would need to make and market healthier foods so as to shift consumption away from highly processed, unhealthy foods. Yet, such healthier foods are inherently less profitable. The only ways the industry could preserve profit is either to undermine public health attempts to tax and regulate or to get people to eat more healthy food while continuing to eat profitable unhealthy foods. Neither is desirable from a nutritional standpoint.

22

The authors of Passage 1 indicate which of the following about the addition of nutrients to foods?

A) It has a helpful impact.

B) It should be increased significantly.

C) It may require further investigation.

D) It gives people unnecessary extra vitamins.

23

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

A) Lines 2–5 ("Processed . . . needs")

B) Lines 29–31 ("How, then . . . security")

C) Lines 32–34 ("Rather . . . options")

D) Lines 37–38 ("One disadvantage . . . understood")

24

The authors of Passage 1 indicate that food enrichment methods

A) often involve industrial machinery.

B) lead to employment opportunities.

C) are the leading source of thiamin.

D) are not comprehended by all people.

25

As used in line 40, "grasp" most nearly means

A) comprehend.

B) clutch.

C) squeeze.

D) reach.

26

The authors of Passage 2 refer to "Big Food" primarily to suggest that global food systems

A) result from a varied, competitive marketplace.

B) involve regions served by single companies.

C) should be simplified through local markets.

D) are largely dominated by a few extremely influential companies.

27

According to the authors of Passage 2, what do profit margins and price/cost surpluses have in common?

A) They typically coincide with ethical practices.

B) They are more important than other concerns held by companies.

C) They are key elements of economic theory.

D) They are best increased through expanding markets.

28

The possibilities offered in the final paragraph (lines 90–98) of Passage 2 have primarily which effect?

A) They show the only ways that industry could promote health.

B) They demonstrate the unlikelihood of industry marketing healthier foods.

C) They refer to government controls to illustrate excessive regulation.

D) They supply positive steps to emphasize the impossibility of corporate charity.

CONTINUE

29

The main purpose of each passage is to

A) support a side in an argument about whether to promote vitamin intake through food.

B) discuss the nature of large-scale food production as it relates to nutrition.

C) compare the need for food security with the desire for nutrition security in the American diet.

D) emphasize the importance of sustainable processing in certain foods of the American diet.

30

Which choice best describes the relationship between the two passages?

A) Passage 2 discusses the underlying processes of a solution that Passage 1 describes in specific detail.

B) Passage 2 presents a plan to clarify the several misunderstood processes presented by Passage 1.

C) Passage 2 outlines an objective perspective that clashes with the opinions discussed in Passage 1.

D) Passage 2 explores the problematic nature of a system embraced by Passage 1.

31

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

A) A thorough discussion of global food systems and content should address adequate nutrition.

B) Well-prepared, non-processed meals are generally more appealing than most processed foods.

C) Previous discussions of nutrition contained less suspicion of processed foods than those discussions do today.

D) People who avoid processed foods due to nutrient concerns are unlikely to be overweight.

32

Which choice provides the best evidence that the authors of Passage 2 would acknowledge some aspect of the statement made in lines 48–50 of Passage 1?

A) Lines 61–63 ("Three-fourths . . . market")

B) Lines 80–84 ("Big Food . . . surpluses")

C) Lines 84–89 ("Although . . . quality")

D) Lines 90–92 ("To promote . . . foods")

CONTINUE

Questions 33–42 are based on the following passage.

This passage is adapted from W.H. Harvey, "A Common Sense Speech," given in 1895. Harvey was an author and political activist who supported bimetallism, a monetary standard in which the value of money is based on the value of both silver and gold.

We believe that bimetallism, that relies on two metals for money, is a better policy than one that relies on only one metal. We do not pretend to say that the Line intelligence of mankind may not find a better system 5 than both of them, but we do say that to demonetize either of these metals is a step backward and not a step forward.

Bimetallism is the right to use either gold or silver as primary money. Thus, under such a law, if our 10 trade relations or the laws of other nations take our gold away, then we have silver, and no serious injury occurs. And the same saving principle applies if our silver should leave us and gold remained. The vital principle in bimetallism is the right to use either metal. 15 If production grows less on one, we have the other, and the two together furnish a more stable supply of money material than either alone can furnish. With only one of them for money, the contraction and expansion of the world's supply alternating as they will, make 20 an uncertain and unstable supply. Of the two metals, dollar for dollar, sixteen parts of silver to one part of gold, silver is the most useful of the two, is applied to the most uses and is the most serviceable of the two metals.

25 The principle that it is safer to rely for money on two metals than on one, is a principle that we carry into everyday life. We rely on wheat, corn and rice for bread, on beef, pork and mutton for meat. If one is scarce, we use the other. It is also a principle 30 recognized by the Unseen Power that made us. We have two eyes, each to relieve the strain upon the other; two ears, two arms, two legs, for the same reason. We have one head, but two lobes of the brain; one heart, but two ventricles and two sets of veins; 35 one chest, but two lungs; two functions to relieve the organs of digestion; the mouth and nose are both dual in construction. Creation itself is dual in the marriage relation. I remind you of these simple facts in nature to teach the simple lesson, that in providing for money 40 it was simplicity and wisdom to provide that money could be made from two metals, one to relieve the strain upon the other, and the volume of both to be drawn upon to meet the demand for money.

In 1873, the law was changed and gold only was 45 made primary money. The mints were left open to the free coinage of gold, but closed as to the free coinage of silver. An unlimited demand for gold for use as money was left in operation. The unlimited coinage of silver was stopped. One of the main arteries feeding blood 50 to civilization was cut off. The doctor was to have no option to pay in money made from either of these metals. He was to be limited to gold alone.

One of the fundamental principles of a popular government was violated in making the change. The 55 consent of the people was not obtained—the consent of the governed—that principle pronounced in the Declaration of Independence. It was not discussed in any campaign, and it was not known to the people for over two years afterward. The editors and the 60 newspaper reporters did not know it. It was done surreptitiously. I have not time to dwell upon this dark page of our history and cover what else I want to in this speech. I want to dispose of it in this way: Silver was demonetized February 12, 1873. I now offer 65 a reward of $100 to any man who will find a word about it in any newspaper published in the month of February, 1873. You will find the newspapers of that year in your public library.

Citizens, your country needs your intelligent and 70 unselfish action! You have ears and you can hear! You have eyes and you can see! Our institutions are crumbling around us! Palliatives are being used to make you acquiesce in your poverty! Do not delay your action. We have waited too long already.

CONTINUE

33

The central problem that Harvey describes in the passage is that the United States government had

A) faced a financial deficit, which negatively impacted the growth of the country's industries.

B) previously made silver the primary money of the country, which led to a decline in gold coinage.

C) publicly announced that it would cease some production of silver coinage, which violated citizen rights.

D) instituted a monetary system in which only one metal was coined, which left the country economically vulnerable.

34

Harvey uses the phrase "saving principle" (line 12) mainly to emphasize what he sees as

A) a check on excessive spending.

B) a consequence of overreliance on one currency.

C) protection against a fluctuating money supply.

D) the U.S. Treasury's current policy.

35

As used in line 13, "vital" most nearly means

A) invigorating.

B) restorative.

C) steady.

D) fundamental.

36

Harvey contends that the decision to rely on one metal for money is unwise because

A) silver's value is sixteen times greater than that of gold.

B) gold has proven more useful than silver.

C) both metals' availability increases and decreases.

D) U.S. trading partners prefer bimetallism.

37

Which choice provides the best evidence for the answer to the above question?

A) Lines 17–20 ("With . . . supply")

B) Lines 20–24 ("Of the . . . metals")

C) Lines 29–30 ("It is . . . us")

D) Lines 72–73 ("Palliatives . . . poverty")

38

The third paragraph (lines 25–43) is primarily concerned with establishing a comparison between

A) the seen and the unseen.

B) nature and economics.

C) symmetrical body parts.

D) gold and silver.

39

As used in line 31, "strain" most nearly refers to

A) an excessive demand.

B) a bodily injury.

C) a forceful action.

D) a specific lineage.

40

Harvey claims that which of the following was a result of government action?

A) The unlimited mining of gold

B) The reduced production of silver coins

C) The reliance of Americans on staple crops

D) The establishment of beneficial trade relations

CONTINUE

41

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

A) Lines 8–12 ("Bimetallism . . . occurs")

B) Lines 27–29 ("We rely . . . other")

C) Lines 44–47 ("In 1873 . . . silver")

D) Lines 50–52 ("The doctor . . . alone")

42

It can be reasonably inferred that Harvey mentions "a popular government" (lines 53–54) in order to

A) recognize leaders who follow citizens' desires.

B) criticize leaders who conceal actions from the public.

C) applaud leaders who take decisive action.

D) denounce leaders who unfairly tax the poor.

CONTINUE

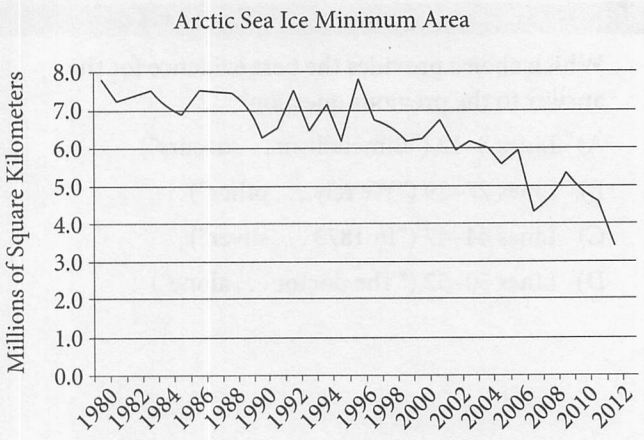
Questions 43–52 are based on the following passage and supplementary material.

The following excerpt is adapted from Ramez Naam, "Arctic Sea Ice: What, Why, and What Next." ©2012 by *Scientific American*.

On September 19th, NSIDC, the National Snow and Ice Data Center, announced that Arctic sea ice has shrunk as far as it will shrink this summer, and that the ice is beginning to reform, expanding the floating ice cap that covers the North Pole and the seas around it. The Arctic Sea Ice extent this September was far smaller than the previous record set in 2007. At 3.4 million square kilometers of ice coverage, this year's Arctic minimum was 800,000 square kilometers smaller than the 2007 record. That difference between the previous record and this year's is larger than the entire state of Texas. An ice-free summer in the Arctic, once projected to be more than a century away, now looks possible decades from now. Some say that it looks likely in just the next few years.

Conditions in the Arctic change dramatically through the seasons. In the depths of winter, the Earth's tilt puts the Arctic in 24 hour-a-day darkness. Temperatures, cold year round, plunge even lower. The sea surface freezes over. At the height of summer, the opposite tilt puts the Arctic in 24 hour-a-day sunlight. While it's a cold, cold place even at these times, the constant sunshine, warmer air, and influx of warm waters from further south serve to melt the ice. The ice cap usually starts shrinking in March, and then reaches its smallest area in mid-September, before cooling temperatures and shorter days start the water freezing and the ice cap growing once again.

When scientists and reporters talk about an ice-free Arctic, they're usually speaking of the Arctic in *summer*, and especially in September, when ice coverage reaches its minimum. The amount of ice left at that minimum has indeed been plunging. In 1980, the ice shrank down to just under 8 million square kilometers before rebounding in the fall. This year's minimum extent of 3.4 million kilometers is less than half of what we saw in 1980. Strikingly, two thirds of the loss of ice has happened in the 12 years since 2000. The ice is receding, and the process, if anything, appears to be accelerating.



Data: NSIDC. Graphic: Ramez Naam

Arctic sea ice coverage in September has dropped by half since 1980, and the drop appears to be accelerating.

As recently as a few years ago, most models of the Arctic ice anticipated that summers would remain icy until the end of the 21st century, and well into the 22nd century. But the trend line above makes that look unlikely. The amount of ice remaining, this year, is about the same as the ice *lost* between the mid-1990s and today. If ice loss continued at that pace, we'd see an ice-free summer sometime around 2030, give or take several years.

Is that plausible? Opinions differ substantially, even among climate scientists. At one end of the spectrum are those who see the ice lasting in summer for another 20 or 30 years, or perhaps even a bit longer. For example, Lars-Otto Reierson, who leads the Arctic Monitoring and Assessment Programme told Reuters that most models predict the summer ice disappearing by 2030 or 2040. Similarly, a paper published this year in *Geophysical Research Letters* by multiple scientists, including several from the National Snow and Ice Data Center, found that an ice-free summer in the Arctic in the "next few decades" was a "distinct possibility." A recent assessment from Muyin Wang at the University of Washington and James Overland at the National Oceanographic and Atmospheric Administration, using the most up to date Arctic ice models and data, projected a nearly ice-free Arctic around 2030. And Cecilia Bitz, a professor of Atmospheric Sciences at the University of Washington at part of the Polar Science Center sees a 50/50 chance that the Arctic will be ice-free in summer in the next few decades.

CONTINUE

On the other end of the spectrum are those who think the melt could happen much sooner. Peter Wadhams, who leads the Polar Ocean Physics Group at the University of Cambridge, has predicted since 2008 that the Arctic ice could be gone in summer by 2015. He now believes there's a chance that it could happen even sooner. Similarly, Mark Drinkwater, the European Space Agency's senior advisor on polar regions and a mission scientist for the CryoStat satellite that measures arctic ice, believes that the Arctic could be ice-free in September by the end of this decade.

When will the ice melt? While the range of possibilities is wide today, it's shrunk dramatically from just a few years ago, when most climate scientists expected the ice to survive through the 21st century. Now the question is whether it will be gone in decades —or in mere years.

43

The first paragraph serves mainly to

A) inform the reader that Arctic ice is starting to return.

B) compare the size of an Arctic area to a U. S. state.

C) illustrate dramatic changes in polar weather conditions over the last century.

D) present a trend that is occurring differently than expected.

44

As used in line 13, "projected" is closest in meaning to

A) hurled.

B) seen.

C) hypothesized.

D) illuminated.

45

According to Naam, the Earth's tilt is significant primarily because it

A) causes the sea surface to freeze and the ice cap to grow further.

B) accounts for seasonal differences in the Arctic.

C) explains why the ice-free summer is accelerating in recent years.

D) exposes the Arctic to constant daylight and melts portions of ice.

46

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

A) Lines 12–15 ("An ice-free . . . years")

B) Lines 16–21 ("Conditions . . . sunlight")

C) Lines 29–32 ("When . . . minimum")

D) Lines 37–40 ("Strikingly . . . accelerating")

47

As used in line 47, "pace" most nearly means

A) walk.

B) loss.

C) rate.

D) measure.

CONTINUE

48

Based on information in the passage, it can reasonably be inferred that climate scientists

A) agree that the polar ice is receding, but disagree about the rate of acceleration.

B) disagree that the polar ice is receding, but agree about the rate of deceleration.

C) are uncertain about whether the polar ice is receding, but agree that it should be studied.

D) are certain that the polar ice is receding, but cannot say whether it will rebound.

49

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

A) Lines 50–51 ("Is that . . . scientists")

B) Lines 57–61 ("Similarly . . . possibility"")

C) Lines 66–70 ("And Cecilia . . . decades")

D) Lines 77–81 ("Similarly . . . decade")

50

In the graph, which of the following periods displays the greatest decline in sea ice minimum area?

A) 1986–1987

B) 1995–1996

C) 2005–2006

D) 2011–2012

51

Which concept is supported by the passage and by the information in the graph?

A) The Arctic ice-free summer will be upon us within decades.

B) The Arctic ice-free summer may not be a scientific fact.

C) The Arctic ice-free summer may come sooner than the 22nd century.

D) The Arctic ice-free summer will not come as swiftly as some have predicted.

52

How does the graph support the author's point that Arctic ice is receding?

A) It shows that the change in ice from 2007 to 2012 is similar in size to the state of Texas.

B) It suggests that the amount of ice could drop to zero within a few years.

C) It indicates a loss of 3 million square kilometers of ice from 1980 to 1990.

D) It presents a trend of sharp and noticeable decline since 2000.

STOP

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.

No Test Material On This Page

Writing and Language Test

35 MINUTES, 44 QUESTIONS

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

DIRECTIONS

Each passage below is accompanied by a number of questions. For some questions, you will consider how the passage might be revised to improve the expression of ideas. For other questions, you will consider how the passage might be edited to correct errors in sentence structure, usage, or punctuation. A passage or a question may be accompanied by one or more graphics (such as a table or graph) that you will consider as you make revising and editing decisions.

Some questions will direct you to an underlined portion of a passage. Other questions will direct you to a location in a passage or ask you to think about the passage as a whole.

After reading each passage, choose the answer to each question that most effectively improves the quality of writing in the passage or that makes the passage conform to the conventions of standard written English. Many questions include a "NO CHANGE" option. Choose that option if you think the best choice is to leave the relevant portion of the passage as it is.

Questions 1–11 are based on the following passage.

A Dirty Job Worth Having

As people become more sensitive to the idea of preserving certain ecosystems, 1 yet more attention must be paid to the land. The central challenge of maintaining an ecosystem, especially by artificial means, is that ecosystems have a tendency to change, particularly with the dual influence of human 2 reacting and a

1

A) NO CHANGE
B) and
C) for
D) DELETE the underlined portion.

2

A) NO CHANGE
B) reacts
C) interacted
D) interaction

CONTINUE

rapidly altering climate. 3 Still, one career that has grown by leaps and bounds in the last fifty years is that of the soil conservationist, whose land-use surveys guide both public and private entities as to how to work within sustainable ecosystems.

Take, for example, the factors that must be considered 4 when building a beach house. Coastal areas are particularly susceptible to the influence of 5 things eroding because of the water from the ocean and in the air. In this context, a soil conservationist might be asked to conduct a survey of the region in order to determine where it would be safest to build. After all, one's dream house would not be quite so ideal if it were at constant risk of collapsing, shifting, or 6 to deteriorate with the ground beneath it.

3

A) NO CHANGE
B) Nonetheless,
C) Finally,
D) Therefore,

4

Which choice most effectively sets up the subject discussed in this paragraph?

A) NO CHANGE
B) in performing these tasks.
C) with the changes in the seasons.
D) if you are doing soil conservation.

5

A) NO CHANGE
B) erosion
C) what erodes
D) the process of erosion

6

A) NO CHANGE
B) deteriorating
C) deteriorate
D) structures deteriorating

CONTINUE

In more agricultural communities, the work of a soil conservationist might take a different form. Farmers, after all, are not necessarily concerned with building structures on the land—instead, they are concerned with land that will yield reliable crops. 7 In these cases, soil conservationists employ a variety of techniques. Of these techniques each in its way is geared toward preserving or reviving land where crops are grown. The goal in these situations is to mimic the biology of "virgin land," or land that has never been farmed. Soil conservationists might advise on farming techniques 8 or chemical supplements that can help the land produce to its full potential. With the efforts of soil conservationists, no-till farmlands, lands that are not farmed with traditional plowing implements, 9 which has grown dramatically, nearly doubling in the fifteen years since 2000.

7

Which choice most effectively combines the underlined sentences?

A) Soil conservationists, in these cases, are ways of preserving or reviving land where crops are grown, and they will use a variety of techniques to do it.

B) In these cases, each one of them is geared toward the idea of preservation or revival as to crops, and the soil conservationists employ a variety of techniques to that end.

C) Geared toward preserving or reviving land where crops are grown, soil conservationists in these cases employ a variety of different techniques.

D) In these cases, soil conservationists employ a variety of techniques, each in its way geared toward preserving or reviving land where crops are grown.

8

At this point, the writer is considering adding the following information.

—such as no-till or terrace methods—

Should the writer make this addition here?

A) Yes, because it demonstrates the advantages of the methods described later in the sentence.

B) Yes, because it gives specific instances of the techniques discussed in this sentence.

C) No, because it distracts from the sentence's main focus on soil conservationists.

D) No, because it provides an unnecessary detail that interrupts the sentence's flow.

9

A) NO CHANGE

B) which have

C) have

D) has

CONTINUE

Soil conservation can be applied to any ecosystem, but its details tend to be rather technical. As a result, most people who work as soil conservationists tend to study agricultural science or environmental studies in college. From there, however, the paths diverge. Clearly, someone working on the eastern seaboard would need a different knowledge base from that of someone working in the deserts of the Southwest, the **10** plains of the Midwest, or the forests of the Northwest. **11** In all cases, however, soil conservationists do truly fascinating work, seeking as they do to continue to strike the balance between natural spaces and the people who live in them.

10

A) NO CHANGE

B) areas without trees

C) plains-like ecosystems

D) barren wasteland

11

Which choice most clearly ends the passage with a restatement of the writer's claim?

A) NO CHANGE

B) In all of these places, soil conservationists do essential work, but just as much is required of the builders and contractors who accompany them.

C) Soil conservationists work in both the public and the private sectors, but the public is better because it can be enjoyed by all.

D) Because the desert is unique, the skills that soil conservationists learn in places like Arizona are valuable but difficult to transfer between regions.

CONTINUE

Questions 12–22 are based on the following passage.

A Bigger Piece of the Peace

—1—

Nobel Prizes have been given since 1901 as a way to honor outstanding achievements in Physics, Chemistry, Literature, Medicine, and Economics. There may be some controversy as to who earns these awards in many cases; 12 therefore, there can be no doubt that the winners are always accomplished in their fields and have contributed something significant to their 13 disciplines and the world at large.

12

A) NO CHANGE
B) for example,
C) however,
D) fittingly,

13

A) NO CHANGE
B) disciplines,
C) disciplines, it's
D) disciplines, for example

CONTINUE

—2—

The Nobel Peace Prize may be a good deal more controversial, but it is by no means any less significant. 14 The prize is given each year by the Norwegian Nobel Committee "to the person who shall have done the most or the best work for fraternity between nations, for the abolition or reduction of standing armies and for the holding and promotion of peace congresses." Time and again we see the 15 committee rewarded bravery in the face of adversity. This is a difficult thing to quantify, but the Peace Prize is as important as the other prizes and contributes to 16 their common goal: to make the world a better place.

14

At this point, the writer is considering adding the following sentence.

> One of the most important prizes of all time, the 1962 prize in Physiology, was given to Francis Crick, James Watson, and Hugh Wilkins for their discovery of the structure of DNA.

Should the writer make this addition here?

A) Yes, because it cites an important moment in Nobel Prize-giving history.

B) Yes, because it explains the typical genetic makeup of a Nobel Prize winner.

C) No, because it implies that all Peace Prize winners must also be scientists.

D) No, because it distracts from the paragraph's main focus on another prize.

15

A) NO CHANGE

B) committee reward

C) committee's rewarding

D) committees' reward

16

A) NO CHANGE

B) they're common goal,

C) they're common goal;

D) their common goal;

CONTINUE

—3—

It is probably no surprise that Martin Luther King, Jr., won the award in 1964 amid his non-violent campaign for civil rights in the United States. By 1964, and certainly by the time of his death in 1968, Baptist **17** minister King's, influence spanned the globe, not only for people of color seeking civil rights but also for all **18** those people's friends, family, and loved ones. King was also the first African-American man to gain this particular kind of stature in the United States and on the world stage.

—4—

19 When given to first-year President Barack Obama, there was a good deal more controversy surrounding the award in 2009. In this case as in the others, however, the Nobel Peace Prize seeks to award the intangible, the unquantifiable, and the hopeful. Whether Bunche, King, Obama, or the hundreds of other recipients, all winners provide the important reminder that people work every day to make the world a better place.

17

A) NO CHANGE
B) minister King's
C) minister, King's,
D) minister, King's

18

Which choice gives a specific supporting detail that is most similar to the details already in the paragraph?

A) NO CHANGE
B) the people throughout the world.
C) who thought the Nobel Prize should be awarded to someone who deserved it.
D) those who championed a cause in non-violent ways.

19

A) NO CHANGE
B) There was a good deal more controversy surrounding the award in 2009, when it was given to first-year President Barack Obama.
C) In 2009, when it was awarded, first-year President Barack Obama received the Prize with a good deal more controversy.
D) When it was awarded to first-year President Barack Obama in 2009, a good deal more controversy surrounded the award.

CONTINUE

—5—

King may be the most famous African-American recipient of the Nobel Peace 20 Prize. The honor was first given to a lesser-known but no less illustrious figure, Ralph Bunche, in 1950. After a difficult childhood punctuated by an illustrious educational and political career, Bunche was one of the many tasked with trying to resolve the Arab-Israeli conflict that had erupted after World War II. The work began with a scare, as the UN's appointee, the Swedish Count Folke Bernadotte, was assassinated by members of the underground Lehi group. After this tragic event, Bunche, Bernadotte's chief aide, became the UN's chief mediator, and his long negotiations began with the Israeli representative Moshe Dayan. These negotiations, many of which were done while the two men shot pool, became the 1949 Armistice Agreements, concluding the 1948 Arab-Israeli Conflict and earning Ralph Bunche 21 the Nobel Peace Prize from the year 1950.

Question 22 asks about the previous passage as a whole.

20

Which choice most effectively combines the sentences at the underlined portion?

A) Prize: the

B) Prize, while the

C) Prize for the

D) Prize, yet the

21

Which choice most closely matches the stylistic pattern established earlier in the sentence?

A) NO CHANGE

B) 1950's Nobel Prize for Peace.

C) the 1950 Nobel Peace Prize.

D) the Nobel Prize for 1950's Peace.

Think about the previous passage as a whole as you answer question 22.

22

To make the passage most logical, paragraph 5 should be placed

A) where it is now.

B) after paragraph 1.

C) after paragraph 2.

D) after paragraph 3.

CONTINUE

Questions 23–33 are based on the following passage and supplementary material.

Conserving the Trees that Conserve the Earth

The most obvious facet of global warming is the rise in global temperatures. What many do not understand quite as well, 23 however, are the factors that contribute to that rise in global temperatures. The rise in carbon dioxide (CO_2) levels, for instance, is commonly cited as a reason, but what exactly does this chemical compound do?

For instance, every time you breathe, you inhale oxygen and a number of other compounds, and you exhale CO_2. Factories, cars, and other heavy machinery perform 24 functions that could be called analogous on a much larger scale. Because of the heavy output from this wide variety of industrial sources, the Earth's atmosphere is bombarded 25. This excess carbon dioxide creates what is known as a greenhouse effect, wherein heat enters the atmosphere but not all of it leaves. CO_2 does not absorb

23

A) NO CHANGE
B) thereby,
C) correspondingly,
D) thus,

24

A) NO CHANGE
B) the functions of an analogy
C) functions that are like analogies
D) analogous functions

25

At this point, the writer is considering adding the following information

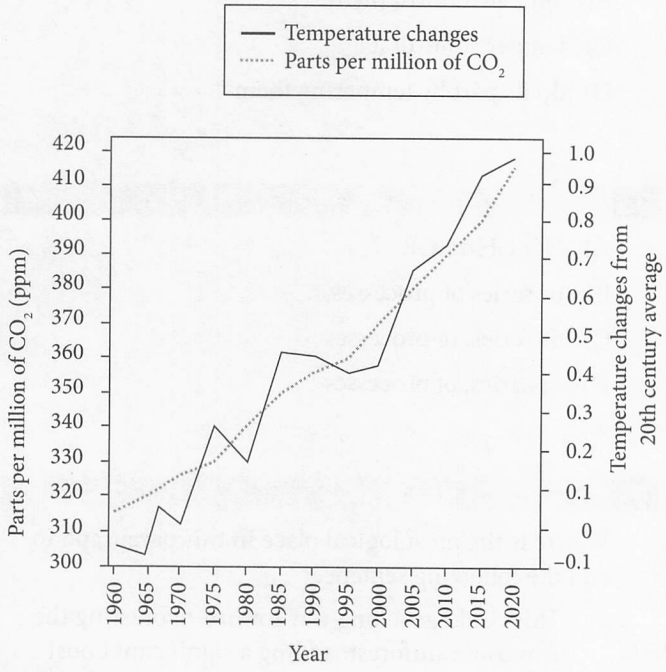
> with more CO_2 than it can process or release naturally back into the area outside the Earth's atmosphere

Should the writer make this addition here?

A) Yes, because it defines the role that the trees in the Amazonian rainforest play in modulating the Earth's CO_2 levels.
B) Yes, because it states why high levels of CO_2 can be a problem in the Earth's atmosphere.
C) No, because it mentions the process of absorbing CO_2, which blurs the essay's focus on the Amazonian rainforest.
D) No, because it undermines the passage's central claim that the Earth can absorb CO_2 naturally.

CONTINUE

heat energy from the Sun, but where the compound is concerned, 26 it's always absorbing heat energy released from the Earth. Here's the problem: while the carbon dioxide can release some of that heat into space, it also releases some back to the Earth, creating a kind of self-perpetuating cycle of rising temperatures. Since 1960, carbon dioxide has increased at a steady rate, 27 as temperatures have increased along exactly the same curve.



There are some earthly mechanisms to absorb and 28 chill out the levels of carbon dioxide in the atmosphere, but many of these industrial processes have depleted or overwhelmed these mechanisms. For instance, trees need carbon dioxide to perform their basic functions, but the number of trees required to offset carbon emissions is staggering. An independent analysis found that to offset the emissions of one modest coal plant operating in a small city in 29 Connecticut would then require 52 million trees!

26

A) NO CHANGE
B) its
C) they're
D) there

27

Which choice offers an accurate interpretation of the data in the chart?

A) NO CHANGE
B) but the temperatures have shown no general increase despite the rising CO_2 levels.
C) whereas the temperature changes peaked in 1989 for no apparent reason.
D) and although temperatures have fluctuated, those have generally increased as well.

28

A) NO CHANGE
B) kill
C) reduce
D) mellow

29

A) NO CHANGE
B) Connecticut, where it would
C) Connecticut would
D) Connecticut, it would

CONTINUE

Still, there are lots of trees on the Earth, and alongside many of the carbon caps that many countries and industries have begun to impose, people are starting to take the ideas of *re*forestation and conservation more seriously. A team of over 150 researchers produced the first comprehensive map of the Amazon rainforest's ecosystem and 30 said, "that half of the Amazon could be deforested by 2050.

[1] But there is a silver lining to the findings in this research. [2] Because of the team's efforts, as many as 57% of Amazon tree species could be eligible for the International Union for the Conservation of Nature's red list of threatened species. [3] Other polluting behaviors would need to change as well for significant emission reversals, but protecting the Amazon's trees could 31 temper some of those polluting behaviors in the meantime and into the future. [4] This could be a first major step in part of the much longer process, 32 or series, of processes, to get the Earth's carbon levels back to appropriate ranges. 33

30

A) NO CHANGE
B) said that
C) said, that
D) said—that

31

A) NO CHANGE
B) temper some of them
C) temper some of it
D) do its part by tempering them

32

A) NO CHANGE
B) or series of processes,
C) or series; of processes
D) or series, of processes

33

Where is the most logical place in this paragraph to add the following sentence?

> This could go a long way toward reforesting the Amazon rainforest, adding a significant boost to the 390 billion individual trees that currently grow there.

A) Before sentence 1
B) Before sentence 2
C) Before sentence 3
D) Before sentence 4

CONTINUE

Questions 34–44 are based on the following passage.

Original Adaptations and Rewrites

Literary influence can take many forms. Therefore, the results of this influence can take many forms—novels, poems, critiques, and countless others. Every great writer works within a literary tradition established by the great writers who came before. Sometimes that influence is 34 formal, in any case—as in the case of a writer who uses the forms created by an earlier writer to discuss new topics. Sometimes that influence is more literal—as in the case of those writers who take marginal characters from earlier works 35 and sometimes poems or movies are included.

[1] Perhaps the most famous instance of such a work is the epic blank-verse poem *Paradise Lost*, written by John Milton and first published in 1667. [2] It was by this alternate route, Milton claimed, that he could help to "justify the ways of God to men." [3] This work retells the biblical story of Adam and Eve and their exile from the Garden of Eden. [4] With the framework set by the biblical story, *Paradise Lost* offers a unique interpretation, 36 just as the story focuses on the fallen angel Satan rather than on the human characters. [5] As such, *Paradise Lost* is considered essential reading for those interested in matters both aesthetic and theological. 37

34

A) NO CHANGE
B) formal—
C) formal, nevertheless—
D) formal, therefore—

35

Which choice provides information that best supports the claim made by this sentence?

A) NO CHANGE
B) but don't cite the author's name at all.
C) and build new literary worlds around them.
D) yet still consider it entirely their own.

36

A) NO CHANGE
B) wherein
C) from which
D) into it

37

To make this paragraph most logical, sentence 2 should be placed

A) before sentence 1.
B) before sentence 3.
C) before sentence 4.
D) before sentence 5.

CONTINUE

The practice of adapting literary works, particularly the great classics of a 38 language; to unique ends has continued. The 1966 novel *Wide Sargasso Sea* was British author Jean Rhys's prequel to the 1847 novel *Jane Eyre*. Toward the end of *Jane Eyre*, it is revealed that one of the novel's central characters, Mr. Rochester, has a wife locked away in one of the rooms of his castle. Rhys's novel tells this wife's story, foregrounding the cruelty of British imperialism and the oppressive society that awaited women in England. As Milton had before, Rhys uses a well-known work to 39 overtake an alternate story.

More recently, Algerian writer Kamel Daoud 40 he adapted Albert Camus's novel *The Stranger* into his own unique work, *The Meursault Investigation*, first published in Algeria in 2013. Camus's novel centers on the protagonist Meursault, 41 who kills an anonymous Arab man for vague reasons. Daoud's novel starts with Camus's

38

A) NO CHANGE
B) language
C) language,
D) language—

39

A) NO CHANGE
B) tell
C) manifest
D) ideate

40

A) NO CHANGE
B) adapted
C) he adopted
D) adopted

41

A) NO CHANGE
B) he kills
C) whom killed
D) killing

CONTINUE

basic outline, but *The Meursault Investigation* is 42 more description than *The Stranger* in that it writes the backstory of that man and gives him a name, Musa. 43 Daoud's narrative follows the observations of Musa's brother Harun and offers a critique of European views that refuse to acknowledge the existence of non-Europeans. "By claiming your own name," Daoud said in an interview, "you are also making a claim of your humanity and thus the right to justice."

Although some of these works may not seem quite as "original" as the original texts, they in fact make literal what all other texts merely imply 44 and do not state. Daoud refers to his novel as part of a "dialogue with Camus," but we should not forget that even the greatest works of literature are speaking to someone.

42

A) NO CHANGE

B) more descriptive, than

C) more descriptive then

D) more descriptive than

43

At this point, the writer is considering adding the following sentence.

> The history of Franco-Algerian relations goes back centuries as France was the occupying colonial power in Algeria from 1830 to 1962.

Should the writer make this addition here?

A) Yes, because it situates Daoud's novel in an essential historical context.

B) Yes, because it gives an example of a global conflict that one writer might have drawn upon.

C) No, because it contradicts the passage's larger claim that literature cannot be defined by historical events.

D) No, because it strays from the paragraph's main focus with an idea that is not elaborated upon.

44

A) NO CHANGE

B) as well.

C) similarly.

D) DELETE the underlined portion, and end the sentence with a period.

STOP

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.

Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

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

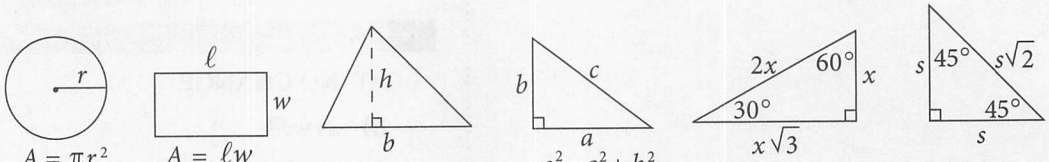
DIRECTIONS

For questions 1–15, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 16–20,** solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 16 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

NOTES

1. The use of a calculator **is not permitted**.
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated, the domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE



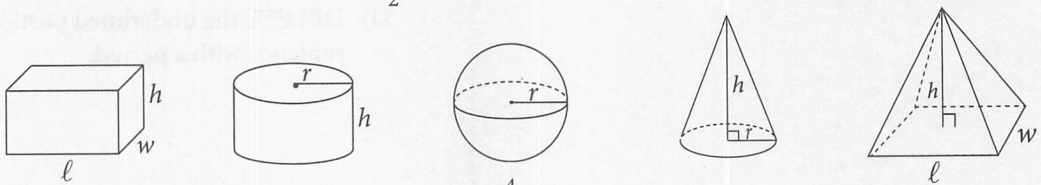
$A = \pi r^2$
$C = 2\pi r$

$A = \ell w$

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

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

Special Right Triangles



$V = \ell wh$

$V = \pi r^2 h$

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

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

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

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

CONTINUE

1

$$2x + 3y = -9$$
$$x - y = -2$$

Which of the following ordered pairs (x, y) satisfies the system of equations above?

A) $(-3, -1)$

B) $(-1, -3)$

C) $(1, 3)$

D) $(3, 1)$

2

$$x = 4(x + y)$$

If (x, y) is a solution to the equation above and $x \neq 0$, what is the value of $\frac{y}{x}$?

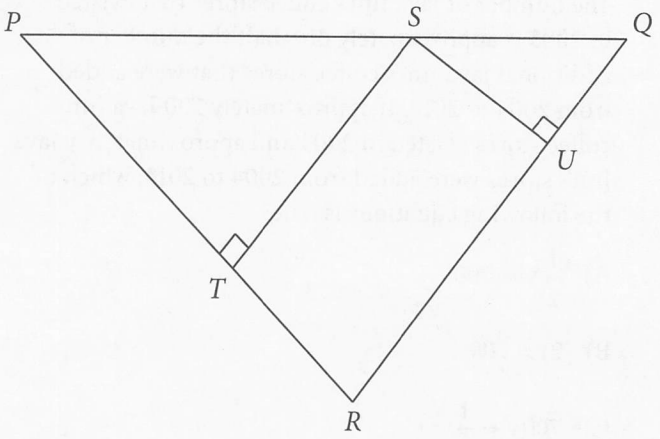
A) $\frac{3}{4}$

B) $\frac{1}{4}$

C) $-\frac{3}{4}$

D) $-\frac{5}{4}$

3



Note: Figure not drawn to scale.

Triangle PQR is isosceles with $PR = QR$ and $PQ = 64$. If the ratio of ST to $SU = 5{:}3$, what is the length of $\overline{SQ}$?

A) 8

B) 24

C) 32

D) 40

4

Buster estimates the expected profit, in dollars, from one week's operation of his family's chocolate-covered banana stand using the expression $4bd - 200$, where b is the number of bananas expected to be sold at the banana stand each day, and d is the number of days the banana stand will be open during that week. Which of the following is the best interpretation of the number 4 in the expression?

A) There will be 4 chocolate-covered bananas sold at the stand each day.

B) The price of a banana increases by \$4 every day.

C) The number of customers will increase by a factor of 4 every day.

D) The banana stand charges \$4 for each chocolate-covered banana.

CONTINUE



5

The number of Java Jim's coffee stores that existed in 2003 is approximately one-half the number of additional Java Jim's coffee stores that were added from 2004 to 2014. If approximately 700 Java Jim's coffee stores existed in 2003 and approximately y Java Jim's stores were added from 2004 to 2014, which of the following equations is true?

A) $\frac{1}{2}y = 700$

B) $2y = 700$

C) $700y = \frac{1}{2}$

D) $700y = 2$

6

Stream Supreme, a streaming movie service, charges a monthly fee of $7 for membership and $1.75 per movie streamed. Another streaming movie service, Download Empire, charges a monthly fee of $4 for membership and $2.25 per movie streamed. If m represents the number of movies streamed in a particular month, what are all the values of m for which Stream Supreme's total monthly charge is less than that of Download Empire?

A) $m < 4$

B) $5 \leq m \leq 6$

C) $6 \leq m \leq 7$

D) $m > 6$

7

$$q = \frac{(p_e - p_{wf})^k}{\mu d} h$$

The formula above models the productivity index, q, in barrels per day, of an oil well with a pressure differential of $(p_e - p_{wf})$, a permeability of k, a pay zone thickness of h, a viscosity of μ, and a drainage factor of d. Which of the following gives h, in terms of q, p_e, p_{wf}, k, μ, and d?

A) $h = \frac{\mu q d}{k}$

B) $h = \frac{k}{\mu q d}$

C) $h = \frac{\mu q d}{(p_e - p_{wf})^k}$

D) $h = \frac{(p_e - p_{wf})^k}{\mu q d}$

8

$$s = 110 + 4C$$

The equation above is used to model the relationship between the number of scoops, s, of ice cream sold per day at a particular ice cream shop, and the temperature, C, in degrees Celsius. According to the model, what is the meaning of the 4 in the equation?

A) For every increase of 1°C, four more scoops of ice cream will be sold.

B) For every decrease of 1°C, four more scoops of ice cream will be sold.

C) For every increase of 4°C, one more scoop of ice cream will be sold.

D) For every decrease of 4°C, one more scoop of ice cream will be sold.

CONTINUE

9

While saving money to pay for graduate school, Stephan created a plan in which the amount of money he saves each month is increased by a constant amount. If Stephan's savings plan requires that he save \$145 during month 3 and that he save \$280 during month 12, which of the following describes how the money Stephan saves changes between month 3 and month 12 of his savings plan?

A) Stephan increases the amount he saves by \$5 each month.

B) Stephan increases the amount he saves by \$15 each month.

C) Stephan increases the amount he saves by \$60 every 6 months.

D) Stephan increases the amount he saves by \$45 every month.

10

Which of the following equations, when graphed in the xy-plane, will include only values of y that are less than 2 ?

A) $y = -x^2 + 3$

B) $y = |-x| - 1$

C) $y = x^3 - 4$

D) $y = -(x - 1)^2 + 1$

11

If $f(x + 1) = 3x - 4$ for all values of x, what is the value of $f(-4)$?

A) -19

B) -16

C) -13

D) -10

12

$$\frac{5 - i}{2 - 3i}$$

If the expression above is rewritten in the form $a + bi$, where a and b are real numbers, what is the value of a ? (Note: $i = \sqrt{-1}$)

A) -2

B) -1

C) 1

D) $\frac{17}{13}$

CONTINUE

13

What is the sum of all values of p that satisfy the equation $3p^2 + 24p - 6 = 0$?

A) $-6\sqrt{2}$

B) -8

C) 8

D) $6\sqrt{2}$

14

The parabola with the equation $y = ax^2 + bx + c$, where a, b, and c are constants, is graphed on the xy-plane. If the parabola passes through the point $(-1, -1)$, which of the following must be true?

A) $a - b + c = -1$

B) $a - b - c = -1$

C) $a + b = 1$

D) $b - c = -1$

15

If $(px + 5)(qx + 3) = 8x^2 + rx + 15$ for all values of x, and $p + q = 6$, what are the two possible values for r ?

A) 2 and 4

B) 7 and 12

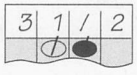
C) 22 and 26

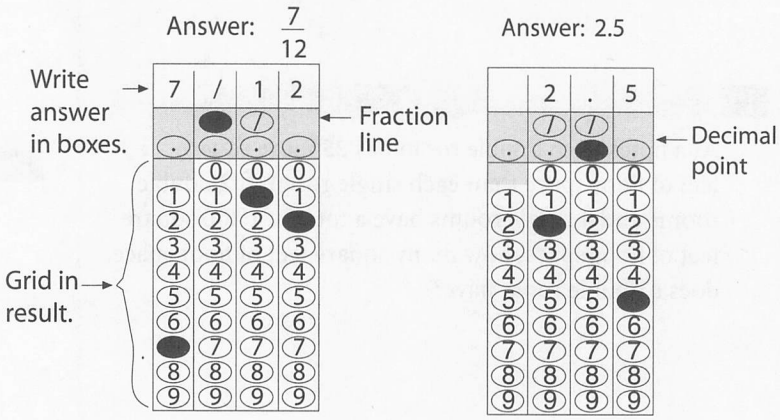
D) 29 and 39

CONTINUE

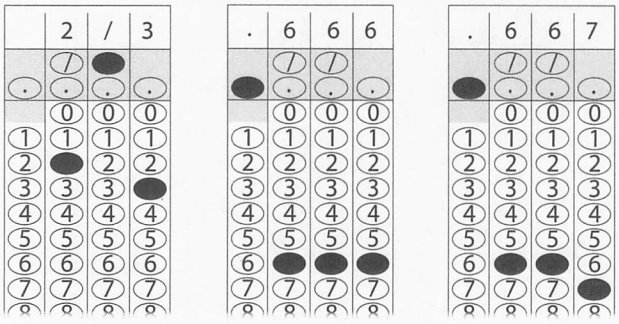
DIRECTIONS

For questions 16–20, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

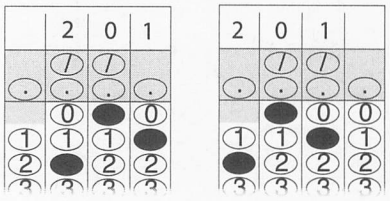
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
4. Some problems may have more than one correct answer. In such cases, grid only one answer.
5. **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If  is entered into the grid, it will be interpreted as $\frac{31}{2}$, not as $3\frac{1}{2}$.)
6. **Decimal Answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.



Acceptable ways to grid $\frac{2}{3}$ are:



Answer: 201 – either position is correct



NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.

CONTINUE

16

What is the value of y if $(4y + 8) - (7y - 12) = 11$?

17

At a hotel, each double room has 25 more square feet of floor space than each single room. If 2 double rooms and 4 single rooms have a total of 1,400 square feet of floor space, how many square feet of floor space does a double room have?

18

One angle of a right triangle measures $a°$, where $\cos a° = \frac{3}{5}$. What is $\sin(90° - a°)$?

19

If $x + 3$ is a factor of $x^2 + kx + 2k$, where k is a constant, what is the value of k ?

CONTINUE

20

$$x^3 - 3x^2 + 5x - 15 = 0$$

What real value of x is a solution to the above equation?

STOP

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.

Math Test – Calculator

55 MINUTES, 38 QUESTIONS

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

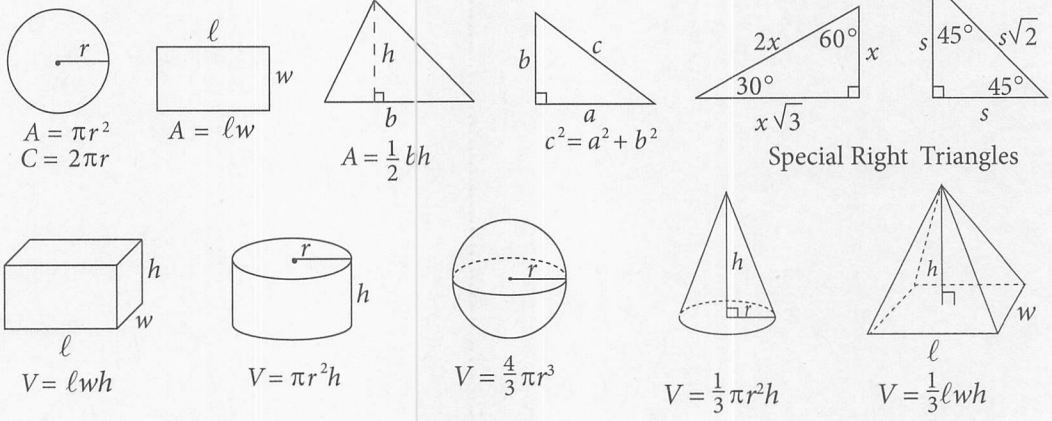
DIRECTIONS

For questions 1–30, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 31–38**, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 31 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

NOTES

1. The use of a calculator **is permitted**.
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated, the domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE



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

CONTINUE

1

A pizzeria sells pizzas in individual slices or in pies of 8 slices. On a certain day, the pizzeria sold a total of 364 slices, 84 of which were sold as individual slices. Which of the following shows the number of pies, n, sold on that day?

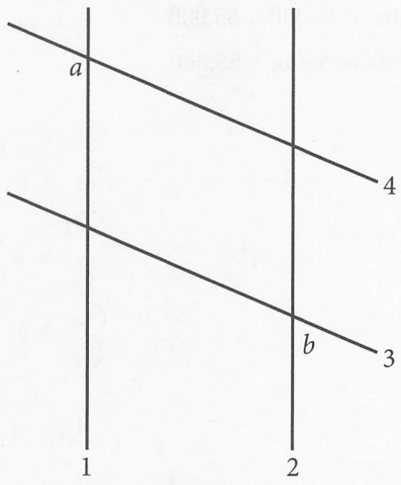
A) $n = \dfrac{364 + 84}{8}$

B) $n = \dfrac{364}{8} + 84$

C) $n = \dfrac{364}{8} - 84$

D) $n = \dfrac{364 - 84}{8}$

2



In the figure above, lines 1 and 2 are parallel, and lines 3 and 4 are parallel. If the measure of $\angle a$ is 125°, what is the measure of $\angle b$?

A) 40°

B) 55°

C) 110°

D) 125°

3

	Cream filling	No filling	Total
White chocolate	5	15	20
Dark chocolate	7	3	10
Total	12	18	30

A box contains 30 pieces of chocolate, distributed as shown in the table above. Each piece is made of either white chocolate or dark chocolate, and each piece contains either cream filling or no filling. If one piece is selected at random, what is the probability that the piece is either white chocolate with cream filling or dark chocolate with no filling?

A) $\dfrac{8}{30}$

B) $\dfrac{12}{30}$

C) $\dfrac{20}{30}$

D) $\dfrac{22}{30}$

CONTINUE

4

An isosceles triangle has perimeter T and sides of length x, x, and y. Which of the following represents x, in terms of T and y?

A) $x = T - y$

B) $x = T - 2y$

C) $x = \dfrac{T - 2y}{2}$

D) $x = \dfrac{T - y}{2}$

5

$$2x + 3y = -6$$

$$x - 4y = 19$$

Which ordered pair satisfies the system of equations shown above?

A) $(-9, 4)$

B) $(-3, 4)$

C) $(-1, -5)$

D) $(3, -4)$

6

When 6 times the number n is subtracted from 8, the result is 20. What is the result when 3 times the number n is subtracted from 5?

A) -2

B) 8

C) 11

D) 20

7

At 12 P.M. on Sunday, there are 25,000 people in a football stadium that holds 65,000. Every minute after 12 P.M., the number of people in the stadium increases by 550. If m represents the time, in minutes, after 12 P.M., which of the inequalities below gives the set of minutes in which the football stadium is below capacity?

A) $550m < 25{,}000$

B) $550m < 65{,}000$

C) $550m + 25{,}000 < 65{,}000$

D) $25{,}000 - 550m < 65{,}000$

CONTINUE

8

Number of United States Residents
With Health Insurance in 2015, in Thousands

	Age in years						
Income in dollars	Under 19	19–25	26–34	35–44	45–64	65 and older	Total
Under 25,000	12,499	4,881	6,146	6,387	13,314	7,359	50,586
25,000–49,999	15,624	6,102	7,683	7,984	16,643	9,200	63,236
50,000–74,999	14,061	5,491	6,915	7,185	14,978	8,278	56,908
75,000–99,999	10,936	4,271	5,378	5,589	11,650	6,439	44,263
100,000 and above	24,998	9,762	12,293	12,774	26,628	14,718	101,173
Total	78,118	30,507	38,415	39,919	83,213	45,994	316,166

The table above shows the number of U.S. residents with health insurance in 2015, in thousands, categorized by age group and annual income. According to these results, if a U.S. resident with health insurance who was 35–64 in 2015 is selected at random, what is the approximate probability that this resident had an income between $50,000 and $74,999 ?

A) 0.20

B) 0.25

C) 0.40

D) 0.80

CONTINUE

9

A truck traveled at an average speed of 70 miles per hour for 4 hours and had a fuel efficiency of 18 miles per gallon. Approximately how many gallons of fuel did the truck use for the entire 4-hour drive?

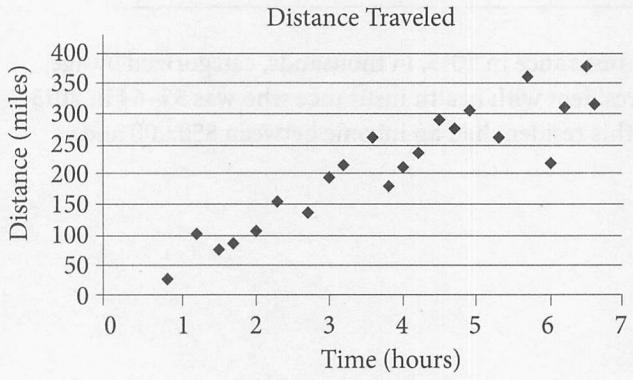
A) 4

B) 10

C) 16

D) 20

10



The scatterplot above shows the distances and times spent traveling for 22 trips by a driver. What is the time, in hours, of the trip represented by the data point farthest from the line of best fit (not shown)?

A) 4

B) 6

C) 8

D) 10

11

$$t_b = 212 - 0.0018a$$

The temperature at which water boils varies with altitude. The formula above models the relationship between t_b, the temperature at which water boils, in degrees Fahrenheit, and a, the altitude, in feet. Which of the following equations expresses altitude in terms of the temperature at which water boils?

A) $a = \dfrac{0.0018}{t_b - 212}$

B) $a = \dfrac{t_b + 212}{0.0018}$

C) $a = \dfrac{t_b - 212}{0.0018}$

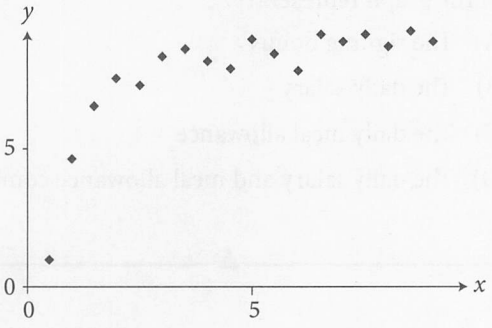
D) $a = \dfrac{212 - t_b}{0.0018}$

CONTINUE

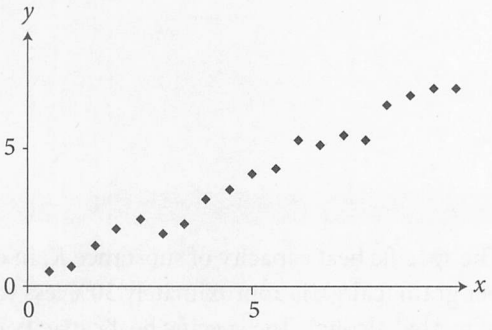
12

Which scatterplot below expresses a positive association that is not linear? (Note: A positive association between two variables is one in which higher values in one variable correspond to higher values in the other variable, and vice versa.)

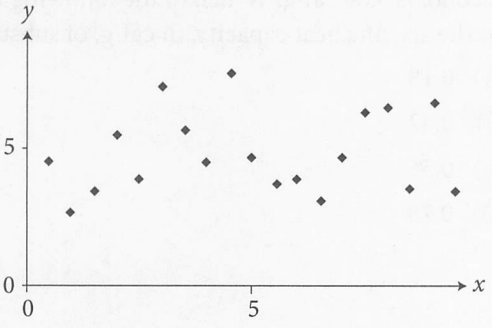
A)



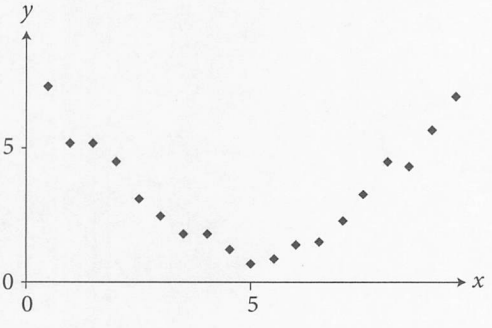
B)



C)



D)



13

$$v = \frac{h - m}{t} + 4.9t$$

For an object thrown straight upward, the formula above gives the relationship between v, the initial speed in meters per second, t, the time in seconds after the object was thrown, h, the height after t seconds, and m, the initial height from which the object was thrown. Which of the following expresses h, in terms of v, t, and m ?

A) $h = -4.9t^2 + vt - m$

B) $h = -4.9t^2 + vt + m$

C) $h = -4.9t^2 - vt + m$

D) $h = 4.9t^2 - vt - m$

14

$$65x + y = 455$$

A grocery store receives a shipment of oranges and consistently sells the same number of oranges each day. The equation above models the number of oranges, y, that remain x days after the shipment is received. What does it mean that (7, 0) is a solution to the equation?

A) It takes 7 days after the shipment until none of the oranges are remaining.

B) There are 7 oranges in the shipment.

C) It takes 7 days for oranges to be sold to 455 customers.

D) After the shipment, 7 oranges are sold each day.

CONTINUE

Questions 15 and 16 refer to the following information.

A minor league baseball player is offered a short-term contract by three teams: the Eagles, the Hawks, and the Jays. Each contract consists of a signing bonus, a daily salary, and a daily meal allowance, as shown in the table below.

Team	Signing bonus, b (in dollars)	Salary, s (in dollars per day)	Meal allowance, m (in dollars per day)
Eagles	1,400	140	40
Hawks	1,200	160	50
Jays	1,500	130	30

The player's total compensation, C, for each contract in terms of the number of days, d, is given by the formula $C = b + (s + m)d$.

15

For what number of days, d, would the player's total compensation including signing bonus, salary, and meal allowance with the Eagles be greater than the total compensation with the Jays?

A) $d < 5$

B) $d > 5$

C) $d < 6$

D) $d > 6$

16

The relationship between the player's total compensation, C, for a contract with the Hawks as a function of the number of days, d, for which the contract lasts is graphed in the xy-plane, with d on the x-axis and C on the y-axis. What does the y-intercept of the graph represent?

A) The signing bonus

B) The daily salary

C) The daily meal allowance

D) The daily salary and meal allowance combined

17

The specific heat capacity of substance K, in calories per gram (cal/g), is approximately 30% less than that of methyl alcohol. The specific heat capacity of methyl alcohol is 0.60 cal/g. Which of the following is closest to the specific heat capacity, in cal/g, of substance K?

A) 0.18

B) 0.42

C) 0.56

D) 0.78

CONTINUE

18

In the xy-plane, if $(-1, 0)$ is a solution to the system of inequalities $y < x + c$ and $y < -x - d$, which of the following must be true about c and d?

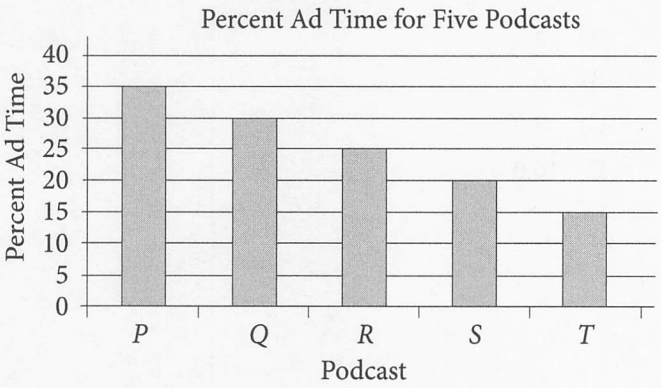
A) $c = d$

B) $c = -d$

C) $c < d$

D) $d < c$

19



A company advertises on five different podcasts: *P*, *Q*, *R*, *S*, and *T*. The graph above shows the amount of time used for the ad on the five different podcasts as a percentage of total run time. Each podcast runs for the same length of time, and the costs to advertise on podcasts *P*, *Q*, *R*, *S* and *T* are \$400, \$350, \$200, \$180, and \$150, respectively. Which of the following podcasts provides the most ad time per dollar?

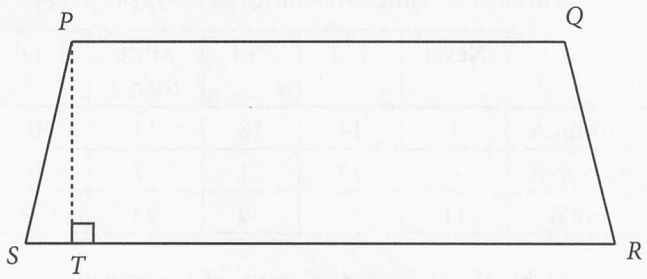
A) *Q*

B) *R*

C) *S*

D) *T*

20



In quadrilateral *PQRS* above, $PS = QR$, and $\overline{PQ}$ is parallel to $\overline{SR}$. If PQ and SR were both decreased by 75% and PT were quadrupled, how would the area of *PQRS* change?

A) The area of *PQRS* would be quadrupled.

B) The area of *PQRS* would be increased by 75%.

C) The area of *PQRS* would be decreased by 75%.

D) The area of *PQRS* would be unaffected.

CONTINUE

21

Number of Times Watching the News per Week

	Never	1–2	3–4	More than 4	Total
Group A	7	14	18	11	50
Group B	4	13	21	12	50
Total	11	27	39	23	100

The table above shows the results of a survey in which 100 people were asked how often they watched the news. Group A consisted of people who were registered voters, and Group B consisted of people who were not registered to vote. If one person is randomly chosen from among those who watch the news fewer than three times a week, what is the probability that the person was a member of Group A?

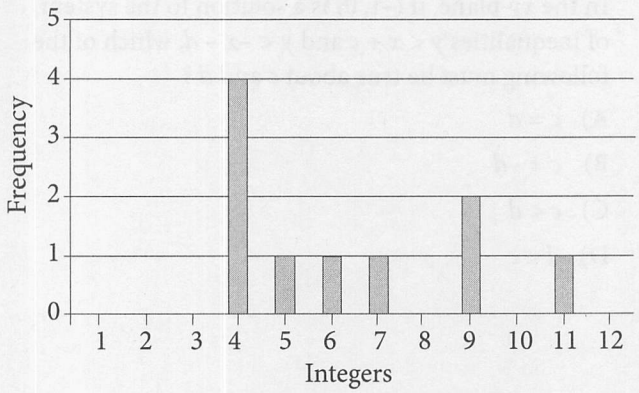
A) $\frac{21}{38}$

B) $\frac{4}{50}$

C) $\frac{21}{50}$

D) $\frac{38}{100}$

22



The bar graph above shows the distribution of randomly selected integers from 1 to 12. What is the mean of the list of numbers?

A) 5.5

B) 6.3

C) 7.0

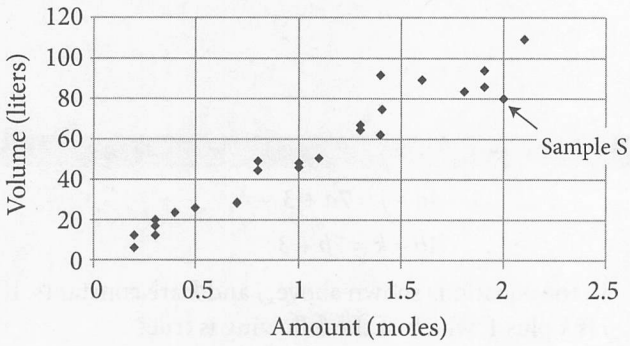
D) 10.0

CONTINUE

Questions 23–25 refer to the following information.

A team of scientists measures the volume of various samples of different gases with a constant pressure of 0.1 atm and a constant temperature of 610 K. The graph below plots the volume of each sample against the amount of the gas.

Volume-Amount Relationship
Among Samples of Gases



The Ideal Gas Law predicts that at this pressure and temperature, the volume of an ideal gas can be modeled by the equation $V = 50n$, where V is the volume in liters and n is the amount of the substance, measured in moles. Assume that the relationship is valid for greater amounts of the substance than are shown in the graph. (A mole is approximately 6.022×10^{23} molecules.)

23

According to the data provided, what is the volume, in <u>milliliters</u>, of Sample S?

A) 8×10^4

B) 2×10^3

C) 8×10^1

D) 4×10^1

24

There are three samples shown of approximately 1.4 moles. Which of the following is closest to the range of volumes of these three samples, in liters?

A) 30

B) 20

C) 9

D) 3

25

Based on the ideal gas law, what is the volume, in liters, of a sample that contains 1,200 moles?

A) 6,000

B) 24,000

C) 36,000

D) 60,000

CONTINUE

26

Let the polynomials f and g be defined by $f(x) = 3x^3 + 6x^2 + 11x$ and $g(x) = 8x^2 + 15x + 7$. Which of the following polynomials is divisible by $3x + 7$?

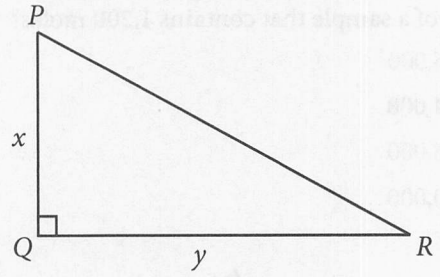
A) $j(x) = 2f(x) + g(x)$

B) $k(x) = f(x) + g(x)$

C) $m(x) = f(x) + 2g(x)$

D) $n(x) = f(x) + 3g(x)$

27



Given the right triangle PQR above, which of the following is equal to $\frac{y}{x}$?

A) $\cos P$

B) $\cos Q$

C) $\tan P$

D) $\tan Q$

28

Let the function f be defined by $f(x) = (x - 1)(x + 7)$. Which of the following is an equivalent form of f in which the minimum value of f appears as either a coefficient or a constant?

A) $f(x) = x^2 - 7$

B) $f(x) = x^2 + 6x - 7$

C) $f(x) = (x + 3)^2 - 16$

D) $f(x) = (x - 3)^2 - 20$

29

$$4a - j = 7a + 3$$

$$4b - k = 7b + 3$$

In the equations shown above, j and k are constants. If j is k plus 1, which of the following is true?

A) a is b plus $\frac{1}{3}$.

B) a is b minus $\frac{1}{3}$.

C) a is b minus 1.

D) a is b minus 3.

CONTINUE

30

If the average (arithmetic mean) of $3x$ and 11 is a, the average of $4x$ and 6 is b, and the average of $5x$ and 7 is c, what is the average of a, b, and c, in terms of x?

A) $x + 2$

B) $x + 3$

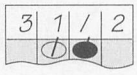
C) $2x + 4$

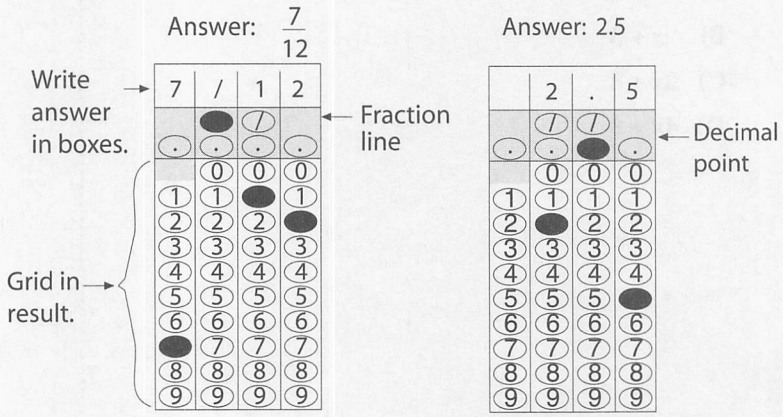
D) $4x + 8$

CONTINUE

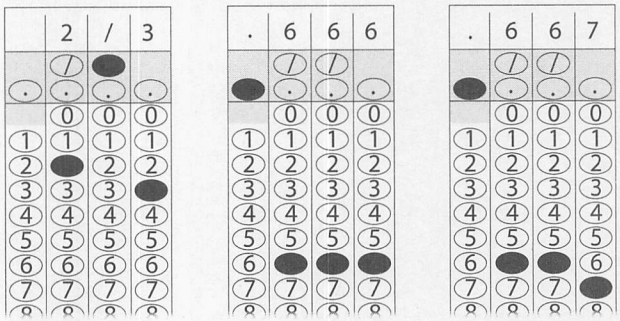
DIRECTIONS

For questions 31–38, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

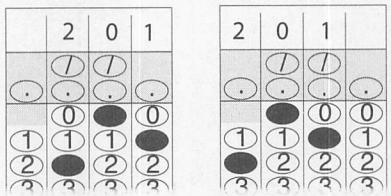
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
4. Some problems may have more than one correct answer. In such cases, grid only one answer.
5. **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If  is entered into the grid, it will be interpreted as $\frac{31}{2}$, not as $3\frac{1}{2}$.)
6. **Decimal Answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.



Acceptable ways to grid $\frac{2}{3}$ are:



Answer: 201 – either position is correct



NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.

CONTINUE

31

A scientist estimates that the water level of a lake is dropping by 2.25 inches per year. If this trend continues, how many years will it take for the water level in the lake to drop by 27 inches?

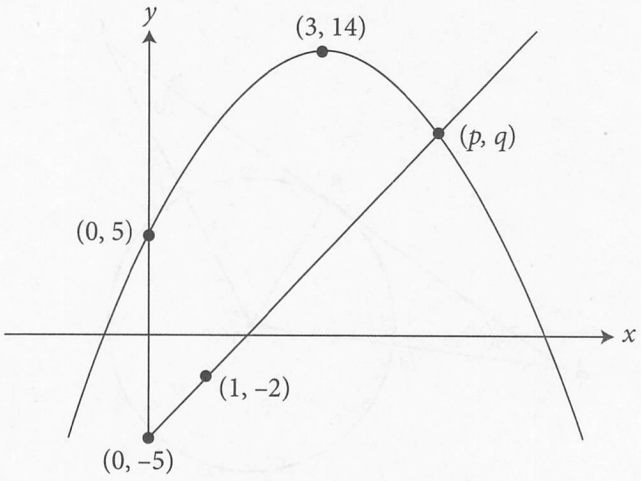
32

A car factory that operates 24 hours a day and 7 days a week produces one car every 20 minutes. How many cars does the factory produce in 3 days?

33

Scores in the game of bowling range from 0 to 300 per game, inclusive. Vito's average score in the first 6 games of a bowling tournament was 200. What is the lowest score he can receive in his 7th game and still have an average score of at least 240 for the entire 12-game tournament?

34



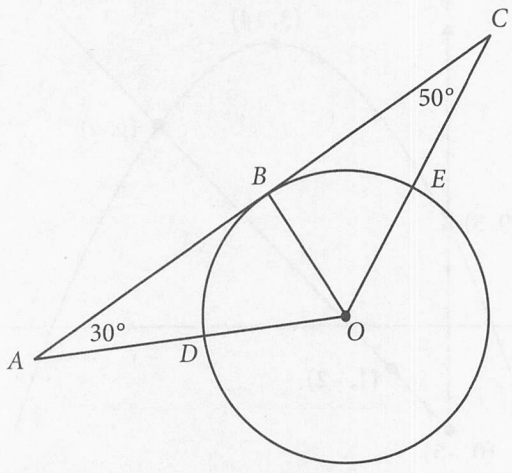
The xy-plane shows a point of intersection between a line and a parabola. The point of intersection has coordinates (p, q). If the vertex of the parabola is at (3, 14), what is the value of p ?

CONTINUE

35

To purchase a car, Harry makes a down payment, and every month thereafter, he pays a fixed amount to the car dealer. The total amount, T, in dollars, that Harry has paid after m months can be represented by the equation $T = 175m + 350$. According to this equation, how much, in dollars, was Harry's down payment? (Disregard the $ sign when gridding your answer.)

36



In the figure above, line segment AC is tangent to the circle with center O at point B. Line segments AO and CO intersect the circle at points D and E, respectively. If the circumference of circle O is 72, what is the length of minor arc $\overset{\frown}{DE}$?

Questions 37 and 38 refer to the following information.

The population of a small town is currently 800. A statistician estimates that the population of the town will decline by 14 percent per year for the next five years. The statistician models the population, P, of the town after x years using the equation $P = 800(k)^x$.

37

In the equation above, what value should be used for k ?

38

According to the statistician's model, what will the population of the town be, to the nearest whole number, after five years?

END OF TEST

DO NOT RETURN TO A PREVIOUS SECTION.