



Practice Test 1

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.

This passage is excerpted from George Gissing, *New Grub Street*. Originally published in 1891. Reardon was a newly successful author and had married, but soon found himself unable to write. Following a conversation with his wife, he takes a walk and thinks about the time just before his wedding.

And the words sang about him, filled the air with a mad pulsing of intolerable joy, made him desire to fling himself in passionate humility at her feet, to weep hot tears, to cry to her in insane worship. He thought her beautiful beyond anything his heart had imagined; her warm gold hair was the rapture of his eyes and of his reverent hand. Though slenderly fashioned, she was so gloriously strong. ‘Not a day of illness in her life,’ said Mrs. Yule, and one could readily believe it.

She spoke with such a sweet decision. Her ‘I love you!’ was a bond with eternity. In the simplest as in the greatest things she saw his wish and acted frankly upon it. No pretty petulance, no affectation of silly-sweet languishing, none of the weaknesses of woman. And so exquisitely fresh in her twenty years of maidenhood, with bright young eyes that seemed to bid defiance to all the years to come.

He went about like one dazzled with excessive light. He talked as he had never talked before, recklessly, exultantly, insolently—in the nobler sense. He made friends on every hand; he welcomed all the world to his bosom; he felt the benevolence of a god.

‘I love you!’ It breathed like music at his ears when he fell asleep in weariness of joy; it awakened him on the morrow as with a glorious ringing summons to

renewed life. Delay? Why should there be delay? Amy wished nothing but to become his wife. Idle to think of his doing any more work until he sat down in the home of which she was mistress. His brain burned with visions of the books he would henceforth write, but his hand was incapable of anything but a love-letter. And what letters! Reardon never published anything equal to those. ‘I have received your poem,’ Amy replied to one of them. And she was right; not a letter, but a poem he had sent her, with every word on fire.

The hours of talk! It enraptured him to find how much she had read, and with what clearness of understanding. Latin and Greek, no. Ah! but she should learn them both, that there might be nothing wanting in the communion between his thought and hers. For he loved the old writers with all his heart; they had been such strength to him in his days of misery.

They would go together to the charmed lands of the South. No, not now for their marriage holiday— Amy said that would be an imprudent expense; but as soon as he had got a good price for a book. Will not the publishers be kind? If they knew what happiness lurked in embryo within their foolish cheque-books!

He woke of a sudden in the early hours of one morning, a week before the wedding-day. You know that kind of awaking, so complete in an instant, caused by the pressure of some troublesome thought upon the dreaming brain. ‘Suppose I should not succeed henceforth? Suppose I could never get more than this

CONTINUE

poor hundred pounds for one of the long books which cost me so much labour? I shall perhaps have children to support; and Amy—how would Amy bear poverty?

60 He knew what poverty means. The chilling of brain and heart, the unnerving of the hands, the slow gathering about one of fear and shame and impotent wrath, the dread feeling of helplessness, of the world's base indifference. Poverty! Poverty!

1

Which choice best describes a major theme of the passage?

- A) The internal battle between true love and self-doubt
- B) The unequivocal joy of marital bliss
- C) The destructive power of encroaching poverty
- D) The fear of never reaching one's ultimate potential

2

According to the narrator, when the woman he loved learned of his feelings for her, she

- A) pledged her undying affection in return.
- B) dedicated herself to her maidenhood.
- C) reconsidered her prior refusal of his advances.
- D) wrote her own book of poetry.

3

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

- A) Lines 7–8 (“Though . . . strong”)
- B) Lines 10–11 (“She spoke . . . eternity”)
- C) Lines 26–27 (“Amy wished . . . wife”)
- D) Lines 33–35 (“Amy replied . . . fire”)

4

Which statement best describes a technique used to represent Amy's desire to marry the narrator?

- A) The narrator describes in detail her youthful enthusiasm as a major motivating factor.
- B) The narrator asks a hypothetical question that is immediately refuted.
- C) The narrator applauds her decision as a reflection of an inner strength that is unparalleled.
- D) The narrator stresses her sincerity as proof of a dedication fostered by her maidenhood.

5

As compared with his love letters, the narrator's book writing is portrayed as being

- A) agreeable.
- B) stalled.
- C) fiery.
- D) imaginative.

6

In describing the relationship between Amy and the narrator, the narrator highlights a distinction between Amy's

- A) desire for marriage and his readiness.
- B) beauty and his common appeal.
- C) conventional education and his love of language.
- D) distaste for spending and his ability to write.

7

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

- A) Lines 4–7 (“He thought . . . hand”)
- B) Lines 11–13 (“In the . . . it”)
- C) Lines 38–41 (“Latin . . . hers”)
- D) Lines 45–47 (“No, not . . . book”)

CONTINUE 

8

As used in line 40, “wanting” most nearly means

- A) lacking.
- B) requesting.
- C) pleasing.
- D) desiring.

9

The narrator uses the phrase “what happiness lurked in embryo” (lines 48–49) to present the publishers as

- A) kind.
- B) wealthy.
- C) influential.
- D) foolish.

10

What function does the last paragraph (lines 59–63) serve in the passage as a whole?

- A) It expands upon the overall theme of the narrator’s never-ending love for Amy.
- B) It lists the long-term effects that poverty could have on the narrator’s relationship.
- C) It provides evidence that the narrator cannot support his wife by revealing his hysteria.
- D) It intensifies the narrator’s growing concerns about his ability to support his marriage.

CONTINUE 

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

This passage is excerpted from Dan Glass, “What Happens if GPS Fails?” ©2016 by The Atlantic.

Despite its name, the Global Positioning System is not about maps; it’s about time. Each satellite in the constellation (24 are needed, plus the U.S. has several spares) has multiple atomic clocks on board, synchronized with each other and to Coordinated Universal Time (UTC)—the time standard used across the world—down to the nanosecond. The satellites continually broadcast their time and position information down to Earth, where GPS receivers in equipment from iPhones to automated tractors acquire signals and use the minuscule differences in their arrival time to determine an exact position.

While GPS was initially conceived to aid navigation, globally synchronized time is now a much more critical function of the system. Telecom networks rely on GPS clocks to keep cell towers synchronized so calls can be passed between them. Many electrical power grids use the clocks in equipment that fine-tunes current flow in overloaded networks. The finance sector uses GPS-derived timing systems to timestamp ATM, credit card, and high-speed market transactions. Computer network synchronization, digital television and radio, Doppler radar weather reporting, seismic monitoring, even multi-camera sequencing for film production—GPS clocks have a hand in all.

What if all these flying clock radios were wiped out, and everything on the ground started blinking 12:00? According to Mike Lombardi, a meteorologist at the National Institute for Standards and Technology, “Nobody knows exactly what would happen.” Since so many of these technologies were designed specifically with GPS in mind, the unsettling truth, he says, is “there’s no backup.”

The bulk of a more promising, comprehensive backup system already exists, right here on the ground. After the sextant but before GPS, navigators around the world used Long Range Aids to Navigation, or “LORAN,” a terrestrial system of transmitters and receiving equipment first developed during WWII. By the mid-1990s, Loran “tower chains” provided coverage for North America, Europe, and other

regions in the Northern Hemisphere. Its use declined in favor of the much finer accuracy of GPS after it became available for civil use in 1995, but the U.S. Coast Guard continued working on an improved system using the existing infrastructure. If adopted, “Enhanced” LORAN, or eLoran, could provide positioning accuracy comparable to GPS. Broadcast at hundreds of thousands of watts, the signal is virtually un-jammable, and unlike GPS, can even be received indoors, underwater, and in urban or natural canyons. It also turns out that eLoran can provide a UTC time signal with sub-microsecond time resolution across a large geographical area.

The technology is available—the Coast Guard demonstrated a working prototype last year—so why isn’t America using it? John Garamendi, a California congressman, asked this question at a July 2015 congressional hearing on the Federal Radionavigation Plan, the nation’s primary planning document for position, navigation, and timing (PNT). “There are two kinds of time,” he opened, “real time . . . and then federal time, which seems to be the forever time. The eLoran system was identified as a backup 15 years ago, and here we are, federal time, not yet done.”

Why is the sense of urgency among decision-makers so out of sync? Could some of it be similar to why people delay backing up their computers even though they’ve been telling themselves to for weeks? How do we decide, when presented a risk with unknown odds, when it’s time to sacrifice time and resources to prevent it?

Now is a critically important time to answer that question, as the world has actually been given odds on another, even more catastrophic risk than GPS failure: destruction of the electrical power infrastructure itself. On July 23, 2012, a billion-ton cloud of electrified gases blasted off the far side of the sun at over six million miles per hour. According to professor Daniel Baker at University of Colorado, this coronal mass ejection (CME) “was in all respects at least as strong as the 1859 Carrington Event,” referring to the strongest solar storm ever recorded, which set fire to telegraph stations and caused auroras down to Cuba. As was widely reported two years ago, if the 2012 CME had occurred one week later, it would have hit Earth.

CONTINUE 

Percent of Smartphone Users Who Use Their Phones to get Location-Based Information, over Time, by Age

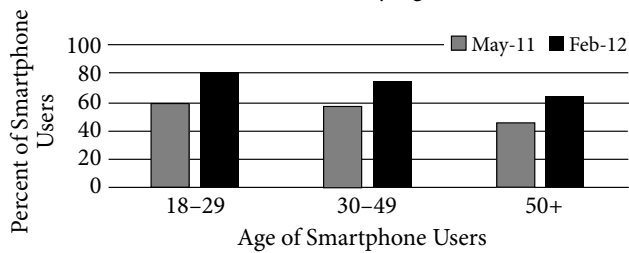


Figure 1

Data Source: Pew Research Center

Commercial GPS Equipment Revenues in North America

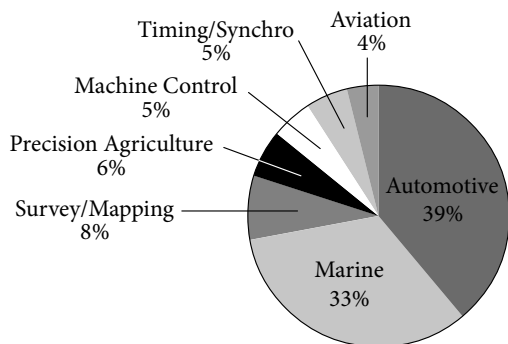


Figure 2

11

The main purpose of the passage is to

- A) present a problem with a current technology and highlight a potential solution.
- B) provide an overview of how clocks and satellites determine distance and location.
- C) analyze the negative impacts of certain technologies across various industries.
- D) praise developers for their ability to answer the hard questions.

12

As used in line 13, “conceived” most nearly means

- A) designed.
- B) understood
- C) absorbed.
- D) accepted.

13

The primary purpose of the question in lines 26–28 (“What . . . 12:00”) is to

- A) introduce a problem.
- B) correct a misconception.
- C) reconsider a perspective.
- D) undermine an idea.

14

Which of the following best characterizes Lombardi’s attitude toward “flying clock radios” (line 26)?

- A) He is confident about their ability to handle a multitude of tasks.
- B) He is concerned about how they will interact with the eLoran systems.
- C) He is annoyed that no one knows exactly how they work.
- D) He is worried that they have no replacement systems in case of emergency.

15

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

- A) Line 25 (“GPS clocks . . . all”)
- B) Line 30 (“Nobody . . . happen”)
- C) Lines 30–33 (“Since . . . backup”)
- D) Lines 34–35 (“The bulk . . . ground”)

CONTINUE

16

As used in line 34, “bulk” most nearly means

- A) dimensions.
- B) mass.
- C) majority.
- D) totality.

17

According to John Garamendi, the reason America isn’t using the eLoran system even though the technology is available is that

- A) the system doesn’t use real time.
- B) government approval takes longer than the development of the technology.
- C) federal decision-makers are scared to change systems.
- D) solar storms threaten the system.

18

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

- A) Lines 48–51 (“Broadcast . . . canyons”)
- B) Lines 64–65 (“The eLoran . . . done”)
- C) Lines 70–72 (“How do . . . it”)
- D) Lines 73–76 (“Now is . . . itself”)

19

According to figure 1, which group is closest in percentage to the percentage of users 18–29 in May 2011 who got location-based information on their smartphones?

- A) Ages 50+ in Feb 2012
- B) Ages 50+ in May 2011
- C) Ages 30–49 in Feb 2012
- D) Ages 18–29 in Feb 2012

20

Which statement is supported by figure 2?

- A) Less than a third of North American GPS revenue comes from the Automotive industry.
- B) GPS revenues for Surveying/Mapping are less than GPS revenues for Precision Agriculture.
- C) GPS devices are less important for the Aviation industry than they are for the Marine industry.
- D) The Automotive and Marine industries make up a greater percentage of North American GPS revenues than the rest of the industries combined.

21

Which additional information, if presented in figure 2, would be most useful in evaluating the statement in lines 13–15 (“While . . . system”)?

- A) The total number of GPS devices sold
- B) The number of individuals in each industry using GPS devices
- C) The percentage of the industry that relies on the GPS devices
- D) The amount of revenue in dollars for each industry



Questions 22–31 are based on the following passage.

This passage is excerpted from Joshua Hammer, “The Dying of the Dead Sea.” ©2005 by Smithsonian Magazine.

A refuge over the millennia for messiahs, martyrs and zealots, the Dead Sea region abounds with sites sacred to Islam, Christianity and Judaism. Some Muslims believe that Moses, whom they regard as a prophet, lies buried in a hilltop mosque just off the main road from Jerusalem. Jesus Christ was said to have been baptized in the Jordan River after traveling down to the Dead Sea from Galilee. And despite its name, the Dead Sea helps support one of the world’s most complex and vibrant ecosystems. Fed by fresh water springs and aquifers, a half-dozen oases along the shore harbor scores of indigenous species of plants, fish and mammals, including ibex and leopards. About 500 million birds representing at least 300 species, including storks, pelicans, lesser spotted eagles, lesser kestrels and honey buzzards, take refuge here during a biannual great migration from Africa to Europe and back again. Ein Feshka, a lush expanse of tamarisk, papyrus, oleander and pools of crystal water, was used by the late king Hussein of Jordan as a private playground in the 1950s and early ’60s. But as the Dead Sea recedes, the springs that feed the oases are moving along with it; many experts believe that Ein Feshka and other oases could wither away within five years.

One reason for the decline, according to environmentalists and various government officials, is a water policy on the part of Israel, Jordan and Syria that encourages unrestricted agricultural use. From the first years of Israel’s existence as a Jewish state, for example, when collective farming transformed much of it into fertile vineyards and vegetable fields, both Labor and Likud governments have bestowed generous water subsidies on the nation’s farmers. The results have been disastrous: today, agriculture accounts for just 3 percent of Israel’s gross national product and uses up to half of its fresh water. Recently, Uri Sagie, chairman of Israel’s national water company, told a conference of Israeli farmers that a growing and irreversible gap between production and consumption looms. “The water sources are being depleted without the deficit being restored,” he warned. Jordan lavishes similar water subsidies on its farmers with similar consequences: the kingdom takes about 71 billion gallons of water a year from the Yarmouk River and

channels it into the King Abdullah Canal, constructed by USAID in the 1970s to provide irrigation for the Jordan Valley; Syria takes out another 55 billion gallons. So what is the answer?

Environmental activists say that one solution is to eliminate the water subsidies altogether. “Unless water is priced at its real costs,” says Ra’ed Daoud, managing director of ECO Consult, a water-use consulting firm, “there’s no way you’re going to reduce agriculture.” But because the region’s agricultural lobby is strong and the environmental movement weak, says Daoud, there has been insufficient leverage for change. Israel’s water commissioner, Shimon Tal, recently spoke publicly about the need to reduce some subsidies, but he admitted that it would be a long and difficult battle. Another approach is to encourage alternate water sources. Friends of the Earth Middle East is part of a coalition of 21 environmental groups that has developed proposals to conserve household water use (about 133 billion gallons a year, as much as that used in agriculture) and to regulate the amount that can be taken out of Israel’s springs. In addition, the Israeli government is promoting the building of wastewater treatment plants and desalination facilities; the first large one on the Mediterranean was completed this past August. Over the next five years, the government says, these facilities will provide as much as 106 billion gallons of fresh water annually for agricultural and domestic consumption.

Friends of the Earth is also taking its message to the farmers themselves—encouraging them to plant crops that use less water and spelling out the advantages of renewed tourism in the area. “Israeli agriculture is incredibly mismanaged,” Friends of the Earth director Gidon Bromberg says. “The farmers here could be planting olives, flowers and other crops like dates that don’t require fresh water. They could be using treated sewage water and allow fresh water to flow back into the Jordan River.” Friends of the Earth cites a Haifa University study that argues that current uses of the Jordan River make no sense. “The potential tourism-dollar return of a healthy river and a healthy Dead Sea outweighs the little return that agriculture offers,” says Bromberg.

CONTINUE 

22

The primary purpose of the passage is to

- A) discuss how the governments of Israel, Syria, and Jordan create water policy.
- B) describe the many species of plants, fish, and mammals that live in the Dead Sea region.
- C) explain the consequences of continuing current water policy in the Dead Sea region.
- D) discuss one cause of the decline of the Dead Sea and outline a possible remedy.

23

As used in line 12, “harbor” most nearly means

- A) nourish.
- B) shelter.
- C) entertain.
- D) consider.

24

The author mentions Ein Feshka primarily in order to

- A) describe a historical site in need of preservation.
- B) transition from a description of the region to a discussion of a problem the region faces.
- C) identify a need for recreation areas in the Dead Sea region.
- D) indicate that environmental impacts vary with different types of land use.

25

What is the most likely reason the author includes “both Labor and Likud governments” in lines 28–33 (“From . . . farmers”)?

- A) To describe the level of cooperation between political parties in the Israeli government
- B) To emphasize the popularity of current water policy among all political parties
- C) To indicate broad political support for water subsidies
- D) To criticize the politicization of natural resources

26

According to the passage, water laws favor

- A) the tourism industry.
- B) government.
- C) environmental activists.
- D) farmers.

27

What can reasonably be inferred about the agriculture industry in the Dead Sea region?

- A) Its use of water is disproportionate to its impact on the economy.
- B) It is an industry in decline.
- C) The agriculture lobby is the most powerful influence on governments in the Dead Sea region.
- D) It will soon use more than 100 billion gallons of water from treatment facilities.

28

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

- A) Lines 34–36 (“today . . . water”)
- B) Lines 54–56 (“But . . . change”)
- C) Lines 70–73 (“Over . . . consumption”)
- D) Lines 77–79 (“Israeli . . . says”)

29

What does the author suggest about tourism?

- A) It was most vibrant in the mid-20th century.
- B) Eco-tourism will be an important part of the future economy in the region.
- C) Tourism may provide more benefit to the Dead Sea region’s economy than agriculture currently does.
- D) Officials in the tourism and agriculture industries should work together to create policy.



30

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

- A) Lines 18–21 (“Ein Feshka . . . ’60s”)
- B) Lines 66–68 (“the Israeli . . . facilities”)
- C) Lines 79–81 (“The farmers . . . water”)
- D) Lines 85–88 (“The potential . . . Bromberg”)

31

What is the main idea of the final paragraph?

- A) Farmers can adopt new practices to use less water and help maintain the Dead Sea.
- B) Farmers should stop planting crops and focus on tourism.
- C) Tourism will soon replace agriculture as the main industry of the region.
- D) In the absence of policy change, farmers are adjusting their practices to conserve water.

CONTINUE 

Questions 32–41 are based on the following passages.

Passage 1 is adapted from James Platt, *Poverty*. Originally published in 1884. Passage 2 is adapted from Will Reason, *Poverty*. Originally published in 1909. As societies became more industrialized and urban in the late nineteenth century, discussions arose regarding the root causes of poverty.

Passage 1

The aim of charitable persons should not be so much the giving with money in hand, or religious teaching on their lips, as the sympathetic, friendly
 Line intercourse of man with man, woman with woman,
 5 irrespective of class, and actuated by the desire to stimulate hope and energy, and to show the lowest outcast that the world, even to them, may be made more enjoyable, if they have the desire to live a life more in harmony with the better part of their nature;
 10 and so in time, by degrees, as the child is taught to walk, step by step, we may improve the lowest types of humanity.

To obtain better dwellings for the poor, it is essential for the poorer class to feel a want for, and
 15 a desire to have, houses better, cleaner, and more wholesome than those they now inhabit. Too many, at present, wantonly and maliciously, but more frequently, through neglect and apathy, injure the houses in which they live. Many of them prefer to be
 20 uncomfortable.

The man or men that are wanted to solve this difficult question, the only true or real reformers, will be those who study how to alter the character, estimate of life, the ideal of existence amongst the poor. From
 25 the clergy of all denominations, from every man who has influence over the masses, we want the moral courage to tell the poor not to marry until they are in a position to support a wife and family, to be reasonably industrious, uniformly thrifty, and unswervingly sober.
 30 The real reformer, the only savior of society, is the man who will tell the poor how they may become less so, by teaching them how to earn more or spend less, not by robbing others of what they have.

We must raise the status of the poorer class,
 35 improve their individuality, give them a higher character, and thus prepare the way for a well-working humanity that should result in well-working institutions. We must regenerate the entire social fabric, through the working of juster laws, purer aims,
 40 nobler instincts—through individual cooperation of the many, as one, in contributing to the welfare of all.

Passage 2

It is clear, therefore, that the readjustment of distribution must be effected through a readjustment of the ownership and management of the essential
 45 factors of production. It is not possible to effect this readjustment on the basis of unrestricted competition, because in the case on the prime factor of production, the land monopoly is caused, not by any artificial arrangement, but by the simple natural fact that it is
 50 essential and restricted in quantity. The only course that remains is to find some way of democratizing the monopoly value, so that everyone benefits by his due share of what has not been made by the industry of any and is indispensable to the industry of all.

This cannot be effected by parceling it out to individuals, for very obvious reasons. It would have to be continually redistributed, it would be impossible to equate the value of the different parts, and such distribution would destroy its productive efficiency.

We therefore must look to some means of collective ownership and use of these natural forces, and also of all the value that accrues not from individual energy, industry or skill, but from the conditions which society itself affords. “To deal with causes we must strike at
 65 the error of distribution, by gradually substituting public ownership for private ownership of the means of production. In no other way can we secure for each worker in the hive the full reward of his labor. So long as between the worker and his just wage stands the
 70 private landlord and the private capitalist, so long will poverty remain, and not poverty alone, but the moral degradations which inevitably arise from the devotion of labor to the service of waste,” [writes L.G. Chiozza in “Riches and Poverty.”]

Here we touch the greatest controversy of the present time, and another volume would be needed to examine all the reasons for and against such a social adjustment. But it is clear that unless some way of effecting it is found, consistent with fairness to all,
 80 poverty, undeserved and unavoidable, must be the lot of many, while equally undeserved income will continue to be reaped, without conscious or intentional fraud on their part, by many others. As the poverty reacts on the character for ill effect, so also it is to be
 85 feared that the unearned riches also produce qualities, of a different and more subtle nature, but equally inimical to the true well-being both of the individuals concerned and of the community.

CONTINUE 

32

As used in line 1, “aim” most nearly means

- A) focus.
- B) shot.
- C) gift.
- D) ability.

33

In Passage 1, Platt suggests that one way a society can reduce poverty is to

- A) provide in-demand technical training to citizens in need of marketable skills.
- B) redistribute wealth directly from certain types of rich men.
- C) teach that the benefits of budgeting outweigh the benefits of handouts.
- D) instruct children in financial matters from a young age.

34

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

- A) Lines 10–12 (“as the . . . humanity”)
- B) Lines 21–24 (“The man . . . poor”)
- C) Lines 30–33 (“The real . . . have”)
- D) Lines 38–41 (“We must . . . all”)

35

In Passage 2, Reason implies that evenly distributing wealth and property among individuals would have what consequence?

- A) Neither the rich nor the poor would reap benefits.
- B) All parties to the economy would improve their position.
- C) The rich would take advantage to create their own monopolies.
- D) The poor would be able to purchase property at decreased value.

36

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

- A) Lines 50–52 (“The only . . . value”)
- B) Lines 56–59 (“It would . . . efficiency”)
- C) Lines 60–64 (“We therefore . . . affords”)
- D) Lines 75–78 (“Here we . . . adjustment”)

37

As used in line 69, “just” most nearly means

- A) only.
- B) strict.
- C) equal.
- D) fair.

38

Reason in Passage 2 would most likely characterize the position taken by Platt in lines 19–20 (“Many of . . . uncomfortable”) as

- A) an accurate description of the root cause of the current economic situation of the poorer class.
- B) a flawed assumption that generalizes the negative behavior of a few.
- C) a surprising but realistic statement consistent with the economic trends of the times.
- D) an offensive characterization of the rich that is not applicable to other classes of society.

39

Both authors would most likely agree that any social changes undertaken to fight poverty would be

- A) likely to completely solve the problems of financial inequality.
- B) a stopgap measure needed to prevent the wealthy from keeping their money.
- C) unsuccessful without a drastic change in the mindset of the poor.
- D) partial solutions that would present new sets of challenges.

CONTINUE 

40

Which choice best describes the way the two authors characterize effective ways to reduce poverty?

- A) Platt believes that financial education is the key to reducing poverty in a society, while Reason believes that financial education is irrelevant if individuals do not participate.
- B) Platt believes that poverty will be reduced only if those who are poor truly desire to lift themselves out of poverty, while Reason believes that poverty will be reduced only if society's wealth is redistributed.
- C) Platt believes wage regulation from major industry is a step in the right direction, while Reason believes that such regulation will be ineffective.
- D) Platt believes training clergy to minister to the poor is the most effective way of improving the lives of those in poverty, while Reason believes that unearned riches are a necessary feature of a society.

41

Based on Passage 1, Platt would most likely say that the "readjustment of distribution" Reason mentions in lines 42–43 would have no effect unless

- A) property were owned collectively by all members of society.
- B) profits from property sales were evenly distributed equally amongst all citizens.
- C) those in poverty exhibited sufficient effort to better themselves.
- D) the number of available jobs increased enough to significantly lower unemployment.

CONTINUE 

Questions 42–52 are based on the following passage and supplementary material.

This passage is excerpted from Thomas Hayden, “What Darwin Didn’t Know.” ©2009 by Smithsonian Magazine.

[The] first public airing of Darwinian evolution caused almost no stir whatsoever. But when Darwin published his ideas in book form the following year, the reaction was quite different. *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life* soon sold out its first press run of 1,250 copies, and within a year some 4,250 copies were in circulation. Allies applauded it as a brilliant unifying breakthrough; scientific rivals called attention to the gaps in his evidence, including what would come to be known as “missing links” in the fossil record; and prominent clergymen, politicians and others condemned the work and its far-reaching implications. In 1864 Benjamin Disraeli, later Britain’s prime minister, famously decried the idea—barely mentioned in *Origin*—that human beings too had evolved from earlier species. “Is man an ape or an angel?” he asked rhetorically at a conference. “I, my lord, I am on the side of the angels. I repudiate with indignation and abhorrence those newfangled theories.”

Darwin knew that plant and animal species could be sorted into groups by similarity, such that birds clustered into songbirds and raptors, say, with each group subdivided again and again down to dozens or hundreds of distinct species. He also saw that the individuals within any given species, despite many similarities, also differed from one another—and some of those differences were passed from parents to their offspring. And Darwin observed that nature had a brutally efficient method of rewarding any variation that helped an individual live longer, breed faster or leave more progeny. The reward for being a slightly faster or more alert antelope? The lions would eat your slower neighbors first, granting you one more day in which to reproduce. After many generations and a great deal of time, the whole population would run faster, and with many such changes over time eventually become a new species. Evolution, Darwin’s “descent with modification through natural selection,” would have occurred.

But what was the source of variation and what was the mechanism for passing change from generation to generation? Darwin “didn’t know anything about why organisms resemble their parents, or the basis of heritable variations in populations,” says Niles Eldredge, a paleontologist at the American Museum of Natural History in New York City.

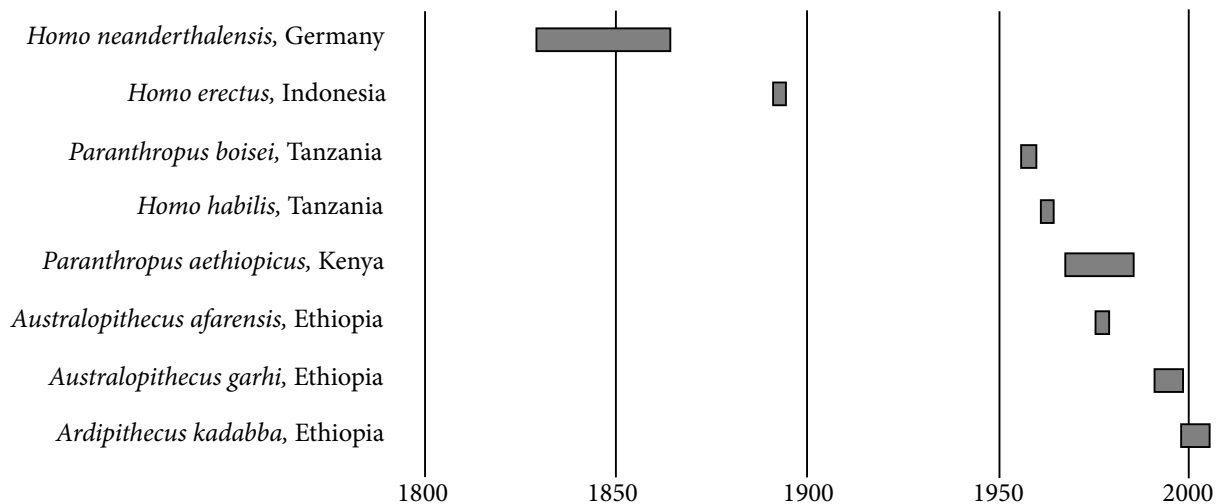
In Darwin’s era, the man who did make progress on the real mechanism of inheritance was the Austrian monk Gregor Mendel. In his abbey garden in the late 1850s and early 1860s, Mendel bred pea plants and found that the transmission of traits such as flower color and seed texture followed observable rules. An offspring inherits a set of these genetic units from each parent. Since the early 1900s, those units of inheritance have been known as genes.

The objection certainly applied to the paucity of ancestral human fossils in Darwin’s time. Years of painstaking work by paleontologists, however, have filled in many of the important gaps. There are many more extinct species to be discovered, but the term “missing link” has for the most part become as outdated as the idea of special creation for each species. Anthropologists once depicted human evolution as a version of the classic “March of Progress” image—a straight line from a crouching proto-ape, through successive stages of knuckle draggers and culminating in upright modern human beings. “It was a fairly simple picture, but it was a simplicity born of ignorance,” says biological anthropologist William Jungers of Stony Brook University in New York. “The last 30 years have seen an explosion of new finds.”

Asked about gaps in Darwin’s knowledge, Francisco Ayala, a biologist at the University of California at Irvine, laughs. “That’s easy,” he says. “Darwin didn’t know 99 percent of what we know.” Which may sound bad, Ayala goes on, but “the 1 percent he did know was the most important part.”

CONTINUE 

Human Fossil Discovery and Naming
 *bars represent timespan between fossil discovery and initial naming of species



On the *Origin of Species*, published 1859

42

Over the course of the passage, the main focus shifts from

- A) a description of Darwin's life to an overview of Darwin's published works.
- B) detailed criticism of Darwin's controversial theory to qualified support for that theory.
- C) Darwin's explanation of a scientific mystery to a summary of how other scientists facilitated that mystery's resolution.
- D) the initial reception for Darwin's work to a broader discussion of how his findings continue to guide scientific research.

43

The author most strongly suggests that the largest reason Darwin's intellectual competitors took issue with his work was that it

- A) didn't present a complete explanation of the hypothesized phenomenon.
- B) presented ideas that didn't match what the church believed.
- C) offended readers with its absurd questions.
- D) unified what had been intentionally disparate ideas.

44

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

- A) Lines 9–10 (“Allies . . . breakthrough”)
- B) Lines 10–12 (“scientific . . . record”)
- C) Lines 15–18 (“In 1864 . . . species”)
- D) Lines 20–21 (“I repudiate . . . theories”)

45

The main purpose of the reference to lions in line 34 is to

- A) disprove a questionable theory.
- B) introduce a completely new idea.
- C) reject a burgeoning controversy.
- D) provide a clarifying example.

CONTINUE

46

Which statement best describes the technique the author uses to advance the main point of the third paragraph (lines 42–48)?

- A) He ponders an unproven possibility to highlight the utility of Darwin’s research.
- B) He poses a question that puzzled those of Darwin’s era to foreshadow a forthcoming finding.
- C) He presents a criticism from an expert to disprove the theory presented by Darwin.
- D) He undermines the importance of Darwin’s theory by discussing the work of another scientist.

47

The author notes that those who criticized Darwin’s work when it first came out were

- A) misguided in attacking scientific discovery based solely on the work of another scientist.
- B) transparent in their jealous slander against his success.
- C) mistaken because other scientists had already proven what Darwin had not.
- D) correct in their complaints that his theory lacked sufficient supporting evidence.

48

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

- A) Lines 4–8 (“*On the . . . copies*”)
- B) Lines 49–51 (“*In Darwin’s . . . Mendel*”)
- C) Lines 58–59 (“*The objection . . . time*”)
- D) Lines 73–74 (“*The last . . . finds*”)

49

As used in line 71, “born of” most nearly means

- A) carried by.
- B) generated from.
- C) possessed by.
- D) admitted to.

50

What purpose does the graph serve in relation to the passage as a whole?

- A) It connects the genetic findings of Mendel with the biological findings of Darwin.
- B) It provides indisputable evidence to prove the theories contained within Darwin’s *On the Origin of Species*.
- C) It reinforces a statement from an expert that much more has been learned since Darwin’s scientific era.
- D) It offers evidence that the fossils found by Darwin and his contemporaries were different from the fossils found in the next century.

CONTINUE 

51

Which statement is best supported by the data presented in the graph?

- A) Human fossils had been discovered in at least five locations by the time Darwin published *On the Origin of Species*.
- B) Human fossils discovered in Tanzania were named more quickly than those found in Kenya.
- C) Both *Paranthropus* species shown in the graph were discovered in the same country.
- D) The more recently a new type of fossil was discovered, the less time it took scientists to name the species.

52

Based on information from both the graph and the passage, the anthropologists' depiction of the "March of Progress"

- A) fails to address the discoveries of a variety of fossils from numerous human species.
- B) accurately depicts the linear origin of modern man.
- C) proves that Darwin's research on *Homo neanderthalensis* was accurate.
- D) undermines the importance of fossil discoveries made around the world.

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.

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.

NEH: A Human-Centered Agency

The National Endowment for the Humanities (NEH) is an independent federal agency that was created in 1965 to provide grants to humanities projects throughout the United States. Funding for the agency has been the

1 protagonist of debate for many years. Some critics **2** think the money that goes to the NEH would be better spent on infrastructure or job creation, while others object to the nature of some of the projects that receive funding.

1

- A) NO CHANGE
- B) significance
- C) discipline
- D) subject

2

- A) NO CHANGE
- B) thought
- C) thinking
- D) would think

CONTINUE 

3 Therefore, the agency provides important services in all fifty states and has had a notable impact on American culture over the last fifty years.

The NEH was founded as a direct response to an explosion in scientific research in the middle years of the 20th century. There was concern, especially among those in the fields of arts and humanities, that non-scientific pursuits were in danger of getting left behind or

4 overlooked. The NEH addresses this concern by distributing grant money in seven areas, including preservation, research, education, and digital humanities.

Among the most notable projects that have been funded by the NEH over the last 50 years are the Ken Burns documentary *The Civil War*, the blockbuster

Metropolitan Museum of Art exhibition “Treasures of

5 Tutankhamen”; and sixteen Pulitzer Prize-winning books.

3

- A) NO CHANGE
- B) Likewise,
- C) However,
- D) For instance,

4

- A) NO CHANGE
- B) in being overlooked.
- C) of oversight.
- D) to be overlooked.

5

- A) NO CHANGE
- B) Tutankhamen” and;
- C) Tutankhamen,” and
- D) Tutankhamen” and,

CONTINUE 

Although some critics of the NEH argue that the agency's spending is frivolous in an age when our country is in desperate need of spending on more concrete things like infrastructure, NEH grant money **6** which has a positive impact on local economies. Grants that support construction or renovation of facilities employ local construction workers, and the construction or expansion of a museum creates permanent jobs for staff. Preservation funds **7** likewise similarly create jobs for archivists and technicians. One striking example is the NEH-funded excavation of Historic Jamestown—the first permanent English colony in America—which has resulted in the creation of an entirely new local tourist industry. **8**

6

- A) NO CHANGE
- B) has
- C) having
- D) to have

7

- A) NO CHANGE
- B) in the same way
- C) comparably
- D) DELETE the underlined portion.

8

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

Jamestown was thought to be lost for hundreds of years—scholars knew where it should be, but found no evidence of it.

Should the writer make this addition here?

- A) Yes, because it further explains why the discovery of Jamestown was important.
- B) Yes, because it reinforces the importance of the NEH grant on the region's economy.
- C) No, because it blurs the paragraph's focus on the far-reaching economic effects NEH grants can have.
- D) No, because it undermines the idea that tourist attractions can contribute to the local economy.



[1] As federal funding for scientific research and the military continues to increase, we should not forget Seaborg's words. [2] In the early 1960s, Glenn Seaborg, then head of the Atomic Energy Commission, expressed his support for establishing the NEH by **9** cautioning against an over-reliance on technology: "Science and technology are providing us with the means to travel swiftly. But what course do we take? This is the question that no computer can answer." [3] The issue should not be **10** weather to fund the NEH but how much. [4] NEH grants help inform the kind of cultural awareness that is vital to our roles as good citizens in a global community. **11**

9

Which choice most effectively sets up the quote that follows in this sentence?

- A) NO CHANGE
- B) emphasizing the importance of science over humanities:
- C) lobbying for increased funding for computer research:
- D) arguing for the importance of public art:

10

- A) NO CHANGE
- B) weather too
- C) whether to
- D) whether too

11

To make this paragraph most logical, sentence 1 should be placed

- A) where it is now.
- B) after sentence 2.
- C) after sentence 3.
- D) after sentence 4.

CONTINUE 

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

Tuition Reimbursement: A Mutual Benefit

All employers want a well-educated workforce, and one way to accomplish that goal is to provide tuition assistance benefits to employees. Tuition assistance programs are **12** commonplace; a 2013 study showed that 61% of U.S. employers offered undergraduate tuition assistance as a benefit—but their goals and guidelines vary widely. Companies that offer tuition assistance **13** see it as a benefit both to employees and to the company. Whether employees are taking classes that are related to their careers or not, tuition assistance programs result in improved morale, **14** also better job performance, and retention.

12

- A) NO CHANGE
- B) commonplace,
- C) commonplace
- D) commonplace—

13

- A) NO CHANGE
- B) seeing
- C) have seen
- D) sees

14

- A) NO CHANGE
- B) job performance,
- C) job performance too,
- D) additionally job performance,



Those who are skeptical of tuition assistance programs argue that **15** the programs cost a lot and provide very little return on the investment. Some firms have instituted a requirement that employees receiving tuition benefits must stay with the company for a specific amount of time after completing their educations. **16** In any case, such clauses are hard to enforce, and research shows that they aren't necessary. Over 80% of workers who receive tuition benefits from their employers feel an increased sense of loyalty stemming from the investment, and they are in fact less likely to **17** leave—than the average employee is.

15

Which choice best establishes the argument that follows:

- A) NO CHANGE
- B) companies should place restrictions on the types of courses employees can be reimbursed for.
- C) taking classes while working spreads employees too thin, resulting in lower productivity.
- D) an employee may use the benefit to seek a position at a different company.

16

- A) NO CHANGE
- B) Consequently,
- C) However,
- D) Additionally,

17

- A) NO CHANGE
- B) leave;
- C) leave,
- D) leave

CONTINUE 

Increased employee loyalty is not the only way that employers benefit from offering tuition assistance. The programs can also be powerful recruiting tools. Employers from the U.S. Armed Forces to Starbucks are able to attract workers who are interested in earning an education while they earn money, without having to **18** take out loans. Most companies require employees to earn a minimum grade in their classes, but student employees often find it easier to maintain their grades when they feel a responsibility to the company paying for their education, not just to themselves. Managers can also use tuition assistance programs to evaluate their employees. If an employee takes advantage of the optional benefit, the thinking **19** goes then he or she is likely to be a highly motivated and productive worker.

18

- A) NO CHANGE
- B) borrow money through educational loan programs.
- C) go into debt by financing their educations with student loans.
- D) take on the risky proposition of borrowing loan money that would leave them with a significant debt burden.

19

- A) NO CHANGE
- B) goes, then he
- C) goes; then he
- D) goes. Then he

CONTINUE

Some companies are increasing the value of their investment in tuition assistance programs by restricting the benefit to classes that will provide their employees with necessary or helpful job skills. **20** In addition, some employers have even gone so far as to create custom degree or certification programs. The figure shows the ways in which a company can leverage its tuition assistance program to **21** make a killing on the company's investment in the program. As shown in the figure, the most effective programs will **22** start with a strategy to manage the workforce necessary for a particular field, which will lead to a secure workforce, will provide a reliable source of talent, and will ultimately make talent development proceed productively.

Benefits of Employee Tuition Assistance Programs



20

- A) NO CHANGE
- B) By contrast,
- C) In other words,
- D) DELETE the underlined portion and begin the sentence with a capital letter.

21

- A) NO CHANGE
- B) provide the best return
- C) make a whole lot of dough
- D) earn a pile of money

22

Which choice makes the writer's description of the figure most accurate?

- A) NO CHANGE
- B) start with productive talent development, which will lead to strategies for managing the workforce necessary for a particular field, and will ultimately lead to a more stable source of talent and also a secure workforce.
- C) start with productive talent development, which will create a secure workforce with a reliable source of talent, which will ultimately align with strategies for managing the workforce necessary for a particular field.
- D) start with a reliable source of talented workers, which will contribute to a secure workforce, will productively develop that workforce, and will ultimately lead to strategies for managing the workforce necessary for a particular field.

CONTINUE 

Questions 23–33 are based on the following passage.

The Changing Face of Fast Food

Over the last two decades there **23** are a number of studies that have shown a strong correlation between the rise of fast food restaurants in the United States and the rise of obesity. Partly in response to this epidemic, a new trend has taken off in the restaurant business: “fast casual” food. It’s difficult to precisely define what fast casual is, but it generally refers to restaurants that offer the traditional quick preparation and counter service of fast food at a slightly higher price point, with a focus on fresh, high-quality ingredients. Though many fast casual restaurants have menus that focus on a particular healthy type of food, such as salads or vegan foods, others offer the traditional burgers-and-fries fast food fare. But even fast casual burger joints **24** are often still cheaper than going to a sit-down restaurant.

It is generally agreed that Chipotle Mexican Grill started the fast casual trend when it opened its first restaurant in Denver in 1993. The chain grew **25** quickly. Driven by customers who were attracted to its fresh menu and sustainably sourced ingredients. Many within the fast food industry took notice—McDonald’s even became a major investor—and the fast casual movement was born. **26**

23

- A) NO CHANGE
- B) have been
- C) will be
- D) had been

24

Which choice most effectively reinforces the definition of fast casual given earlier in the paragraph?

- A) NO CHANGE
- B) emphasize the higher quality and freshness of their ingredients.
- C) serve salads as well as burgers and fries.
- D) may contribute to the obesity epidemic.

25

- A) NO CHANGE
- B) quickly: driven
- C) quickly, driven
- D) quickly; driven

26

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

It is somewhat unclear where the term fast casual came from—two different people are generally credited with coining the term, but it was trademarked in 1995 by Horatio Lonsdale-Hands.

Should the writer make this addition here?

- A) Yes, because it provides important background for the information presented in the following paragraph.
- B) Yes, because it clarifies the origins of the term “fast casual.”
- C) No, because it blurs the paragraph’s focus on the beginnings of the fast casual movement.
- D) No, because it distracts from the paragraph’s main idea by introducing a figure whose role in the movement is unclear.

CONTINUE 

Fast casual's focus on high-quality ingredients is working. During the 2007–2009 recession, spending in the restaurant business declined for two **27** unbending years. **28** In fact, during that same period, fast casual business grew by double digits. Traditional fast food restaurants are changing in response. McDonald's, which is now a competitor of **29** Chipotle, having sold its interest in the burrito business in 2006, announced recently that it is making the switch from frozen burger patties to fresh meat for its Quarter Pounders at most of its restaurants. This comes after the company recently eliminated high fructose corn syrup from **30** they're buns and announced a plan to transition to using only eggs from cage-free chickens.

27

- A) NO CHANGE
- B) linear
- C) even
- D) straight

28

- A) NO CHANGE
- B) Unsurprisingly,
- C) In other words,
- D) In contrast,

29

- A) NO CHANGE
- B) Chipotle having sold its interest in the burrito business in 2006
- C) Chipotle, having sold its interest in the burrito business in 2006
- D) Chipotle having sold its interest, in the burrito business in 2006,

30

- A) NO CHANGE
- B) their
- C) it's
- D) its

CONTINUE 

While the move to cage-free eggs has the potential to make a big impact on how chicken farms are run, it does nothing to address one of the bigger problems of fast food:

31 therefore, its lack of nutritional value. Critics also

32 question whether increasingly fast casual restaurants are actually healthy? The typical meal from Chipotle,

for example, contains over 1,000 calories and a full-day's allowance of sodium. But **33** change is slowly coming.

The pressure that fast casual restaurants are putting on their more traditional counterparts as well as the growing number that truly do serve healthy food are indications that consumers are paying more attention to what they put in their mouths and that the restaurant industry is responding.

31

- A) NO CHANGE
- B) indeed,
- C) for instance,
- D) specifically,

32

- A) NO CHANGE
- B) increasingly question whether fast casual restaurants are actually healthy?
- C) question whether increasingly fast casual restaurants are actually healthy.
- D) increasingly question whether fast casual restaurants are actually healthy.

33

- A) NO CHANGE
- B) slow changes are starting to arrive.
- C) changes that take a long time are beginning to come.
- D) arriving soon are those changes that never happen quickly.

CONTINUE 

Questions 34–44 are based on the following passage.

Did the *Rite* Cause a Riot?

It is commonly understood that at the premiere of Igor Stravinsky's *The Rite of Spring* on May 29, 1913, the shocking nature of the ballet caused a riot to break out in the audience. The music started with an unnaturally high bassoon solo, which elicited shouts and jeers from the audience almost immediately. The furor only rose when the dancers from the Ballets Russes took the stage and began the jerky, convulsive movements of Vaslav Nijinsky's **34** choreography. The choreography was shocking because it was not characteristic of the grace and fluidity typically expected from ballet. A fight soon **35** broke up amidst the spectators, the orchestra was pelted with vegetables thrown by outraged audience members, and the police were called to restore order.

There are many theories **36** as to what caused the audience of *The Rite of Spring* to react so strongly. It may have been the dissonant nature of Stravinsky's music, with its constantly changing rhythms and jarring percussion, or the purposefully awkward, ungraceful movements of the dancers. The theme of the ballet **37** itself was a pagan ritual in which a virgin sacrifices herself to the god of spring, may also have upset some viewers. The negative reception was summed up by a **38** review, in *Le Figaro*, that proclaimed "We are sorry to see an artist such as M. Stravinsky involve himself in this disconcerting adventure."

34

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

- A) choreography, which was uncharacteristic through its lack of
- B) choreography that lacked
- C) choreography, because of it lacking in conveyance of
- D) choreography through which Nijinsky tried not to convey

35

- A) NO CHANGE
- B) brought up among
- C) broke out among
- D) broke out between

36

Which choice best establishes the main idea of the paragraph?

- A) NO CHANGE
- B) about why Stravinsky composed such a controversial piece of music.
- C) regarding the role of the police in the uproar.
- D) surrounding which Russian folk traditions Stravinsky drew his inspiration from.

37

- A) NO CHANGE
- B) itself, being
- C) itself
- D) itself,

38

- A) NO CHANGE
- B) review, in *Le Figaro* that proclaimed,
- C) review in *Le Figaro* that proclaimed,
- D) review in *Le Figaro*, that proclaimed

CONTINUE 

Although several dozen eyewitness accounts of the evening exist, they are often contradictory and do little **39** to sort of exactly what happened in the Theatre des Champs-Elysees that night. In fact, if one makes a timeline of first-person accounts of the *Rite's* premiere, descriptions of the level of disruption and violence increase as the accounts get further away from the actual event. **40** On the other hand, it's likely that stories of the riot have gotten exaggerated over time.

39

- A) NO CHANGE
- B) to sort out
- C) for sort out
- D) for sort of

40

- A) NO CHANGE
- B) As a result,
- C) At the same time,
- D) In other words,

CONTINUE

[1] Scholars have also recently begun to suspect that the uproar may have been planned. [2] It is possible that he actually planted someone to start shouting, but more likely he simply set up an expectation for controversy. [3] There was impassioned debate in Paris in the early years of the 20th century between traditionalists and modernists that was **41** exemplified by the debate over the Eiffel Tower: modernists saw it as a mark of progress, while traditionalists saw it as a monstrosity. [4] Diaghilev likely caused members of both groups **42** that believed that others would react strongly to *The Rite of Spring*. [5] Serge Diaghilev, the founder of the Ballets Russes, was a savvy entrepreneur who understood that any publicity is good publicity. [6] From such charged expectations, it is **43** not unsurprising that controversy arose. **44**

41

The writer wants to add a supporting detail to explain the different views of the traditionalists and the modernists. Which choice best accomplishes this goal?

- A) NO CHANGE
- B) still going on today: *The Rite of Spring* remains a controversial piece of music in many circles.
- C) not limited to music: people also argued over visual arts, architecture, and literature.
- D) nothing new: there have always been people who will be upset by innovation of any kind, and there always will be.

42

- A) NO CHANGE
- B) believing
- C) who believed
- D) to believe

43

Which choice most effectively signals that the result the author mentions was expected?

- A) NO CHANGE
- B) surprising
- C) not surprising
- D) unusual

44

To make this paragraph most logical, sentence 5 should be placed

- A) where it is now.
- B) before sentence 2.
- C) before sentence 3.
- D) before sentence 4.

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.

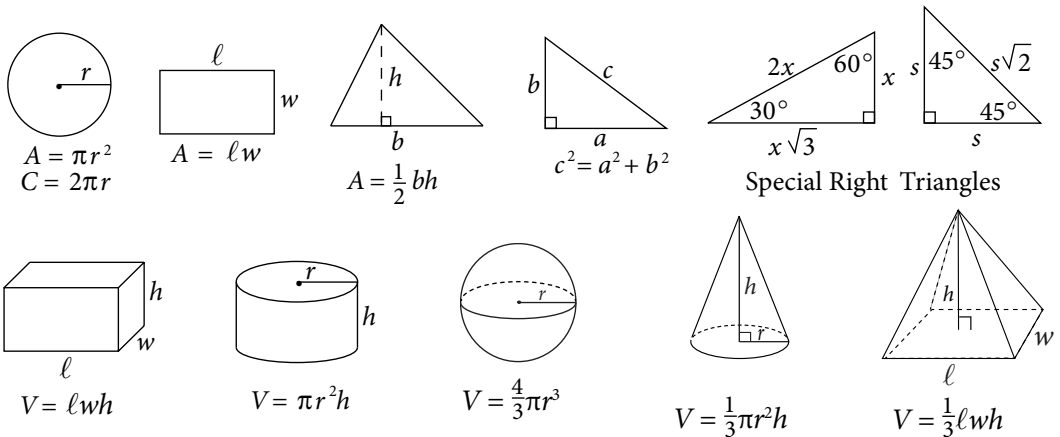
DIRECTIONS

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



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

Which of the following is equivalent to $10 + 2(x - 7)$?

- A) $-14x + 10$
- B) $2x + 24$
- C) $2x + 3$
- D) $2x - 4$

2

$$3x - \frac{y}{3} = 21$$

$$x = y + 7$$

Which ordered pair (x, y) satisfies the system of equations shown above?

- A) $(0, -7)$
- B) $(4, 27)$
- C) $(7, 0)$
- D) $(9, -16)$

3

$$a + b = 15$$

The equation above relates the number of hours, a , Kevin spends doing homework each week and the number of hours he spends watching television each week. If Kevin spends a total of 15 hours doing homework and watching television each week, what does the variable b represent?

- A) The number of hours spent watching television for each hour spent doing homework
- B) The number of hours spent watching television each week
- C) The number of hours spent doing homework each week
- D) The total number of hours spent doing homework and watching television each week

4

Josephine purchases a computer for \$4,590. The computer decreases in value at a constant rate for 9 years, after which it is considered not to have any monetary value. How much is the computer worth 6 years after it is purchased?

- A) \$1,530
- B) \$2,295
- C) \$3,060
- D) \$4,080

CONTINUE 



5

For $i = \sqrt{-1}$, which of the following complex numbers is equivalent to $(10i - 4i^2) - (7 - 3i)$?

- A) $-11 + 7i$
- B) $-3 + 13i$
- C) $3 - 13i$
- D) $11 - 7i$

6

What is the value of $f(-2)$ if $f(x) = \frac{x^2 + 4x - 8}{x - 2}$?

- A) -3
- B) -1
- C) 1
- D) 3

7

Heinrich must buy at least 100 shares of stock for his portfolio. The shares he buys will be from Stock X, which costs \$22 per share and Stock Y, which costs \$35 per share. His budget for buying stock is no more than \$4,500. He must buy at least 20 shares of Stock X and 15 shares of Stock Y. Which of the following represents the situation described if a is the number of shares of Stock X purchased and b is the number of shares of Stock Y purchased?

- A) $22a + 35b \leq 4,500$
 $a + b \geq 100$
 $a \leq 20$
 $b \leq 15$
- B) $22a + 35b \leq 4,500$
 $a + b \leq 100$
 $a \leq 20$
 $b \leq 15$
- C) $22a + 35b \leq 4,500$
 $a + b \leq 100$
 $a \geq 20$
 $b \geq 15$
- D) $22a + 35b \leq 4,500$
 $a + b \geq 100$
 $a \geq 20$
 $b \geq 15$

8

$$x^2 - 8x + 5$$

Which of the following is equivalent to the expression above?

- A) $(x - 4)^2 - 11$
- B) $(x - 4)^2 + 11$
- C) $(x + 4)^2 - 11$
- D) $(x + 4)^2 + 11$



9

Juliet is selling photographs as part of a project for her entrepreneurship class. She sells the first 20 photographs for \$10 each. Because the first 20 photographs sold so quickly, she raised the price of the photographs to \$15 each for the rest of the project. After her expenses, Juliet earns a profit of 80% of the revenues from her sales. What is the least number of photographs she must sell for the rest of the project to earn a profit of at least \$400?

- A) 18
- B) 20
- C) 24
- D) 32

10

$$\frac{p^{\frac{1}{4}}q^{-3}}{p^{-2}q^{\frac{1}{2}}}$$

Which of the following is equivalent to the expression above, where $p > 1$ and $q > 1$?

- A) $\frac{p^2\sqrt[4]{p}}{q^3\sqrt{q}}$
- B) $\frac{p^2\sqrt{p}}{q^3\sqrt{q}}$
- C) $\frac{\sqrt[4]{p}}{q^3\sqrt{q}}$
- D) $\frac{\sqrt[4]{p}}{\sqrt[3]{q^2}}$

11

The graph of function g in the xy -plane is a parabola defined by $g(x) = (x - 2)(x - 4)$. Which of the following intervals contains the x -coordinate of the vertex of the graph?

- A) $6 < x < 8$
- B) $4 < x < 6$
- C) $-2 < x < 4$
- D) $-4 < x < -2$

12

$$xa^3 + ya^2 + za = 0$$

In the equation above, x , y , and z are constants. If the equation has roots -6 , 0 , and 4 , which of the following is a factor of $xa^3 + ya^2 + za$?

- A) $a - 2$
- B) $a + 4$
- C) $a - 6$
- D) $a + 6$



13

If the expression $\frac{1}{2}(x+c)(x-c)$, where c is a positive constant, can be rewritten as $\frac{1}{2}x^2 - 5$, what is the value of c ?

- A) $\sqrt{5}$
- B) $\sqrt{10}$
- C) 5
- D) 10

14

Which of the following is equivalent to $\frac{z^2 + 7z - 3}{z + 2}$?

- A) $z + 5 - \frac{13}{z + 2}$
- B) $z + 5 - \frac{7}{z + 2}$
- C) $z + 9 - \frac{21}{z - 2}$
- D) $z + 9 - \frac{15}{z - 2}$

15

A homeowners' association limits the dimensions of the pools that it will allow in a particular subdivision. The bylaws state that permits will only be granted for pools shaped like rectangular prisms, for which the sum of the length of the pool and the perimeter of the vertical side containing the ladder cannot exceed 200 meters. The perimeter of the ladder side is determined using the width and the depth of the pool. If a pool has a length of 75 meters and its width is 1.5 times its depth, which of the following shows the allowable depth a , in meters, of the pool?

- A) $0 < a \leq 62\frac{1}{2}$
- B) $0 < a \leq 50$
- C) $0 < a \leq 31\frac{1}{4}$
- D) $0 < a \leq 25$

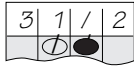


DIRECTIONS

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

- 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.
- Mark no more than one circle in any column.
- No question has a negative answer.
- 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.

Answer: $\frac{7}{12}$

Write answer in boxes. →

7	/	1	2
.	.	.	.
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

← Fraction line

Grid in result. →

Answer: 2.5

	2	.	5
.	.	.	.
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

← Decimal point

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

	2	/	3
.	.	.	.
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

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1	1	1	1
2	2	2	2
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4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

.	6	6	7
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0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

Answer: 201 – either position is correct

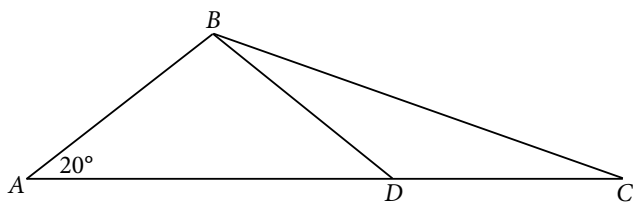
	2	0	1
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1	1	1	1
2	2	2	2
3	3	3	3
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6	6	6	6
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8	8	8	8
9	9	9	9

2	0	1	
.	.	.	.
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

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



16



In the figure above, point D is on line AC , $AB = BD = CD$, and $AD = 15$. What is the measure, in degrees, of $\angle BCD$? (Disregard the degree symbol when gridding your answer.)

17

If $15 - 3b = 21$, what is the value of $5 - b$?

18

The graph of a line in the xy -plane passes through the point $(-2, k)$ and crosses the x -axis at the point $(-4, 0)$. The line crosses the y -axis at the point $(0, 12)$. What is the value of k ?

CONTINUE



19

$$5(10x^2 - 300) + (9,844 + 50x^2)$$

The expression above can be rewritten in the form $cx^2 + d$, where c and d are constants. What is the value of $d - c$?

20

If n is a constant equal to the number of degrees in an angle measuring 3π radians, what is the value of n ?

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.

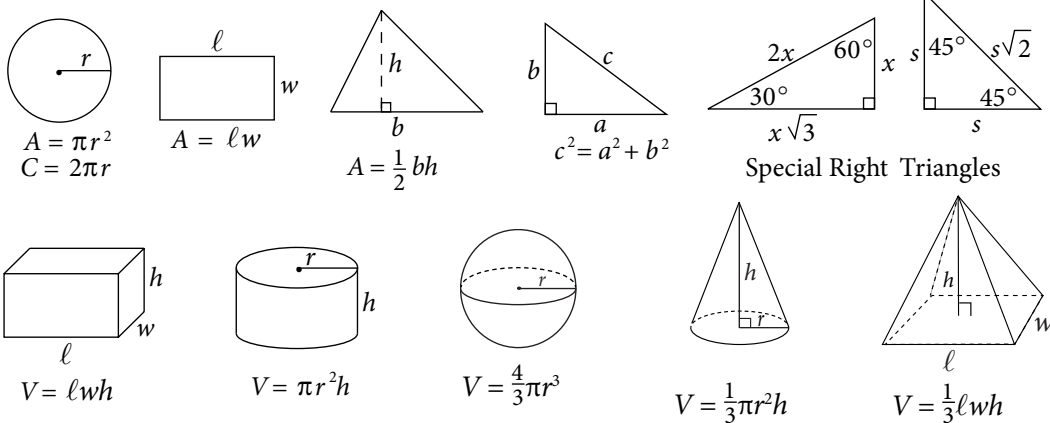
DIRECTIONS

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 certain homeowner uses a gas edger to clean up his lawn every time he mows. If the edger uses 160 milliliters of fuel each time, what is the maximum number of times the homeowner can edge his lawn with 8 liters of fuel? (1 liter = 1,000 milliliters)

- A) 5
- B) 50
- C) 100
- D) 1,000

2

Assignment Choice for Two Physics Classes

	Dr. Soper	Mr. Coelho	Total
Lab Report Only	17	21	38
Lab Report and Final Exam	3	2	5
Total	20	23	43

The table above shows the number of students who chose to be graded on lab reports only or on lab reports and final exams in Dr. Soper's and Mr. Coelho's physics classes. What fraction of the students in Dr. Soper's class chose to be graded on the lab report and final exam?

- A) $\frac{3}{43}$
- B) $\frac{5}{43}$
- C) $\frac{3}{20}$
- D) $\frac{3}{5}$

3

$$(4 - a^2) - (2a^2 - 6)$$

Which of the following expressions is equivalent to the one above?

- A) $a^2 - 2$
- B) $a^2 + 10$
- C) $-3a^2 - 2$
- D) $-3a^2 + 10$

4

The ordered pair $(3, -1)$ satisfies which of the following inequalities?

- I. $x + 3y > 0$
- II. $2x + 3y > 2$
- III. $x + y < 0$

- A) I only
- B) II only
- C) I and III only
- D) II and III only

CONTINUE

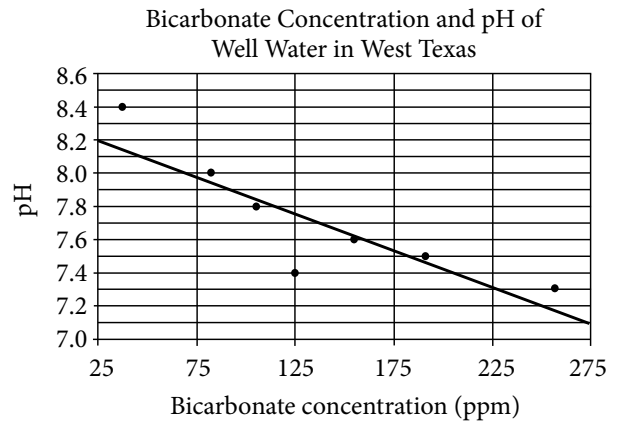


5

A psychology student randomly selected 300 people from a group of people who indicated that they preferred to work alone. Those 300 people were given a task to work on individually and then asked whether they were happy or unhappy while doing the task. Of those surveyed, 5% stated they were unhappy while doing the task. Which of the following inferences can appropriately be drawn from this survey result?

- A) Few people who prefer working alone will be unhappy doing this task.
- B) Few people who do not prefer working alone will be happy doing this task.
- C) Less than 5% of people will be happy doing this task if they do not work alone.
- D) Less than 5% of people will be unhappy doing this task if they work alone.

Questions 6 and 7 refer to the following information.



The scatterplot above shows the pH of seven well water samples in West Texas with respect to the bicarbonate concentration in ppm (parts per million). The line of best fit is also shown.

6

According to the scatterplot, which of the following statements about the relationship between a well's pH and its bicarbonate concentration is true?

- A) A well with half as much bicarbonate as another well will have a pH twice that of the other well.
- B) Wells that have more bicarbonate tend to have higher pH.
- C) Wells that have more bicarbonate tend to have lower pH.
- D) The bicarbonate concentration of the well water is unrelated to its pH.

CONTINUE



7

A new well is discovered in West Texas with a bicarbonate concentration of 225 ppm. According to the line of best fit, which of the following best approximates the pH of the well water?

- A) 7.1
- B) 7.3
- C) 7.4
- D) 8.4

8

$$25 = (ky - 1)^2$$

In the equation above, $y = -2$ is one solution. If k is a constant, what is a possible value of k ?

- A) -13
- B) -3
- C) 0
- D) 5

9

Andrew works out for 30 minutes every other day. If he spends 35% of his workout time one day waiting for the weight rack, how many seconds of that day's workout did he spend waiting for the weight rack?

- A) 630
- B) 35
- C) 21
- D) 10.5

10

If $8x - 8yz + 2 = 74$, what is the value of $x - yz$?

- A) 2
- B) 6
- C) 9
- D) 16

CONTINUE



11

A chef trimmed fat off a steak and was left with a steak weighing 8.80 ounces. If the weight of the fat was equal to 12 percent of the original weight, what was the original weight, in ounces, of the steak?

- A) 8.92
- B) 9.20
- C) 10.00
- D) 11.20

12

A backpacker is packing survival rations that consist of granola bars and packets of peanut butter. A granola bar has 470 food calories, and a packet of peanut butter has 90 food calories. The backpacker makes the survival rations using a total of 10 granola bars and packets of peanut butter combined, and the granola bars and packets of peanut butter have a total of 1,660 food calories. Which of the following systems of equations can be used to determine the number of granola bars, g , and packets of peanut butter, p , that are in the survival rations?

- A) $280(g + p) = 1,660$
 $g - p = 10$
- B) $90g + 470p = 1,660$
 $g - p = 10$
- C) $90g + 470p = 1,660$
 $g = 10 - p$
- D) $470g + 90p = 1,660$
 $g = 10 - p$

13

Ten floorboards with equal widths laid down side-to-side cover a width of approximately $7\frac{3}{4}$ feet. At this rate, which of the following is the closest to the number of boards laid side-to-side needed to cover a width of 32 feet?

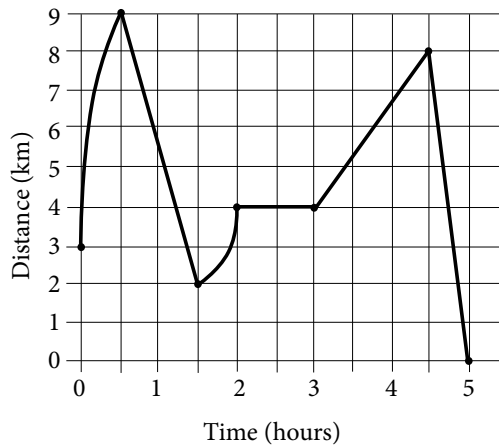
- A) 15
- B) 20
- C) 30
- D) 40

CONTINUE



14

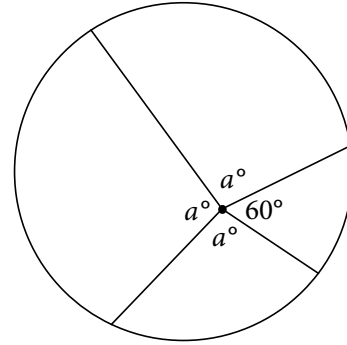
George's Distance from Home over Time



George recorded his distance from home over a five-hour period; his distance and time are shown in the graph above. According to the graph, which of the following is NOT true about the five-hour period?

- A) George's distance from home increased at a constant rate during the first hour of the five-hour period.
- B) George's distance from home reached its maximum during the first hour.
- C) George remained a constant distance from his home for one hour.
- D) George was moving further from his home for a longer period of time than he was moving closer to his home.

15



In the figure above, what is the value of a ?

- A) 40
- B) 60
- C) 100
- D) 130

16

$$y = -75x + 5,000$$

The equation above models the amount of money y , in dollars, remaining in Bo's bank account x days after the start of the fall semester. The amount of money in Bo's bank account is based on the money he earned over the summer and how much he spends per day during the fall semester. When the equation is graphed in the xy -plane, what does the slope of the graph represent in terms of the model?

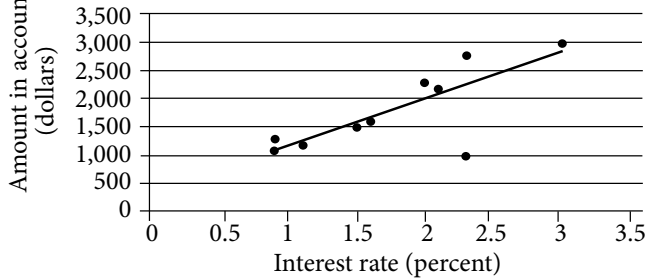
- A) The total amount in Bo's bank account
- B) Daily spending of \$5,000
- C) Daily spending of \$75
- D) The amount of money Bo earned over the summer

CONTINUE



17

Amount in Account and
Interest Rate for 10 accounts



The scatterplot above shows data for ten accounts opened by a company, along with the line of best fit. For the account that contains the least amount of money, which of the following is closest to the difference of the actual amount and the amount predicted by the line of best fit?

- A) \$200
- B) \$500
- C) \$900
- D) \$1,200

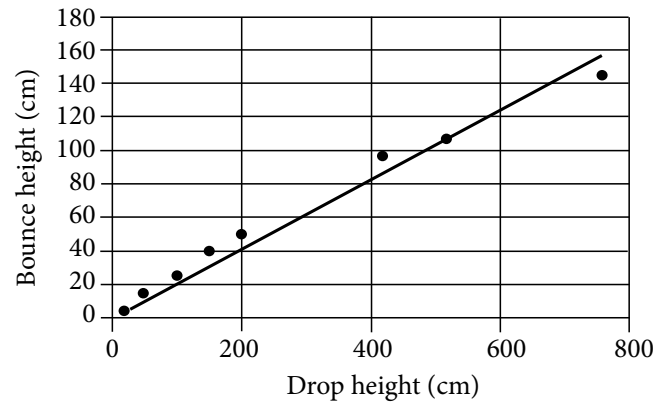
18

If $\frac{x}{3} = 4$ and $x + y = 32$, what is the value of $x - y$?

- A) -24
- B) -8
- C) 12
- D) 32

19

Drop Height and Bounce Height
for Eight Balls



The scatterplot above shows the height in centimeters for both the drop and bounce of eight different balls of the same type. The line of best fit for the data is also shown. According to the line of best fit, which of the following is closest to the predicted increase in bounce height, in centimeters, for every increase of 100 centimeters in drop height?

- A) 25
- B) 20
- C) 15
- D) 10

CONTINUE



Questions 20 and 21 refer to the following information.

Formula A: $BMI = \frac{w}{h^2}$

Formula B: $BMI = \frac{4w - 100}{5}$

The formulas above are used in nutrition to estimate the body mass index BMI , in kilograms per square meter, of adults whose weight w ranges between 50 and 100 kilograms and whose height h is measured in meters.

20

Based on Formula B, what is w in terms of BMI ?

- A) $w = 5BMI + 25$
- B) $w = 5BMI - 25$
- C) $w = \frac{5BMI + 100}{4}$
- D) $w = \frac{5BMI - 100}{4}$

21

If both Formulas A and B give the same estimate for BMI , which of the following expressions is equivalent to $4w - 100$?

- A) $\frac{w}{h^2}$
- B) $\frac{5w}{h^2}$
- C) $\frac{5w}{4h^2}$
- D) $\frac{5w + 100}{4h^2}$

22

The number of bacteria colonies h hours after the beginning of an experiment is given by the function $C(h) = 3^h - 2h + 20$. What does the number 20 represent in the function?

- A) The final rate of growth, in colonies per hour
- B) The initial rate of growth, in colonies per hour
- C) One less than the initial number of bacteria colonies
- D) One more than the final number of bacteria colonies

CONTINUE



23

Agricultural Land as a Percent of
Total Land Area, 2014

Country	Percent of Total Land Area
Brazil	33.8%
Canada	7.2%
Greenland	0.6%
Latvia	30.1%
Mexico	54.9%
New Zealand	42.2%
Russian Federation	13.3%
Turkey	50.1%
United States	44.6%

The World Bank measures the amount of land devoted to agriculture among all 196 countries in the world. The results from 9 of the countries are given in the table above. The median percent of agricultural land for all 196 countries is 34.95%. What is the difference between the median percent of agricultural land for these 9 countries and the median for all 196 countries?

- A) 1.15%
- B) 4.19%
- C) 9.65%
- D) 19.95%

24

To ship figurines, the figurines are placed in a rectangular box and then small packing pellets are added. The base of the box has an area of 4.4 in.^2 , and the height of the box is 6.5 in. If the volume of the air in the box after the figures and pellets are added is 8.0 in.^3 , which of the following is closest to the combined volume of the figurines and pellets in the box?

- A) 1.9 in.^3
- B) 20.6 in.^3
- C) 28.6 in.^3
- D) 117.84 in.^3

25

The economy of Argentina as measured by its Gross Domestic Product (GDP) is shrinking at a rate of 2.6% per year. In 2015, the GDP of Argentina was \$630 billion. Which of the following functions represents Argentina's GDP, A , in billions of dollars, y years since 2015?

- A) $A(y) = 630 - (1 - 0.26)y$
- B) $A(y) = 630(1 - 0.26)^y$
- C) $A(y) = 630 - (1 - 0.026)y$
- D) $A(y) = 630(1 - 0.026)^y$



Questions 26 and 27 refer to the following information.

Weights of Modern U.S. Coins

Coin	Grams	Drams
Penny	2.50	1.41
Nickel	5.00	2.82
Dime	2.25	1.27

The table above gives the average weight, expressed in both grams and drams, of three types of modern U.S. coins.

26

If y grams is equivalent to d drams, of the following, which best represents the relationship between y and d ?

- A) $y = 1.8d$
- B) $d = 1.8y$
- C) $yd = 1.8$
- D) $y = 0.56d$

27

If a bag of coins weighing 225 grams is filled with p pennies, n nickels, and d dimes, which of the following expresses d in terms of n and p ?

- A) $100 - \frac{10}{9}(p + 2n)$
- B) $100 + \frac{10}{9}(p + 2n)$
- C) $100 - \frac{10}{9}(p - 2n)$
- D) $100 + \frac{10}{9}(p - 2n)$

28

$$(x - 2)^2 + (y + 5)^2 = 36$$

If a circle in the xy -plane has the equation above, which of the following does NOT lie on the exterior of the circle?

- A) (2, 1)
- B) (2, 5)
- C) (5, 2)
- D) (-1, 1)

CONTINUE



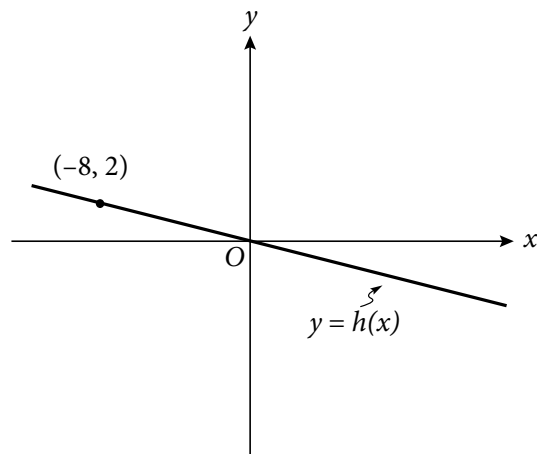
29

Month	Number of Peppers
June	2,200
July	2,640

A farmer counted the number of peppers produced by a certain field in June and July. The number counted for each month was recorded in the table above. The farmer estimates that the percent increase from June to July would be half the percent increase from July to August. How many peppers does the farmer expect the field to produce in August?

- A) 2,860
- B) 2,904
- C) 3,520
- D) 3,696

30



In the xy -plane above, a point (not shown) with coordinates (a, b) lies on the graph of the linear function h . If a and b are nonzero integers, what is the ratio of b to a ?

- A) -4 to 1
- B) -2 to 1
- C) -1 to 2
- D) -1 to 4

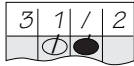


DIRECTIONS

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- 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 $3\frac{1}{2}$.)

- 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.

Answer: $\frac{7}{12}$

Write answer in boxes. →

7	/	1	2
.	.	.	.
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

Grid in result. →

Fraction line ←

Answer: 2.5

	2	.	5
.	.	.	.
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

Decimal point ←

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

	2	/	3
.	.	.	.
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
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9	9	9	9

Answer: 201 – either position is correct

	2	0	1
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5	5	5	5
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7	7	7	7
8	8	8	8
9	9	9	9

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

CONTINUE



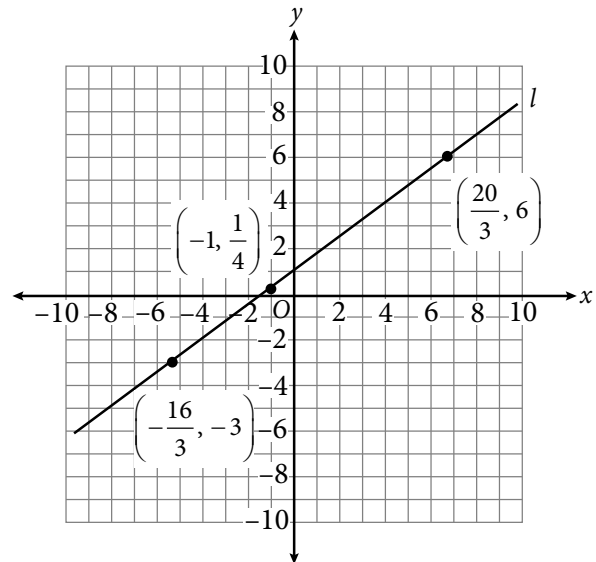
31

The raw score on a certain standardized test is determined by subtracting $\frac{1}{4}$ of the number of incorrect answers from the number of correct answers. If a student answered 30 questions and received a raw score of 20, how many questions did the student answer incorrectly?

32

One of the first diets to limit the intake of carbohydrates was prescribed by Dr. William Harvey in 1862. This diet consisted of three meals a day containing equal amounts of protein per meal. If protein contains 4 dietary calories per gram, and the diet consisted of 672 dietary calories of protein per meal, how much protein, to the nearest ounce, was in each meal? (1 ounce is approximately 28 grams.)

33



What is the slope of line l shown in the xy -plane above?

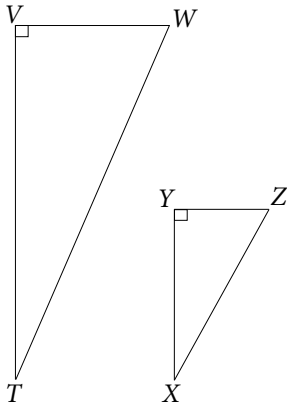
34

$$\begin{aligned} -9 - a &= b \\ a^2 - 6a - 9 &= b \end{aligned}$$

If the ordered pair (a, b) satisfies the system of equations above, what is one possible value of a ?

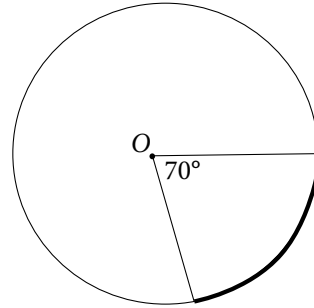


35



In the figure above, $\sin T = \frac{5}{13}$. If $TV = 24$, $XZ = 13$, and $\angle W \cong \angle Z$, what is $VW - YZ$?

36



Point O is the center of the circle above. What fraction of the circumference of the circle is the length of the bolded arc?

CONTINUE



Questions 37 and 38 refer to the following information.

Number of Participants by Number of Bullseyes Thrown and Day

	Day 1	Day 2	Day 3	Total
0 Bullseyes	2	3	4	9
1 Bullseyes	1	3	1	5
2 Bullseyes	2	3	7	12
3 Bullseyes	5	2	1	8
4 Bullseyes	3	2	0	5
5 Bullseyes	2	2	2	6
Total	15	15	15	45

The same 15 participants, on each of 3 days, threw 5 darts in order to win a bullseye contest. The number of players throwing a given number of bullseyes on each day is shown in the table above.

37

No participant threw the same number of bullseyes on two different days. If a participant is selected at random, what is the probability that the selected participant threw 3 bullseyes on Day 1 or Day 2, given that the contestant threw 3 bullseyes on one of the three days?

38

What is the mean number of bullseyes each participant threw on Day 2 ?

END OF TEST

DO NOT RETURN TO A PREVIOUS SECTION.