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SAT® Practice Test

IMPORTANT REMINDERS

1

A No. 2 pencil is required for the test. Do not use a mechanical pencil or pen.

2

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Reading Test

65 MINUTES, 52 QUESTIONS

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

DIRECTIONS

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 adapted from *Michael Ondaatje, The Cat's Table*. ©2011 by Michael Ondaatje. The novel's narrator reflects on his journey as a young boy traveling by ship from the former British colony Ceylon—now Sri Lanka—to England during the 1950s. Ramadhin and Cassius are friends he made during the journey.

His name was Mr. Fonseka and he was travelling to England to be a teacher. I would visit him every few days. He knew passages from all kinds of books he could recite by heart, and he sat at his desk all day wondering about them, thinking what he could say about them. I knew scarcely a thing about the world of literature, but he welcomed me with unusual and interesting stories, stopping abruptly in mid-tale and saying that someday I should find out what happened after that. "You will like it, I think. Perhaps he will find the eagle." Or, "They will escape the maze with the help of someone they are about to meet. . . ." Often, during the night, while stalking the ship with Ramadhin and Cassius, I'd attempt to add to the bare bones of an adventure Mr. Fonseka had left unfinished.

He was gracious, with his quietness. When he spoke, he was tentative and languid. Even then I understood his rareness by the pace of his gestures. He stood up only when it was essential, as if he were a sick cat. He was not used to public effort, even though he was now going to be a part of a public world as a teacher of literature and history in England.

I tried to coax him up on deck a few times, but his porthole and what he could see through it seemed enough nature for him. With his books, some bottled Kelani River[1] water, as well as a few family photographs, he had no need to leave his time capsule. I would visit that room if the day was dull, and he would at some point begin reading to me. It was the anonymity of the stories and the poems that went deepest into me. And the curl of a rhyme was something new. I had not thought to believe he was actually quoting something written with care, in some far country, centuries earlier. He had lived in Colombo[2] all his life, and his manner and accent were a product of the island, but at the same time he had this wide-ranging knowledge of books. He'd sing a song from the Azores or recite lines from an Irish play.

I brought Cassius and Ramadhin to meet him. He had become curious about them, and he made me tell him of our adventures on the ship. He beguiled them as well, especially Ramadhin. Mr. Fonseka seemed to draw forth an assurance or a calming quality from the books he read. He'd gaze into an unimaginable distance (one could almost see the dates flying off the calendar) and quote lines written in stone or papyrus. I suppose he remembered these things to clarify his own opinion, like a man buttoning up his own sweater to give warmth just to himself. Mr. Fonseka would not be a wealthy man. And it would be a spare life he would be certain to lead as a schoolteacher. But he had a serenity that came with the choice of the life he wanted to live. And this serenity and certainty I have seen only among those who have the armour of books close by.

I am aware of the pathos and the irony that come with such a portrait. All those foxed Penguin editions of Orwell and Gissing and the translations of Lucretius with their purple borders that he was bringing with him. He must have believed it would be a humble but good life for an Asian living in England, where something like his Latin grammar could be a distinguishing sword.

[1]River in Sri Lanka
[2]Large city in Sri Lanka

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I wonder what happened to him. Every few years, whenever I remember, I will look up any reference to Fonseka in a library. I do know that Ramadhin kept in touch with him during his early years in England. But I did not. Though I did realize that people like Mr. Fonseka came before us like innocent knights in a more dangerous time, and on the very same path we ourselves were taking now, and at every step there were no doubt the same lessons, not poems, to learn brutally by heart.

I think about Mr. Fonseka at those English schools wearing his buttoned sweater to protect himself from English weather, and wonder how long he stayed there, and if he did really stay "forever." Or whether in the end he could no longer survive it, even though for him it was "the centre of culture," and instead returned home on an Air Lanka flight that took only two-thirds of a day, to begin again, teaching in a place like Nugegoda. London returned. Were all those memorized paragraphs and stanzas of the European canon he brought back the equivalent of a bottle of river water?

1

Over the course of the passage, the narrator's focus shifts from

A) a description of the internal world of a character to an expression of sympathy for that character.
B) a recollection of interactions with a character to speculation about that character's life.
C) the discussion of a character's history to a recounting of an important turning point.
D) the narration of a childhood experience to that event's impact on the narrator's life.

2

The narrator indicates that his acquaintance with Mr. Fonseka influenced him because Mr. Fonseka

A) inspired him to become a writer.
B) motivated him to pursue teaching.
C) taught him to memorize stories.
D) introduced him to literature.

3

The narrator's use of "stalking" in line 12 has the main effect of

A) conveying a sense of fear shared by the narrator and his friends.
B) bringing a feeling of intrigue to an otherwise ordinary activity.
C) characterizing the friendship between the narrator and his friends.
D) portraying the narrator as overly dramatic.

4

The second paragraph (ines 15-20) mainly serves to

A) illustrate how certain traits in a character can undermine a character's goals.
B) provide essential details about a character's past that foreshadow the character's future.
C) reveal personal information about a character that explains the character's internal conflict.
D) demonstrate how a character's external mannerisms reflect that character's inner being.

5

The narrator indicates that he visited Mr. Fonseka's cabin on the ship when the narrator

A) felt there was nothing else more interesting to do.
B) had concerns about Mr. Fonseka's reclusive habits.
C) wanted to borrow some of Mr. Fonseka's books.
D) had not remembered the ending to a story he enjoyed.

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6

In the passage, the narrator finds it a significant contradiction in Mr. Fonseka's character that he

A) recites works about the outdoors but rarely leaves his room.
B) enjoys sharing stories but does not finish telling them.
C) has read extensively about the world but has experienced very little of it.
D) has chosen to pursue a career as a teacher but has shown small interest in it.

7

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

A) lines 5-9 ("I knew . . . that")
B) lines 18-20 ("He was . . . England")
C) lines 21-23 ("I tried . . . for him")
D) lines 31-33 ("He had . . . books")

8

In the passage, the narrator speculates that Mr. Fonseka likely believed that his knowledge of literary classics would

A) enable him to better understand English people.
B) earn him respect in his new country.
C) bring him great financial success.
D) be a gateway to many possible professions.

9

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

A) Lines 43-47 ("I suppose . . . schoolteacher")
B) Lines 47-50 ("But he . . . close by")
C) Lines 54-57 ("He must . . . sword")
D) Lines 75-77 ("Were . . . water")

10

When the narrator refers to "the equivalent of a bottle of river water" in line 75, he is suggesting that the literature Mr. Fonseka memorized will be a

A) memento of a place left behind.
B) necessary item for personal use.
C) charm bringing good luck.
D) reminder of past enjoyments.

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Questions 11-20 are based on the following passage and supplementary material.

This passage is adapted from Daniella Kupor and Zakary L. Tormala, "Glowing Reviews Aren't Always the Most Persuasive." ©2018 by Harvard Business School Publishing.

Online reviews can play a big role in influencing people's purchase decisions, but what makes a review most persuasive one way or the other? Certainly bad reviews can dissuade customers, but it turns out that some good reviews can too. Our research on persuasion and marketing is the first to find that a moderately positive review can be more persuasive than an extremely positive review. We found that a moderately positive review is even more persuasive when the default review selection is extremely positive. This is because reviews that deviate from a default review selection are perceived to be more thoughtful—and thus more accurate—than reviews that conform to the default.

We first tested this phenomenon by showing participants a consumer review for a particular brand of granola bar. The review platform preselected a 10-star rating for the granola bars, but previous customers who wished to rate the granola bar as less than ten stars could change the rating. We had participants read a single review from a previous customer and we varied whether that review gave 10 stars (the preselected default) or eight stars (a lower but still positive rating that deviated from the default). When we offered participants the choice between a free granola bar or a commensurate amount of money, we found that people who viewed the eight-star review were more likely to choose the granola bar than were people who viewed the 10-star review.

We also found that the moderately positive reviews were not just seen as more persuasive, but as more helpful. In another study, we analyzed a retail platform that asks customers to rate products on a five-star scale, and on which a five-star rating is the most frequent (and thus is the perceived default). The platform allows consumers to indicate if they find a particular review to be helpful. Because previous research suggests that consumers rate reviews as more helpful when those reviews are more persuasive, we analyzed "helpful" votes as a proxy for the review's persuasiveness. These data revealed that consumers rated deviatory (non-five-star) reviews as more helpful than non-deviatory (five-star) reviews. Again, less positive reviews appear to be more persuasive than more positive reviews in the context of an extremely positive default.

In a follow-up study we found that extreme reviews regain their persuasiveness if they are long. We presented consumers with real consumer reviews for pens, and varied the reviews' star ratings so that some deviated from a five-star default. In the first part of this study, consumers viewed brief reviews that included either a four-star or a five-star rating in the context of a 5-star default. Just as in our earlier studies, those consumers were more likely to purchase the pen when they viewed a four-star review. But when we gave them longer reviews with either four- or five-star ratings, the review's deviatory status no longer impacted consumers' desire to purchase the pen.

Consumers are largely unaware of how influenced they can be by moderate reviews. In another study, we found that when consumers want to persuade another shopper to make a similar purchase, they will often leave the highest possible rating even when they know that this highest rating is the default. In their attempts to increase their own persuasive influence, then, consumers may inadvertently decrease it by avoiding moderate endorsements, even when they themselves find such endorsements to be more persuasive.

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Figure 1

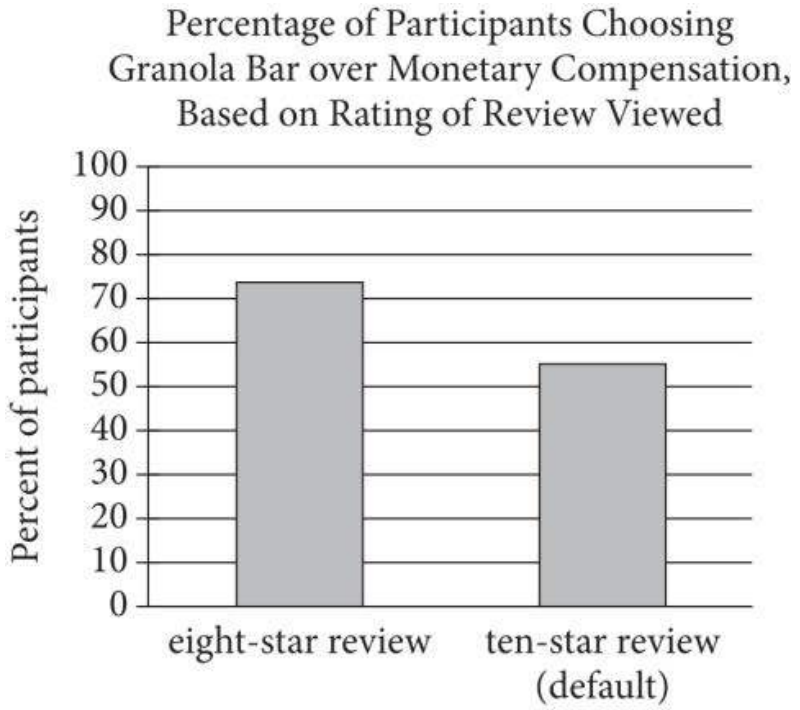

Figure 2

Participants' Perception of Accuracy and Thoughtfulness of Reviews of a Cleaning Services under Various Rating and Default-Rating Conditions

	Ten-star default rating		Eight-star default rating	
	Ten-star review	Eight-star review	Ten-star review	Eight-star review
Mean perception of the review's accuracy (1="not at all"; 7="very much")	3.59	5.48	5.06	3.41
Mean perception of the review's thoughtfulness (1="not at all"; 7="very much")	3.26	5.41	5.10	3.08

Figures adapted from Daniella Kupor and Zakary Tormala, "When Moderation Fosters Persuasion: The Persuasive Power of Deviatory Reviews." ©2018 by Daniella Kupor and Zakary Tormala.

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11

Which choice best describes the overall structure of the passage?

A) Researchers present experimental results and then propose practical applications for them.
B) Researchers question an accepted claim and then reveal the reasons for their doubts.
C) Researchers describe surprising findings and then examine a variety of possible explanations for them.
D) Researchers offer an explanation for an unexpected phenomenon and then present studies supporting the explanation.

12

According to the passage, the researchers were primarily interested in investigating which question?

A) Are consumers likely to believe that extremely positive reviews are intentionally deceptive marketing tools?
B) Why are moderately positive reviews just as likely to deter purchases as they are to encourage them?
C) In what circumstances might positive reviews have effects similar to those of negative reviews?
D) Do consumers find qualitative reviews with no numerical ratings less accurate than those with numerical ratings?

13

As used in line 12, "conform to" most nearly means

A) adjust to.
B) correspond to.
C) reconcile with.
D) combine with.

14

Which choice best supports the idea that when writing product reviews, review writers tend not to draw from their own experiences of using reviews to make purchasing decisions?

A) lines 36-38 ("These . . . (five-star) reviews")
B) lines 38-40 ("Again . . . default")
C) lines 55-59 ("In another . . . default")
D) lines 59-63 ("In their . . . persuasive")

15

The sentence in lines 41-42 ("In a . . . long") mainly serves to

A) introduce testing conditions that determined the limits of the authors' earlier findings.
B) concede the failure of a theory in its wider applications.
C) reinforce the research goal originally proposed by the authors.
D) suggest practical solutions to a common problem.

16

As used in line 52 "status" most nearly means

A) legitimacy.
B) nature.
C) immobility.
D) prestige.

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17

Based on the passage, what would the effect on the data reflected in figure 1 be if participants in the first study discussed in the passage had been given long reviews to read but no other changes were made to the study?

A) The ten-star review group's percentage would increase significantly over the percentage of the eight-star review group.
B) The ten-star review group's percentage would increase to a level similar to the percentage of the eight-star review group.
C) The eight-star review group's percentage would decrease to a percentage significantly below the percentage of the ten-star review group.
D) Both the eight-star and the ten-star review groups' percentages would remain unchanged.

18

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

A) lines 42-45 ("We presented . . . from a five-star default")
B) lines 45-48 ("In the . . . of a 5-star default")
C) lines 48-50 ("Just . . . review")
D) lines 50-53 ("But when . . . pen")

19

According to figure 2, the mean perception of the review's accuracy was lower than the mean perception of the review's thoughtfulness in which condition?

A) Ten-star reviews in the ten-star default category
B) Eight-star reviews in the ten-star default category
C) Ten-star reviews in the eight-star default category
D) Eight-star reviews in the eight-star default category

20

Which statement do the data in figure 2 best support?

A) Participants found rating systems with eight-star defaults to be highly accurate.
B) Participants did not find ten-star reviews to be thoughtful or accurate.
C) Participants trusted deviatory reviews only when the default rating was extremely high.
D) Participants trusted deviatory reviews more than non-deviatory reviews regardless of the default rating.

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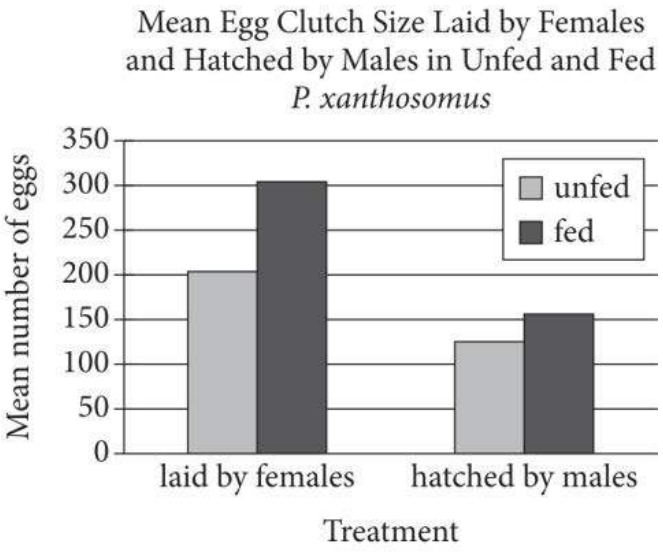
Questions 21-31 are based on the following passage and supplemental material.

This passage and accompanying graph are adapted from Marian Y. L. Wong and Peter M. Buston, "Social Systems in Habitat-Specialist Reef Fishes: Key Concepts in Evolutionary Ecology." ©2013 by American Institute of Biological Sciences. Reproductive suppression occurs when some sexually mature members of a species are prevented from breeding.

Paragobiodon xanthosomus is an obligate coral-dwelling goby (Gobiidae) that resides in just one type of host coral, *Seriatopora hystrix*. Within groups, only the largest male and female breed monogamously with each other, and all other group members are nonbreeding subordinate females that are reproductively suppressed. To determine whether resource limitation was the cause of female reproductive suppression, University of Wollongong biologist Marian Y. L. Wong and her colleagues began by identifying three key resources that could affect female reproductive success. First, the reproductive success of females may be limited by a shortage of suitable breeding sites with which to successfully rear offspring, given that *P. xanthosomus* lays eggs in a nest site within the coral colony itself. Second, the reproductive success of females may be limited by the availability of food resources necessary to produce or feed offspring, given that female fecundity in fishes is often limited by the abundance of food. Third, because parental care is only provided by the breeding male, the reproductive success of females could be limited by paternal care if the males can successfully care for the eggs laid by only one female at a time.

To determine whether nest sites were limiting, Wong and colleagues experimentally removed the existing nest site used by breeding pairs within the coral. In all cases of removal, the pair simply picked another branch and laid their eggs, which suggests that nest sites were not limiting. To determine whether food was limiting, a field experiment was performed in which both males and females in natural pairs were fed by squirting high-protein marine fish pellets into their coral colony using a syringe. After a 3-week feeding period, egg clutches from each pair were collected as soon as they were laid, and clutch sizes were compared between fed and unfed pairs. As was predicted, the females that were fed laid significantly larger clutches than those that were unfed, which suggests that food was a limiting factor for female reproduction. In the same experiment, Wong and colleagues also determined whether paternal care was limiting by collecting egg clutches from fed and unfed pairs just prior to hatching (approximately 4–5 days after laying). Since *P. xanthosomus* males provide sole care of eggs, the size of a clutch at hatching essentially reflects the ability of males to care for their eggs. Therefore, if the males in fed pairs did not hatch significantly larger clutches than did the males in unfed pairs, despite the females in the fed pairs laying larger clutches than those laid by the unfed pairs, this would suggest that males are unable to care for the eggs laid by more than one female under natural circumstances. Indeed, there was no difference in clutch sizes at hatching between the fed and unfed pairs, which indicates that male parental care is another limiting reproductive resource over which females may compete.

In summary, a refined experimental assessment of the benefits of reproductive suppression and monogamy has demonstrated that resource limitation underlies reproductive suppression and female competition. Therefore, habitat-specialist reef fishes have provided an important new insight into mating system theory. Since these experiments, the role of resource limitation has been reported in a social mammal, and those results suggested that resource limitation could serve as a widespread explanation for reproductive suppression and the mating systems of social species in general.



Difference in mean number of eggs hatched by males was not statistically significant.

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21

The main purpose of the passage is to

A) discuss the role of paternal care in reproductive suppression in *P. xanthosomus* gobies.
B) examine the link between reproductive suppression in *P. xanthosomus* gobies and in social mammals.
C) provide a cost-benefit analysis of reproductive suppression in *P. xanthosomus* gobies.
D) investigate factors that contribute to reproductive suppression in *P. xanthosomus* gobies.

22

Which choice best describes the overall structure of the passage?

A) The basis of a study by Wong and her colleagues is introduced, the process of the study and its findings are summarized, and a conclusion explaining the significance of the findings is put forth.
B) The characteristics of a particular species are described, the findings of Wong and her colleagues about that species are provided, and a follow-up study of other species is recommended.
C) Previous research on a topic is summarized, current research on the same topic by Wong and her colleagues is discussed, and the implications of their cumulative research are explained.
D) A hypothesis by Wong and her colleagues regarding a certain species is offered, findings that challenge the hypothesis are discussed, and the merits of the findings are considered.

23

The passage suggests that the factor that most directly influences the rank of an individual adult within a particular group of *P. xanthosomus* is the

A) ability of the individual to obtain resources.
B) rank of the parents of the individual.
C) relative size of the individual.
D) size of the clutch the individual is able to lay.

24

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

A) line 1-3 ("Paragobiodon . . . hystrix")
B) line 3-6 ("Within . . . suppressed")
C) line 6-11 ("To determine . . . success")
D) line 18-22 ("Third . . . time")

25

As used in line 7, line 24, and line 9, "determine" most nearly means

A) discover.
B) dictate.
C) choose.
D) predict.

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26

Based on the research as presented in the passage, which conclusion can most reasonably be made about the average clutch size of a breeding female *P. xanthosomus*?

A) The average clutch size of a breeding female may increase if the number of nonbreeding subordinate females in her group increases.
B) The average clutch size of a breeding female may increase if her breeding partner is replaced with a different male.
C) The average clutch size of a breeding female may decrease if the natural food supply becomes scarce for a sufficient period of time.
D) The average clutch size of a breeding female may decrease if the number of suitable nesting sites in her coral colony decreases.

27

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

A) lines 26-28 ("In all . . . limiting")
B) lines 29-32 ("To determine . . . syringe")
C) lines 35-38 ("As was . . . reproduction")
D) lines 42-45 ("Since . . . eggs")

28

As used in line 44, "reflects" most nearly means

A) indicates.
B) speculates.
C) repeats.
D) reverses.

29

The last sentence of the passage serves mainly to

A) indicate further research questions about reproductive suppression in gobies left unanswered by the experiments described in the passage.
B) suggest that the conclusions drawn from the experiments described in the passage have been corroborated by another study and are likely to apply to many species.
C) provide a definition of mating system theory and show that the findings of the experiments described in the passage are consistent with that theory.
D) detail studies that the researchers who ran the experiments described in the passage plan to conduct to examine reproductive suppression in social mammals.

30

According to the graph, the mean number of eggs laid by unfed females was closest to

A) 50.
B) 100.
C) 150.
D) 200.

31

Which statement about the mean number of eggs hatched by males of the species *P. xanthosomus* is best supported by the graph?

A) The mean number of eggs hatched by fed males is approximately 150.
B) The mean number of eggs hatched by unfed males is approximately 200.
C) The mean number of eggs hatched by fed males exceeds the mean number of eggs laid by unfed females.
D) The mean number of eggs hatched by fed males is roughly equivalent to the mean number of eggs laid by unfed females.

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Questions 32-42 are based on the following passage.

This passage is adapted from a speech delivered in 1860 by Frederick Douglass, "A Plea for Free Speech in Boston." Douglass was a prominent African American abolitionist.

The world knows that last Monday a meeting assembled to discuss the question: "How Shall Slavery Be Abolished?" The world also knows that that meeting was invaded, insulted, captured, by a mob of gentlemen, and thereafter broken up and dispersed by the order of the mayor, who refused to protect it, though called upon to do so. If this had been a mere outbreak of passion and prejudice among the baser sort . . . hounded on by some wily politician to serve some immediate purpose,—a mere exceptional affair,—it might be allowed to rest with what has already been said. But the leaders of the mob were gentlemen. They were men who pride themselves upon their respect for law and order.

These gentlemen brought their respect for the law with them and proclaimed it loudly while in the very act of breaking the law. Theirs was the law of slavery. The law of free speech and the law for the protection of public meetings they trampled underfoot, while they greatly magnified the law of slavery. . . .

No right was deemed by the fathers of the Government more sacred than the right of speech. It was in their eyes, as in the eyes of all thoughtful men, the great moral renovator of society and government. Daniel Webster called it a homebred right, a fireside privilege. Liberty is meaningless where the right to utter one's thoughts and opinions has ceased to exist. That, of all rights, is the dread of tyrants. It is the right which they first of all strike down. They know its power. Thrones, dominions, principalities, and powers, founded in injustice and wrong, are sure to tremble, if men are allowed to reason of righteousness, temperance, and of a judgment to come in their presence. Slavery cannot tolerate free speech. Five years of its exercise would banish the auction block and break every chain in the South. They will have none of it there, for they have the power. But shall it be so here?

Even here in Boston, and among the friends of freedom, we hear two voices: one denouncing the mob that broke up our meeting on Monday as a base and cowardly outrage; and another, deprecating and regretting the holding of such a meeting, by such men, at such a time. We are told that the meeting was ill-timed, and the parties to it unwise.

Why, what is the matter with us? Are we going to palliate and excuse a palpable and flagrant outrage on the right of speech, by implying that only a particular description of persons should exercise that right? Are we, at such a time, when a great principle has been struck down, to quench the moral indignation which the deed excites, by casting reflections upon those on whose persons the outrage has been committed? After all the arguments for liberty to which Boston has listened for more than a quarter of a century, has she yet to learn that the time to assert a right is the time when the right itself is called in question, and that the men of all others to assert it are the men to whom the right has been denied?

It would be no vindication of the right of speech to prove that certain gentlemen of great distinction, eminent for their learning and ability, are allowed to freely express their opinions on all subjects—including the subject of slavery. Such a vindication would need, itself, to be vindicated. It would add insult to injury. Not even an old-fashioned abolition meeting could vindicate that right in Boston just now. There can be no right of speech where any man, however lifted up, or however humble, however young, or however old, is overawed by force, and compelled to suppress his honest sentiments.

Equally clear is the right to hear. To suppress free speech is a double wrong. It violates the rights of the hearer as well as those of the speaker. It is just as criminal to rob a man of his right to speak and hear as it would be to rob him of his money. I have no doubt that Boston will vindicate this right. But in order to do so, there must be no concessions to the enemy. When a man is allowed to speak because he is rich and powerful, it aggravates the crime of denying the right to the poor and humble.

The principle must rest upon its own proper basis. And until the right is accorded to the humblest as freely as to the most exalted citizen, the government of Boston is but an empty name, and its freedom a mockery. A man's right to speak does not depend upon where he was born or upon his color. The simple quality of manhood is the solid basis of the right—and there let it rest forever.

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32

A central claim of the passage is that free speech is a right that

A) exists independently of the circumstances of one's birth.
B) must be used to abolish social injustices such as slavery.
C) is frequently not appreciated by the American public.
D) is most often abused by people with power and means.

33

As used in line 10, "exceptional affair" most nearly means

A) brilliant occasion.
B) famous event.
C) surprising occurrence.
D) isolated incident.

34

Douglass indicates that the nation's original founders believed that

A) the exercise of free speech should be limited to specific circumstances.
B) they had successfully ensured free speech for all citizens.
C) free speech provides a means by which democracy can improve itself.
D) individuals were responsible for protecting their own right to free speech.

35

Douglass's use of the words "banish" and "break" (line 34) mainly serves to

A) underscore the injustice of slavery as an institution that disallows free speech.
B) emphasize the potency of free speech as a means of dismantling slavery.
C) convey the ruthlessness of powerful individuals who suppress free speech.
D) suggest the intensity of the struggle that will be required to safeguard free speech.

36

Douglass most strongly suggests that people who criticize the timing and wisdom of the meeting are

A) moderately regretful about the situation, since they unknowingly aided the mob in suppressing free speech.
B) highly hypocritical in their actions, since they had initially encouraged the meeting to discuss abolishing slavery.
C) somewhat complicit in the mob's violation of free speech, since they suggest that the right of speech is conditional.
D) keenly remorseful for the opinion they have expressed, since they recognize that they have caused a rift among abolitionists in Boston.

37

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

A) lines 14-16 ("These . . . law")
B) lines 28-32 ("Thrones . . . presence")
C) lines 44-47 ("Are . . . right")
D) lines 64-67 ("There . . . sentiments")

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38

The passage most strongly suggests that Douglass's criticism of Boston's response to the invasion of the meeting is based partly on his assumption that its citizens

A) should understand the importance of upholding a freedom when its existence is threatened.
B) would sympathize more with the goals of the mob than with the goals of the people holding the meeting.
C) believe that the right to free speech depends on one's social status.
D) are uninformed about the exact nature of the events that occurred during the meeting.

39

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

A) lines 37-42 ("Even . . . time")
B) lines 51-56 ("After . . . denied")
C) lines 61-62 ("Such . . . injury")
D) lines 68-69 ("Equally . . . wrong")

40

The main purpose of the sentence in lines 62-64 ("Not . . . now") is to

A) highlight the degree to which the ability to speak freely in Boston has suffered at the hands of the mob.
B) indicate that political meetings in Boston require all speakers to exercise caution.
C) suggest that expressions of outrage over slavery were more intense during abolition meetings of the past.
D) convey nostalgia for a time when people of distinction regularly attended abolition meetings.

41

Douglass maintains that in order for individuals to exercise the right of free speech, it is necessary that they have a

A) government that is willing to listen to their grievances.
B) system of education that promotes equality for all citizens.
C) legal system in which victims of crime can expect justice.
D) public forum in which they do not feel threatened

42

The sentence in lines 70-72 ("It is . . . money") mainly serves to

A) imply that the right of speech and the protection of wealth are both essential to the pursuit of happiness.
B) highlight the illegality of violating free speech by juxtaposing the violation with an acknowledged crime.
C) point out that when individuals are denied the right of free speech, they are also placed at financial risk.
D) suggest that individuals should value the right of speech as much as they value the right to amass money.

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Questions 43-52 are based on the following passages.

Passage 1 is adapted from Philip Ball, "Did Cracking Continent Trigger a Deep Freeze?" ©2004 by Springer Nature. Passage 2 is adapted from Annie Sneed, "A New Idea on How Earth Became a Giant Snowball." ©2017 by Scientific American, a division of Springer Nature America, Inc.

Passage 1

The theory that the Earth was once completely frozen emerged in the 1960s, when scientists realised that global freezing could happen if the polar ice sheets grew above a certain threshold size. Because bright ice reflects sunlight and heat back into space, growing ice sheets cause further cooling. This feedback loop could tip the climate system into a deep freeze.

The planet could eventually thaw as carbon dioxide from volcanoes poking through the ice warms it.

In the late 1980s, Joe Kirschvink nicknamed this state 'Snowball Earth'. Around the same time, geologists began to uncover hints in the geological record that this freeze-thaw process might have happened at least once in the distant past—at the end of the Proterozoic eon, 600 to 800 million years ago.

But it was unclear what could have tipped the world into that state in the first place. Yannick Donnadieu in Gif sur Yvette, France, and co-workers provided an explanation.

Donnadieu and colleagues have run computer simulations of global climate change 750 million years ago during the break-up of Rodinia, a supercontinent in which nearly all of the present-day continents were welded together around the South Pole. As the vast land mass fragmented into smaller pieces, driven by the engine of continental drift, they found that evaporation from smaller seas between the isolated continents increased the rainfall over land areas.

The increased rainfall in turn speeded the weathering of any exposed rock. As rock is worn away by water, chemical reactions take place in which carbon dioxide from the air becomes bound up in carbonate minerals. The more rain there is, the more of this greenhouse gas is extracted from the air.

The team also note that the break-up of Rodinia was prompted in part by the eruption of great plains of volcanic rock. The fresh rock from a volcano is more reactive than old rock, and so it weathers more quickly, sucking up even more carbon dioxide.

In the researchers' computer models, the combined effects of higher rainfall and quick-weathering rock reduced the levels of carbon dioxide below the threshold needed to trigger a Snowball Earth.

Passage 2

One of the most popular ideas [about what sparked snowball Earths] focuses on weathering, a natural process that captures and stores carbon via the chemical breakdown of rocks. When the supercontinent Rodinia broke up around 750 million years ago, the new, smaller continents scattered to locations around the equator where it was warm and wet—prime conditions for weathering. In addition, large volcanic regions would have emerged as the giant land mass fragmented, which would have been extremely vulnerable to weathering.

The problem: weathering works incredibly slowly —the process is constantly happening but it affects the global climate on a million-year time scale. Earth's climate system usually self-corrects in that amount of time. Plus, the greater volcanic activity would have released carbon dioxide, making it even harder to push Earth into a snowball state. This supercontinent breakup scenario could have caused a runaway cooling effect only if weathering outpaced other feedbacks in the climate system, explains Francis Macdonald.

Macdonald dated a volcanic region, called the Franklin Large Igneous Province (LIP). He discovered the Franklin LIP became active close to when the first snowball Earth event began around 717 million years ago. "I started thinking: How could these be so coincident? How might they be related?" he says.

Macdonald and Robin Wordsworth used a combination of geologic evidence and modeling to test whether the Franklin LIP could be the culprit. In a new study, they show the Franklin LIP's volcanic activity could have caused extreme climate cooling. That is because of a unique combination of factors: First, the Franklin LIP formed in an area rich in sulfur; as it erupted, large plumes of hot gas and dust would have lofted sulfur particles kilometers into the air. Sulfur particles block the incoming sun and also keep heat from escaping Earth, which can create either a warming or cooling effect, depending on the location. That's why the next piece of physical evidence is key—geologic records show the Franklin LIP sat at the equator where Earth receives more solar energy than the amount of heat it radiates back out to space. According to the researchers' model, if enough

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90 sulfur particles reached high enough into the atmosphere at this equatorial location, it would block enough of the sun's incoming energy to trigger runaway cooling.

43

The main purpose of the fourth paragraph of Passage 1 (lines 16-19) is to

A) indicate the author's skepticism about the validity of a finding.
B) present a hypothesis that is supported by the results of a study.
C) dismiss recent criticism of a widely accepted explanation.
D) identify a research question that a team of scientists investigated.

44

As used in line 30, "exposed" most nearly means

A) unguarded.
B) threatened.
C) debunked.
D) uncovered.

45

As used in line 37, "fresh" most nearly means

A) pure.
B) new.
C) natural.
D) vivid.

46

According to Passage 2, in addition to the presence of sulfur in the Franklin LIP, which factor would have determined whether a Snowball Earth was possible approximately 717 million years ago?

A) The amount of rainfall occurring in the Franklin LIP
B) The geographic positioning of the Franklin LIP
C) The age of the rock formations in the Franklin LIP
D) The duration of volcanic eruptions in the Franklin LIP

47

Based on Passage 2, which additional finding, if true, would most likely help validate Macdonald and Wordsworth's hypothesis?

A) Several large volcanic regions extending beyond the Franklin LIP were also found to be rich in sulfur.
B) The amount of sulfur emitted during volcanic eruptions in the Franklin LIP was less than the amount of carbon dioxide emitted.
C) Volcanic eruptions in the Franklin LIP were powerful enough to propel sulfur particles to an altitude where they could redirect solar energy.
D) Volcanic activity occurring in the Franklin LIP caused the breakup of Rodinia into several smaller landmasses.

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48

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

A) lines 67-70 ("He discovered . . . ago")
B) lines 75-77 ("In a . . . cooling")
C) lines 79-82 ("First . . . the air")
D) lines 89-93 ("According . . . cooling")

49

Which choice best states the relationship between the two passages?

A) Passage 2 provides an alternative explanation for a phenomenon discussed in Passage 1.
B) Passage 2 considers additional evidence that supports a hypothesis presented in Passage 1.
C) Passage 2 criticizes the methodology used in a study that is described in Passage 1.
D) Passage 2 speculates on the long-term effects of a phenomenon that is detailed in Passage 1.

50

Based on the passages, Donnadieu and colleagues (Passage 1) and Macdonald and Wordsworth (Passage 2) would most likely agree with which claim regarding a Snowball Earth event at the end of the Proterozoic eon?

A) The event likely occurred despite a predominantly warm and wet climate.
B) The event likely developed partially as a result of the emergence of active volcanic regions.
C) The event likely escalated as polar ice sheets absorbed more solar energy than was reflected back into the atmosphere.
D) The event likely ended when the amount of carbon dioxide in the atmosphere exceeded the amount stored in carbonate minerals.

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51

Based on Passage 2, it can most reasonably be inferred that the validity of the researchers' claim in the last paragraph of Passage 1 depends on which assumption about geologic conditions during the time of the breakup of Rodinia?

A) The smaller continents that resulted from the breakup of Rodinia remained primarily near the South Pole.

B) A decline in volcanic activity likely reduced the amount of carbon dioxide released into the atmosphere.

C) The process of weathering released certain particles into the atmosphere that are known to have warming effects.

D) The rate at which carbon dioxide was captured through weathering exceeded the rate at which it was released through volcanic activity.

52

Which choice from Passage 2 provides the best evidence for the answer to the previous question?

A) lines 47-51 ("When . . . weathering")

B) lines 55-57 ("The problem . . . scale")

C) lines 61-65 ("This . . . Macdonald")

D) lines 82-85 ("Sulfur . . . location")

STOP

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

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No Test Material On This Page

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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.

In Search of Vikings

In 1961, Norwegian archaeologists set out across the Atlantic Ocean to investigate the legendary Viking presence in North America. While many scholars believed the land referred to in the Norse epics as Vinland was a part of Canada or the United States, no physical evidence of a Norse village had ever been discovered in North America. 1 The absence of physical evidence can be a major issue for crime investigators, but historians struggle with this problem as well.

1

Which choice provides the most effective transition to the discussion that follows in the passage?

A) NO CHANGE
B) Physical evidence of Norse villages, however, is extensive throughout Scandinavia and has been carefully studied by archaeologists.
C) Regardless of what these archaeologists discovered, the Norse epic Saga of the Greenlanders contains interesting information about the alleged Viking presence in North America.
D) That changed when these archaeologists began excavating a remote stretch of the Canadian coast.

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CONTINUE
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The team of researchers, which included Anne Stine Ingstad, who studied archaeology at the University of Oslo, sailed around the coast of Newfoundland, Canada, 2 looked for a place that fit the description in the Norse sagas. A local fisherman from the village of L'Anse aux Meadows led them to a nearby site that featured large, unusual dirt-covered mounds that looked like houses, and the team decided to begin digging. 3 With Ingstad supervising the dig 4 at the course of several years, their excavations provided the first solid archaeological evidence for the theory of Norse contact with North America. Ingstad and her team uncovered the remains of nine structures, including a great hall with a central fireplace just like the ones the Vikings built in Greenland, Iceland, and Scandinavia.

While the architectural elements found by Ingstad's team indicated possible Norse occupation, some thought these remains could be evidence of the Indigenous Beothuk people, who populated the area at least five hundred years prior to the alleged Viking landing. Ingstad sought proof that the remains were Norse in particular. The Beothuk people were hunter-gatherers who made advanced tools and structures out of wood and bone, 5 and they used canoes made of bark for many activities. When Ingstad and her team found one-thousand-year-old scraps of iron, melted metal, and part of a stone anvil, they concluded the remains were Norse, providing proof of a westward Norse migration.

2

A) NO CHANGE
B) looking
C) they looked
D) and who were looking

3

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

> In a published account of her work with the team, Ingstad describes L'Anse aux meadows and its environs as "a fair land . . . bathed in sunshine."

Should the writer make this addition here?

A) Yes, because it provides an effective transition to the sentence that follows.
B) Yes, because it offers evidence that supports the main ideas of the paragraph.
C) No, because it offers loosely related information that interrupts the discussion in the paragraph.
D) No, because it contradicts information provided in the previous sentence.

4

A) NO CHANGE
B) over the course to
C) over the course of
D) at the course along

5

Which choice provides the best transition to the paragraph's concluding sentence?

A) NO CHANGE
B) but they did not employ ironworking.
C) and they lived in tents during the summer.
D) though researchers do not know much about their religious practices.

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CONTINUE
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Not only did Ingstad's excavation establish the presence of Vikings, but it also 6 revealed much about their daily lives. Ingstad uncovered 7 structures. These structures included sheds for protecting boats as well as the remains of a bathhouse. She also found a small stone spinning wheel. According to the sagas, spinning yarn was work generally performed by Norse 8 women this find suggested that women were among the settlers on

6

Which choice most effectively sets up the details provided in the paragraph?

A) NO CHANGE
B) led to an excellent book about the team's adventures.
C) prompted the Newfoundland government to establish the excavation site as an authentic ancient monument.
D) helped cement Ingstad's reputation as a first-rate archaeologist.

7

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

A) structures, ones such as sheds for the protection of boats and
B) structures, and these structures also included sheds for boats' protection as well as
C) structures such as sheds for protecting boats and
D) structures; those that were discovered included sheds that were used in order to protect boats as well as

8

A) NO CHANGE
B) women, thus,
C) women, consequently,
D) women, so

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the site. The artifacts that Ingstad found led 9 her, to conclude that more than one hundred Vikings had lived at the site for several years, using 10 them as a base to explore other parts of the coastline. The archaeologists' findings definitively 11 rewrote the history of Viking exploration, confirming that Europe and North America had far older links than people had previously believed.

9

A) NO CHANGE
B) her to conclude that
C) her, to conclude that,
D) her to conclude, that

10

A) NO CHANGE
B) it
C) those
D) each of these

11

A) NO CHANGE
B) revised, thanks to their discoveries, the history
C) rewrote and reworked the history
D) rewrote in an authoritative manner the historical account

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

The New Fish on the Block

Species throughout time have been shaped by divergent evolution, in which a population becomes more distinct from the rest of its species as 12 they adapt to a habitat. Biologists have long assumed that most organisms will 13 initially struggle in the beginning to survive when faced with an unfamiliar environment. 14 However, a recent study by biologists Daniel Bolnick and William Stutz at the University of Texas at Austin shows how newcomers to an ecosystem can 15 thrive. When they thrive it allows locally rare traits to persist and keeps different populations within the same species genetically closer together.

The experiment's subject was the three-spined stickleback fish. Bolnick and Stutz examined how two 16 ecotypes, or, geographic variants, of stickleback—relatively smaller ones from lakes and larger ones from streams—fared when removed from their usual habitats.

12

A) NO CHANGE
B) those adapt
C) it adapts
D) these adapt

13

A) NO CHANGE
B) initially struggle with great effort
C) initially, at the beginning, struggle quite extensively
D) initially struggle

14

A) NO CHANGE
B) In addition,
C) Therefore,
D) Moreover,

15

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

A) thrive—in doing this, it allows locally rare traits to persist and keeps
B) thrive and so then allows locally rare traits to persist and keeps
C) thrive: and in this way locally rare traits can persist, keeping
D) thrive, allowing locally rare traits to persist and keeping

16

A) NO CHANGE
B) ecotypes or geographic variants,
C) ecotypes or, geographic variants
D) ecotypes, or geographic variants,

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CONTINUE

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They also wanted to test whether there was an advantage to being the less-common 17 ecotype, the researchers placed sticklebacks from each environment into multiple cages in lakes and streams. Each cage contained two fish of one ecotype and one of the other. In half the cages, lake sticklebacks were in the 18 majority; in the other half, stream sticklebacks were in the majority. The scientists then measured fish survival rates over six weeks.

17

A) NO CHANGE
B) ecotype, so, then the
C) ecotype. The
D) ecotype: and the

18

A) NO CHANGE
B) majority,
C) majority
D) majority:

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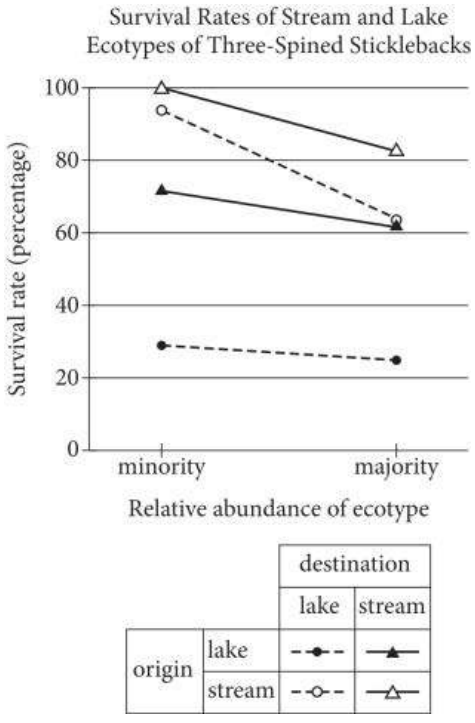
The results suggested that moving into a new habitat could be beneficial. The survival rate 19 of lake-origin sticklebacks in both lake and stream cages was higher than that of stream-origin sticklebacks in both cages, regardless of whether they were in the majority or the minority. This advantage was attributed to the greater amount of nutrients in stream ecosystems. Independent of a fish's origin or destination, though, both ecotypes survived at higher rates when they were in the minority. When stream fish were placed into lake cages, for example, their survival rate as the majority ecotype was about 20 60 percent. When they were in the minority, nearly 75 percent survived. The researchers inferred that an advantage of the rare ecotype was having a diet that differed from that of the residents. "You come in and you eat something nobody else around you eats, so you aren't competing for food," Bolnick notes.



Adapted from Daniel I. Bolnick and William E. Stutz, "Frequency Dependence Limits Divergent Evolution by Favouring Rare Immigrants over Residents." ©2017 by Macmillan Publishers Ltd.

19

Which choice offers the best interpretation of the data in the graph?

A) NO CHANGE
B) was highest for stream-origin sticklebacks placed in lake cages,
C) of lake-origin sticklebacks in stream cages was more than twice that of lake-origin sticklebacks in lake cages,
D) was lowest for lake-origin sticklebacks in stream cages,

20

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

A) NO CHANGE
B) 65 percent. When they were in the minority, nearly 95
C) 30 percent. When they were in the minority, nearly 35
D) 85 percent. When they were in the minority, nearly 100

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The 21 researcher's concluded that because newcomers face less competition, they are able to survive more often and pass on their genes in their new environment. As a result, the pace of divergent evolution, the process by which populations within a species become genetically different, slows. In addition, as genes are passed on, genetic variation increases. Since variation allows species to express traits that were once rare but are often advantageous, the 22 species can rely on diet to survive.

21

A) NO CHANGE
B) researchers' concluded that because newcomer's
C) researchers' concluded that because newcomers'
D) researchers concluded that because newcomers

22

Which choice provides the most effective conclusion to the passage?

A) NO CHANGE
B) species' chances of survival grow.
C) species can survive in both lakes and streams.
D) species' survival depends on its members' relative size.

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Questions 23-33 are based on the following passage.

A Space of One's Own

23 Until Shelly Palmer—the CEO of a technology and marketing company—returned home from a meeting, he found that a family member had cleaned and organized his notoriously messy desk. Palmer quickly realized that he could not find the materials he needed and that the space was poorly suited to the way he was used to working. 24 Stringent workplace rules may trigger employee complaints in many traditional offices, where employers implement "clean desk policies" based on the notion that having too many items on and around one's desk can be distracting, hampering an employee's performance. 25 As it turns out, the state of an employee's desk can reflect a number of things about an employee's personality.

23

A) NO CHANGE
B) When
C) Whereas
D) DELETE the underlined portion.

24

Which choice provides the most effective transition from the previous sentences to the information that follows in this sentence?

A) NO CHANGE
B) In home offices such as Palmer's, workers are not typically bound to a strict schedule, unlike
C) Such imposition of order onto a worker's desk occurs on a larger scale
D) Complex filing systems can hinder the efficiency of workers

25

Which choice most effectively sets up the main claim of the passage?

A) NO CHANGE
B) As experts confirm, employees can work more efficiently by organizing their materials according to how frequently they use them.
C) Some companies have gone to the extreme of distributing detailed handbooks explaining what employees should and should not keep at their desks.
D) Researchers have been challenging that idea, however—and employers would be wise to listen.

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As a study by psychologists at the University of Exeter in the United Kingdom 26 have suggested, employees may experience increased productivity 27 and satisfaction when they are allowed to determine the number and arrangement of items on their desks or in their offices. The psychologists, Craig 28 Knight and S. Alexander Haslam, asked some participants to do administrative tasks in a "clean" office that contained only a chair and an empty desk. Other participants were given the same furniture along with pictures and plants and told to decorate the office and desk using any items they liked. They then conducted the same tasks as those in the bare office. Participants who had the freedom to arrange their spaces completed tasks more quickly and with fewer errors than those confined to the "clean" office, and more frequently reported feeling empowered.

Some employers might argue that 29 a clean desk policy is necessary. In the absence of a clean desk policy, workers would be free to let their desks devolve into outright clutter. However, a University of Minnesota study led by Dr. Kathleen D. Vohs shows that disorderly work spaces can be an asset. Vohs placed participants either at a tidy desk with papers arranged in piles or 30 placed them at a messy desk with papers strewn across the desk and floor. She then instructed the participants to brainstorm new uses for Ping-Pong balls for a manufacturer. Those at the messy desk were judged to have developed more creative ideas than those at the tidy desk, leading Vohs and her team to conclude that "disorderly environments seem to inspire breaking free of tradition, which can produce fresh insights."

26

A) NO CHANGE
B) are suggesting,
C) suggests,
D) suggest,

27

A) NO CHANGE
B) and increased satisfaction, both of which are experienced by employees
C) and, in addition, satisfaction
D) as well as satisfaction that increases

28

A) NO CHANGE
B) Knight, and S. Alexander Haslam
C) Knight—and S. Alexander Haslam,
D) Knight and S. Alexander Haslam;

29

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

A) a clean desk policy, being necessary, would keep workers from being
B) without a clean desk policy, workers would be
C) when a necessary clean desk policy is absent, workers would be
D) workers lacking a clean desk policy, which employers find necessary, would be

30

A) NO CHANGE
B) they were placed
C) placed
D) DELETE the underlined portion.

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Requiring workers to maintain sparse desks may 31 have a negative impact on office productivity. For example, employers may have little choice but to adopt a clean desk policy in cases where limited office space requires that single desks be shared by multiple employees. 32 Still, in workplaces where people have their own desks, employers would 33 as well consider the potential benefits of permitting workers to arrange—or clutter—their desks as they like.

31

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

A) NO CHANGE
B) not present a challenge for certain types of employees.
C) result in heightened tensions for some employees.
D) be necessary in some work environments.

32

A) NO CHANGE
B) In addition,
C) Therefore,
D) Likewise,

33

A) NO CHANGE
B) do as well as
C) do well to
D) well

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Questions 34-44 are based on the following passage.

The U-Wing's Design Makes a U-Turn

Doug Chiang had a problem with his spaceship. Designed for the 2016 film Rogue One, the vehicle sketched out by Chiang and his team of concept 34 artists (professionals who help filmmakers and video game producers translate ideas from page to screen—looked a little too 35 above this planet. In any other film, perhaps the futuristic design would have sufficed, but Chiang wasn't working on just any film. He was working on the latest installment of Star Wars, a franchise of science-fantasy films whose 36 merchandise includes toy versions of the spaceship Millennium Falcon.

When preparing to make the original Star Wars film in the 1970s, director George Lucas turned to concept artists Ralph McQuarrie and Joe Johnston to create art depicting the 37 creatures vehicles and locations described in the screenplay. The aesthetic that emerged from the artists' pens and paintbrushes was a blend of cinematic and world history, incorporating 38 a "used universe" feel: nothing looked shiny and new. Chiang's designs needed to mesh seamlessly with those of

34

A) NO CHANGE
B) artists—professionals
C) artists, professionals
D) artists: professionals

35

A) NO CHANGE
B) beyond this planet.
C) out of this world.
D) on top of the world.

36

Which choice most effectively establishes a main idea of the passage?

A) NO CHANGE
B) characters frequently travel from planet to planet in spaceships.
C) themes are drawn from fairy tales and myths.
D) visual aesthetic draws more heavily on the past than on the future

37

A) NO CHANGE
B) creatures vehicles, and
C) creatures, vehicles, and
D) creatures, vehicles and,

38

Which choice best supports a point made earlier in the sentence?

A) NO CHANGE
B) a distinctive color palette: earth tones for the heroes, and black, gray, and red for the villains.
C) elements not only from Westerns and samurai films but also from World War II military uniforms.
D) distinct silhouettes based on basic shapes, such as circles and triangles

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McQuarrie and Johnston because the events depicted in Rogue One occur immediately before those of the original Star Wars film. However, when Chiang's new ship, the U-Wing, was placed alongside the iconic X-Wing from the original film, the two vehicles 39 looked as different as night and day. The Rogue One team would need to take the U-Wing back to the drawing board.

[1] He had been working on Star Wars films since the mid-1990s, when Lucas selected him to be the head of the Lucasfilm art department. [2] At the time, Lucas was developing 40 a trilogy of three prequels to the original Star Wars, and 41 he encouraged Chiang to take bold risks and explore the gray area between "what is Star Wars and what is not." [3] This artistic risk-taking often meant that designs would go through dozens of iterations before being finalized, but the results were usually stunning. [4] For Chiang, the U-Wing was just the latest in a series of Star Wars design challenges. 42

39

A) NO CHANGE
B) were so different, I would have wanted to shout, "Hey, that's not Star Wars!"
C) were like apples and oranges.
D) didn't look like they belonged to the same universe, aesthetically.

40

A) NO CHANGE
B) a trilogy of prequels to
C) three prequels in a trilogy that Lucas set before
D) a trilogy of Star Wars prequels that take place before

41

A) NO CHANGE
B) they encouraged him
C) it encouraged Lucas
D) he encouraged Lucas

42

The writer wants to add the following sentence to this paragraph

> Chiang was no stranger to such trial-and-error design work

The best placement for the sentence is

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

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For the next version of the spaceship, Chiang and his team began incorporating elements from real-world vehicles, such as the widely recognized 1960s-era "Huey" helicopter. They also drew directly on 43 McQuarrie's and Johnston's visual vocabulary by integrating the engine design from the X-Wing. In the end, the team produced 781 versions of the U-Wing before the director of Rogue One approved the design. The result was a spaceship that looked like it could have appeared in the original film. Chiang says that the final design "looks very obvious," but he adds that 44 "we knew the U-Wing was going to be very challenging."

43

A) NO CHANGE
B) McQuarries and Johnstons
C) McQuarries' and Johnstons'
D) McQuarrie and Johnston's

44

Which quotation from Chiang best completes the sentence and concludes the passage?

A) NO CHANGE
B) "you can configure the wings in a hundred different ways, if not thousands."
C) "[the U-Wing] became a very organic design."
D) "getting to that obvious [look] is always very hard."

STOP

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

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Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

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

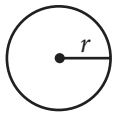
DIRECTIONS

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.

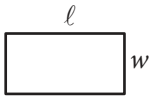
NOTES

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.

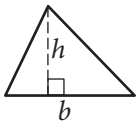
REFERENCE



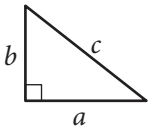
$A = \pi r^2$
$C = 2\pi r$



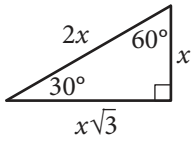
$A = \ell w$

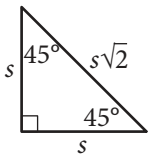


$A = \frac{1}{2}bh$

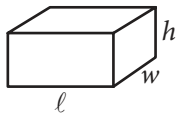


$c^2 = a^2 + b^2$

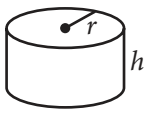




Special Right Triangles

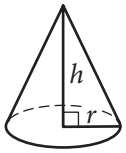


$V = \ell wh$

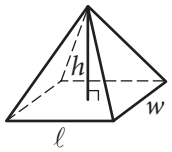


$V = \pi r^2 h$

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



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



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

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.

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CONTINUE

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1

In the 1884 US presidential election, candidates James Blaine and Grover Cleveland received a total of 401 electoral college votes. The number of electoral college votes Blaine received, b, was 37 fewer than the number of electoral college votes Cleveland received, c. Which system of equations represents this situation?

A) $b + c = 438$
$b = c - 37$

B) $b + c = 438$
$b = c + 37$

C) $b + c = 401$
$b = c - 37$

D) $b + c = 401$
$b = c + 37$

2

$$2p + 6 = 8 + 7p$$

What value of p satisfies the given equation?

A) $-\frac{2}{9}$

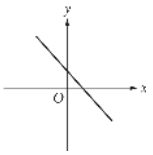
B) $-\frac{2}{5}$

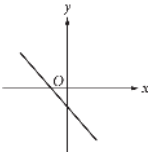
C) $\frac{14}{15}$

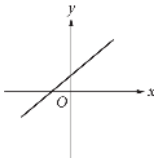
D) $\frac{14}{9}$

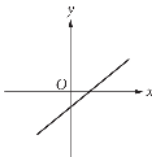
3

Which of the following could represent the graph of the linear equation $y = mx + 3$, where m is a positive constant?

A)


B)


C)


D)


4

The equation $y = \sqrt{\frac{hg}{x}}$ relates to the positive numbers g, h, x, and y. Which equation correctly expresses h in terms of g, x, and y?

A) $h = gxy$

B) $h = gxy^2$

C) $h = \frac{gy^2}{x}$

D) $h = \frac{xy^2}{g}$

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CONTINUE

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5

$$|x-1|=8$$

If x is a solution to the given equation, what is a possible value of x - 1?

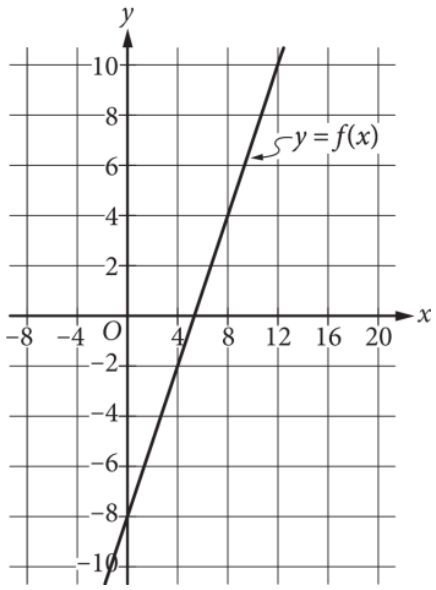
A) −8

B) −6

C) 6

D) 7

6



The graph of the linear function f is shown. Which equation defines f?

A) $f(x)=\frac{3}{2}x-8$

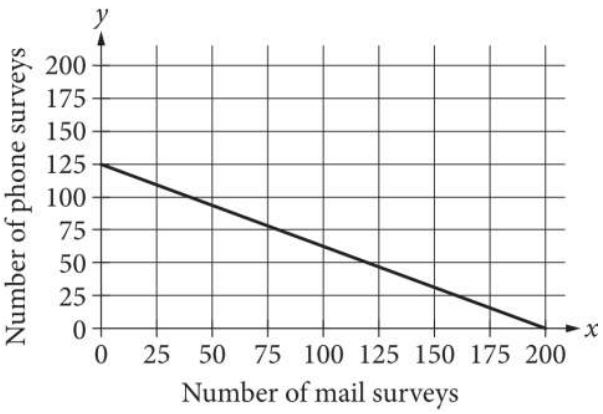
B) $f(x)=\frac{3}{2}x+5$

C) $f(x)=\frac{1}{3}x-8$

D) $f(x)=\frac{1}{3}x+5$

7

A research institute conducted phone and mail surveys. The total cost of conducting these surveys was $5,000. The line shown models the possible combinations of phone and mail surveys that the institute could have conducted.



According to the model, what was the cost for each phone survey conducted?

A) $200

B) $125

C) $40

D) $25

8

Which expression is equivalent to $(5x^3 - 2x + 1) - (2x^3 + 2x + 1)$?

A) $3x^3$

B) $3x^3 + 2$

C) $3x^3 - 4x$

D) $3x^3 - 4x + 2$

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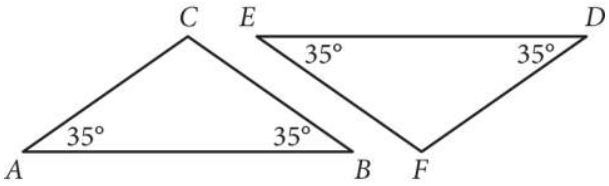
9



Triangle ABC and triangle DEF each have two angles measuring 35°, as shown. Which of the following additional pieces of information is sufficient to prove that triangle ABC is congruent to triangle DEF ?

A) the measures of ∠ACB and ∠DFE are equal.

B) The lengths of $\overline{BC}$ and $\overline{EF}$ are equal.

C) The lengths of $\overline{AC}$ and $\overline{DE}$ are equal.

D) No additional information is necessary to prove that the two triangles are congruent.

10

Which expression is equivalent to $y^{\frac{1}{8}\left(y^{\frac{3}{4}}\right)^{\frac{3}{2}}}$, where $y > 0$?

A) $\sqrt[4]{y^5}$

B) $\sqrt[3]{y^4}$

C) $\sqrt[8]{y^5}$

D) $\sqrt[8]{y^7}$

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11

What is the value of $\sin\left(\frac{3\pi}{4}\right)$?

A) $-\frac{\sqrt{2}}{2}$

B) $-\frac{\sqrt{3}}{2}$

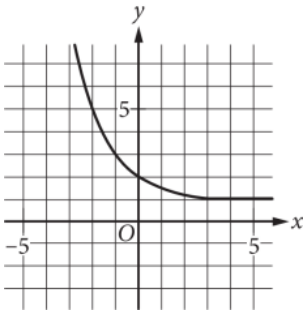
C) $\frac{\sqrt{2}}{2}$

D) $\frac{\sqrt{3}}{2}$

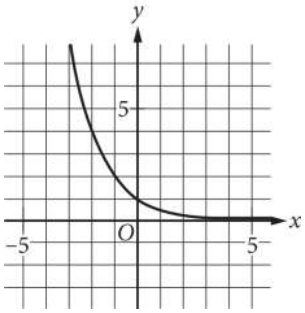
12

What is the graph of the equation $y = 2^{-x} + 1$?

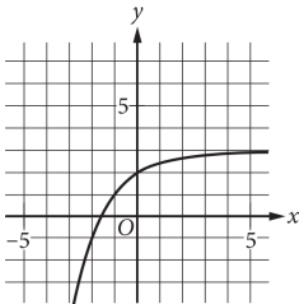
A)



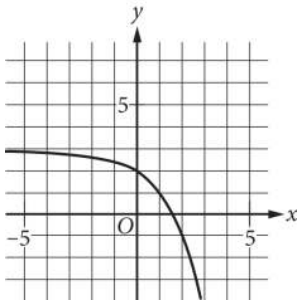
B)



C)



D)



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13

In 2005, 10 phlox plants were planted in a garden. The number of phlox plants increased by 140% each year. Which of the following equations best models the estimated number of plants, P, in the garden t years after 2005?

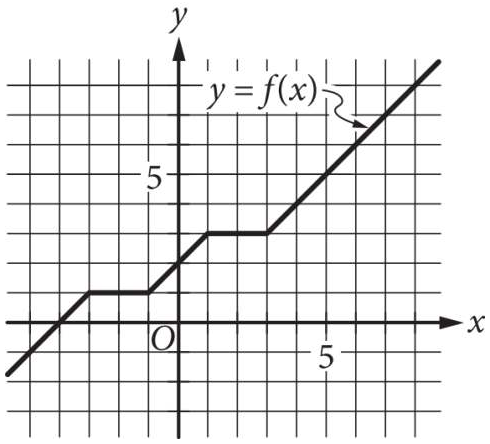
A) $P = 1.14(10)^t$

B) $P = 2.4(10)^t$

C) $P = 10(1.14)^t$

D) $P = 10(2.4)^t$

14



The complete graph of the function f is shown in the xy-plane. What is the y-intercept of the graph of $y = f(x + 2)$?

A) (0 , 3)

B) (0 , 2)

C) (0 , 1)

D) (0 , 0)

15

One of the two equations in a linear system is $2x + 2y = 2$. The system has no solution. Which equation could be the other equation in the system?

A) $3x - 3y = 3$

B) $3x + 3y = 3$

C) $2x - 2y = 2$

D) $2x + 2y = 3$

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CONTINUE

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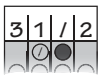
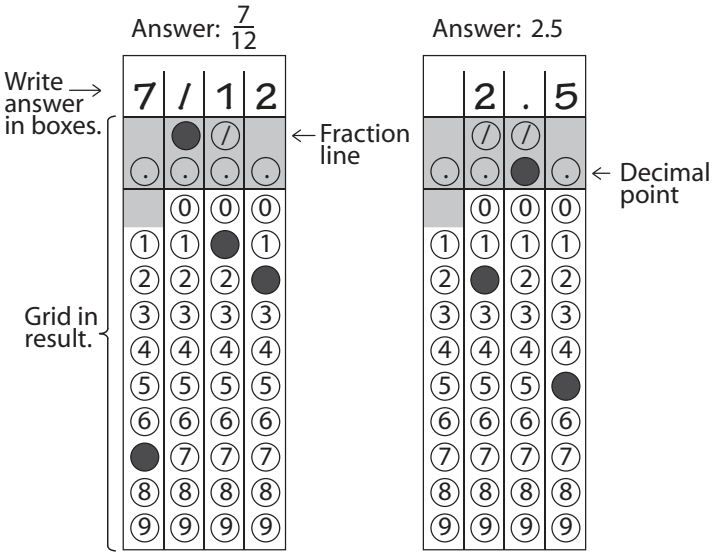
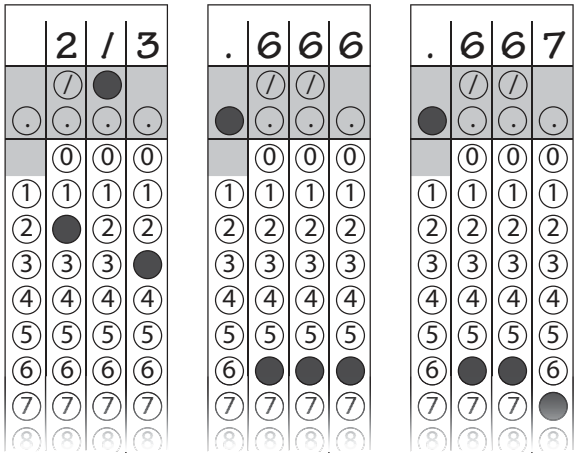
DIRECTIONS

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

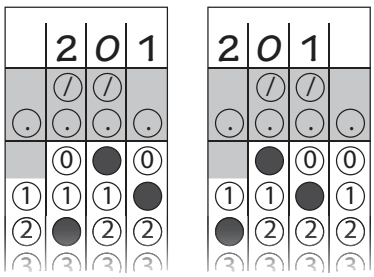
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
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 $3\frac{1}{2}$.)
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.

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CONTINUE

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16

$$g(x) = \frac{(2+x)}{x}$$

For the given function g, what is the value of $g(8)$?

17

Line h is defined by $y = -8x + 7$. What is the slope of a line that is perpendicular to line h in the xy-plane?

18

$$x + 2y = 11$$
$$3x + 3y = 24$$

The solution to the given system of equations is the ordered pair (x , y). What is the value of x ?

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CONTINUE

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19

	volume (m^3)
Rectangular prism A	96
Rectangular prism B	12

Rectangular prism A is similar to rectangular prism B, where the longest side of rectangular prism A corresponds to the longest side of rectangular prism B. The table gives the volumes, in cubic meters (m^3), of the two prisms. The length of the longest side of rectangular prism A is 6 meters. What is the length, in meters, of the longest side of rectangular prism B?

20

$$x^2 - 10x + 14 = 0$$

One solution to the given equation can be written as $x = 5 + \sqrt{n}$, where n is a constant. 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.

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No Test Material On This Page

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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

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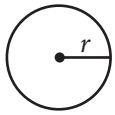
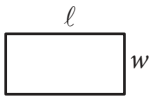
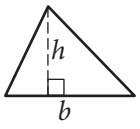
REFERENCE



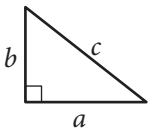
$A = \pi r^2$
$C = 2\pi r$



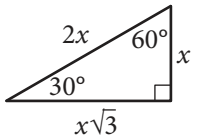
$A = \ell w$

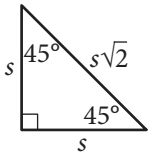


$A = \frac{1}{2}bh$

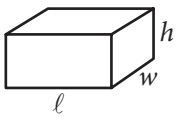


$c^2 = a^2 + b^2$

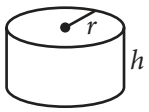




Special Right Triangles

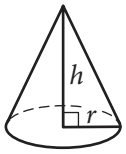


$V = \ell wh$

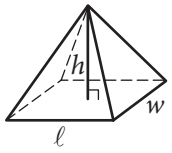


$V = \pi r^2 h$

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



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



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

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.

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CONTINUE

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1

It is estimated that humans begin REM sleep 90 minutes after falling asleep. Based on this estimate, how many seconds after falling asleep do humans begin REM sleep?

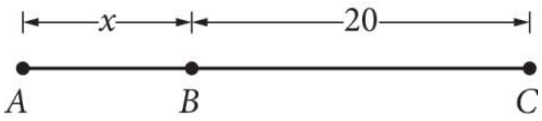
A) 3,600
B) 5,400
C) 8,100
D) 9,000

2

The function g is defined by $g(x) = 4x - 2$. What is the value of $g(-3)$?

A) $-\frac{1}{4}$
B) $-\frac{5}{4}$
C) -10
D) -14

3



For line segment $\overline{AC}$ shown, the length of line segment $\overline{BC}$ is 2 times the length of line segment $\overline{AB}$. Which equation represents this situation?

A) $x + 2 = 20$
B) $x + 20 = 2$
C) $x - 2(20)$
D) $2x = 20$

4

Two people sweep the floor. The table gives their sweeping rates, in square yards per minute (yd^2/min).

Person	Rate
Jeremy	12
Eric	16

If each person sweeps the floor for 5 minutes, how much greater of an area, in square yards, does Eric sweep than Jeremy?

A) 20
B) 60
C) 80
D) 140

5

Which expression is equivalent to $x^4(3x^2 + 9x - 8)$?

A) $x^4 + 3x^2 + 9x - 8$
B) $3x^6 + 9x^5 - 8x^4$
C) $3x^8 + 9x^5 - 8x^4$
D) $12x^2 + 36x - 32$

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6

The function f is defined by $f(x) = 2x - 4$. What is the y-intercept of the graph of $y = f(x)$ in the xy-plane?

A) $(0, 4)$
B) $(0, 2)$
C) $(0, -2)$
D) $(0, -4)$

7

The table summarizes the number of public schools in two California counties in 2017.

	County		
School	Los Angeles	San Diego	Total
Elementary	1,395	498	1,893
Middle	422	165	587
High	570	191	761
Total	2,387	854	3,241

A public middle school will be selected at random from the two counties. What is the probability, to the nearest hundredth, of selecting a school in San Diego County?

A) 0.05
B) 0.19
C) 0.28
D) 0.69

8

A museum built a scale model of the solar system throughout its city where 1 mile in the model represents an actual distance of 400,000,000 miles. The model of the Sun is x miles away from the model of Earth. Which expression represents the actual distance, in miles, between Earth and the Sun?

A) $400{,}000{,}000x$
B) $1{,}000{,}000x$
C) $400x$
D) $\frac{x}{400}$

9

The list shown gives the heights, in inches, for the 6 ten-year-old children in a group.

52, 53, 54, 54, 55, 56

A seventh child with a height of 60 inches will be added to the group. Which of the following correctly describes how the mean and the median of the group will change when the seventh child is added?

A) The mean and the median will increase.
B) The mean and the median will decrease.
C) The mean will increase, and the median will remain the same.
D) The mean will decrease, and the median will remain the same.

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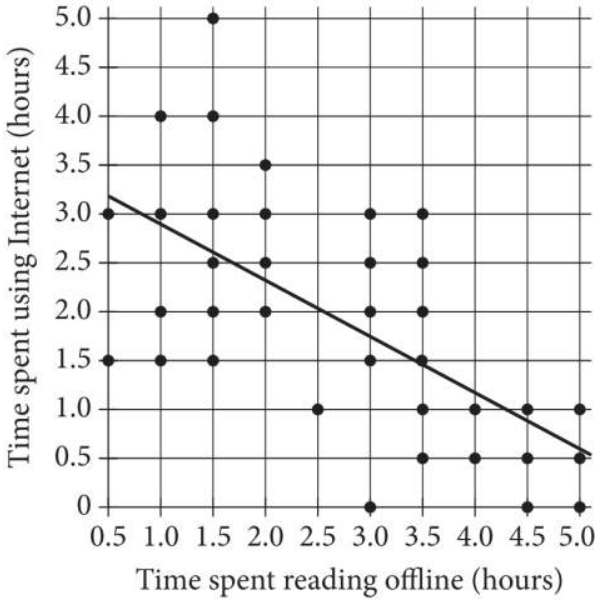
Questions 10 and 11 refer to the following information.



In a certain school district, 36 high school students were selected at random for a study on Internet use and offline reading habits. During October, each student reported the average amount of time, to the nearest half hour, spent reading offline on Saturdays and the average amount of time, to the nearest half hour, spent using the Internet on Saturdays. The scatterplot above shows the times recorded by the students. A line of best fit is also shown.

10

The line of best fit underestimates one student's reported average time spent using the Internet on Saturdays by more than 2 hours. For how many hours did this student report reading offline?

A) 0.5
B) 1.5
C) 3.5
D) 5.0

11

According to the line of best fit, if a student spends an average of 1.25 hours reading offline on Saturdays, which of the following is the best estimate of time the student would be expected to spend using the Internet on Saturdays?

A) Between 3.5 and 4.0 hours
B) Between 3.0 and 3.5 hours
C) Between 2.5 and 3.0 hours
D) Between 2.0 and 2.5 hours

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12

Line k is defined by $y = -x + 5$. Line j is parallel to line k on the xy-plane. What is the slope of line j?

A) -1

B) $-\frac{1}{5}$

C) 1

D) 5

13

For a survey, students were assigned to either group R or group V. Combined, the students in both groups answered a total of 17 questions. Of these, a total of 9 questions were answered by the students in group V. The equation $4r + 9 = 17$ describes this situation, where r represents the number of questions answered by each student in group R. Which of the following is the best interpretation of $4r$ in this context?

A) The number of students in group R

B) The number of students in group V

C) The total number of questions answered by students in group R

D) The total number of questions answered by students in group V

14

How many solutions does the equation $5(x + 1) = 5x + 5$ have?

A) zero

B) Exactly one

C) Exactly two

D) Infinitely many

15

Age	Average amount of money
25	\$42
28	\$36
33	\$26
35	\$22
42	\$8

The table shows the results of a survey on the average amount of money d, in dollars, consumers would be willing to spend on a product and their corresponding age a, in years. Which equation could represent this linear relationship?

A) $d = -2a + 92$

B) $d = -\frac{1}{2}a + 92$

C) $d = 2a - 8$

D) $d = 2a - 40$

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16

$$4(x + 1) = 6 + 2(x + 1)$$

If x is the solution to the given equation, what is the value of $x + 1$?

A) 1

B) 3

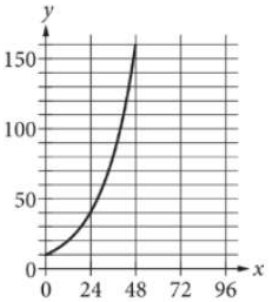
C) 4

D) 6

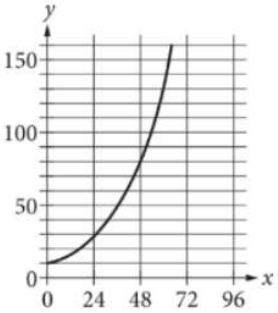
17

The initial number of bacteria in a population is 10 thousand. The bacteria in the population are observed to double in number every 12 hours. Which graph represents the number of bacteria y, in thousands, x hours after the initial observation?

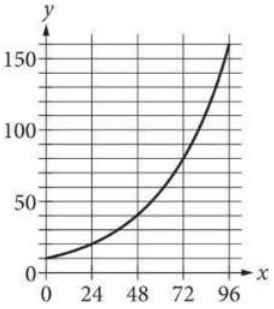
A)



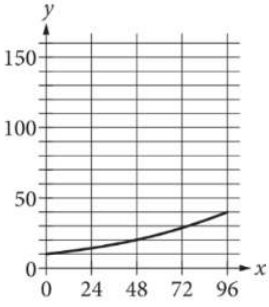
B)



C)



D)



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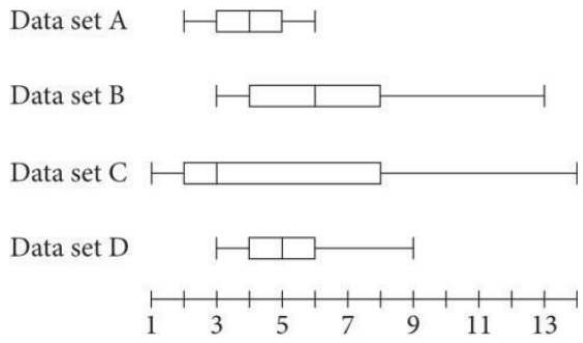
18



The box plots shown summarize the data in each of four data sets. Which of the four data sets has a range of 6 ?

A) Data set A
B) Data set B
C) Data set C
D) Data set D

19

A forest contains different species of trees. Let t represent the total number of trees in the forest, let h represent the number of hickory trees, and let k represent the number of oak trees. If a tree is selected at random from the forest,which expression represents the probability of selecting a tree that is neither hickory nor oak?

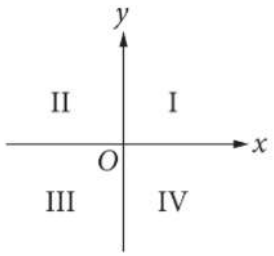
A) $\frac{h+k}{t}$

B) $\frac{t-h-k}{t}$

C) $\frac{h+k-t}{t}$

D) $\frac{t+h+k}{t}$

20



In the xy-plane shown, the quadrants are labeled I, II, III, and IV. The graph of $y = -(x + h)^2 + k$, where h and k are positive constants, is a parabola. In which quadrant is the vertex of this parabola?

A) Quadrant I
B) Quadrant II
C) Quadrant III
D) Quadrant IV

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21

At the beginning of the day, there were 500 items for sale in a store. The number of items for sale at the end of the day was r% less than the number at the beginning of the day. Which expression represents the number of items for sale at the end of the day?

A) $\left(\frac{100 - r}{100}\right)500$

B) $\left(\frac{100 + r}{100}\right)500$

C) $\left(\frac{r}{100}\right)500$

D) $(100 - r)500$

22

The area, in square inches, of a certain right triangle is given by the equation $A = \frac{1}{2}b(2b)$, where b is the length, in inches, of one of the legs of the triangle. Which expression represents the length, in inches, of the shortest leg of the triangle?

A) $\frac{1}{2}b$

B) b

C) $2b$

D) $2b^2$

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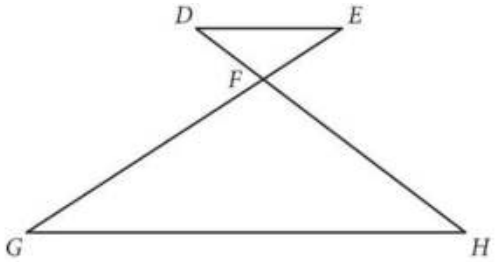
23

Scientists took 94 ice core sections from a glacier. Each section was in the shape of a right circular cylinder and had a length of 1 meter and a diameter of 0.1 meter. Which of the following is closest to the total volume, in cubic meters, of the 94 sections?

A) 30
B) 7
C) 3
D) 0.7

24



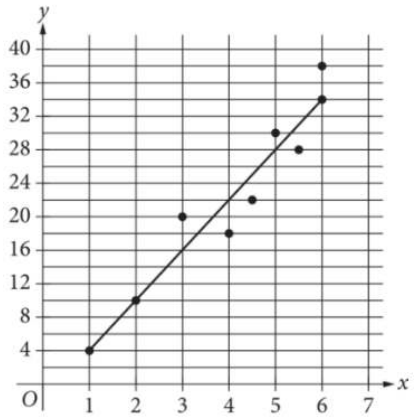
In the figure shown, $\overline{GE}$ and $\overline{DH}$ intersect at point F. Which of the following additional statements is (are) sufficient to prove that triangle DEF is similar to triangle HGF?

I. The length of $\overline{DE}$ is $\frac{1}{3}$ the length of $\overline{HG}$
II. DE is parallel to HG

A) I is sufficient, but II is not.
B) II is sufficient, but I is not.
C) I is sufficient, and II is sufficient.
D) Neither I nor II is sufficient.

25

The scatterplot shows the relationship between two variables, x and y. A line of best fit for the data is also shown.



Which data point has an actual y-value that is 2 more than the y-value predicted by the line of best fit for the corresponding x-value?

A) (2, 10)
B) (3, 20)
C) (4, 18)
D) (5, 30)

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26

A plant's height is 1.25 times its height from last week. What was the percentage increase in the plant's height from last week?

A) 1.25%

B) 2.5%

C) 12.5%

D) 25%

27

In a forest, white pine trees between 15 and 45 years old grew 36 to 48 inches in height each year. A 15-year-old white pine tree growing in the forest was 240 inches tall. Which of the following inequalities gives all possible values for the tree's height h, in inches, at the end of its 45th year?

A) $h \leq 540$

B) $h \leq 2{,}160$

C) $240 \leq h \leq 1{,}080$

D) $1{,}320 \leq h \leq 1{,}680$

28

p% of x is 3. Which expression represents x in terms of p ?

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

B) $\frac{3p}{100}$

C) $\frac{(100)(3)}{p}$

D) $\frac{p}{(100)(3)}$

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29

$$f(x) = 3^{-2(x+1)}$$

Which of the following equivalent forms of the given function f displays, as the base or the coefficient, the y-coordinate of the y-intercept of the graph of $y = f(x)$ in the xy-plane?

A) $f(x) = \left(\frac{1}{3}\right)^{(2x+2)}$

B) $f(x) = \frac{1}{9}\left(\frac{1}{3}\right)^{2x}$

C) $f(x) = 81^{\left(-\frac{1}{2}x-\frac{1}{2}\right)}$

D) $f(x) = 3^{(-2x-2)}$

30

Two different store owners in a shopping center estimated the percentage of all visitors who wear eyeglasses. They each selected a random sample of the shopping center visitors and recorded whether the visitors were wearing eyeglasses. The results from each sample are shown in the table below.

	Percentage of visitors wearing eyeglasses	Margin of error
Sample A	21%	3%
Sample B	21%	2%

If the associated margin of error was calculated the same way for both samples, which of the following is the most likely reason that the result for Sample A has a larger margin of error?

A) Sample A included more visitors than Sample B.

B) Sample B included more visitors than Sample A.

C) Sample A included a greater percentage of visitors who were wearing eyeglasses than Sample B.

D) Sample B included a greater percentage of visitors who were wearing eyeglasses than Sample A.

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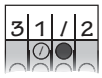
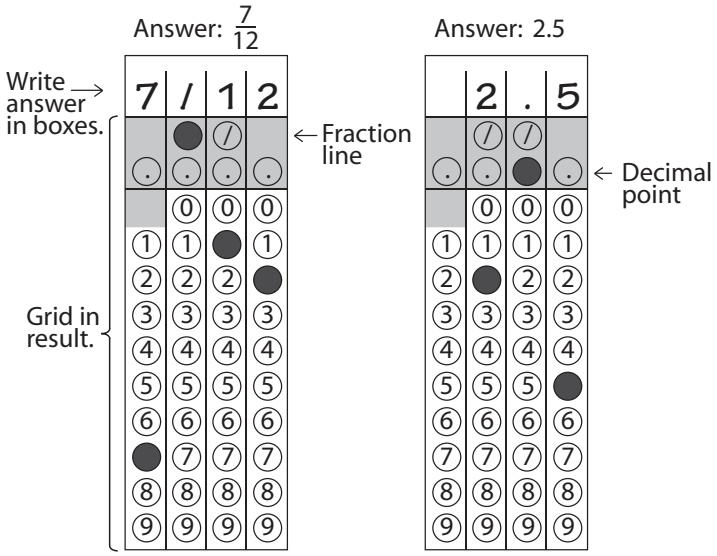
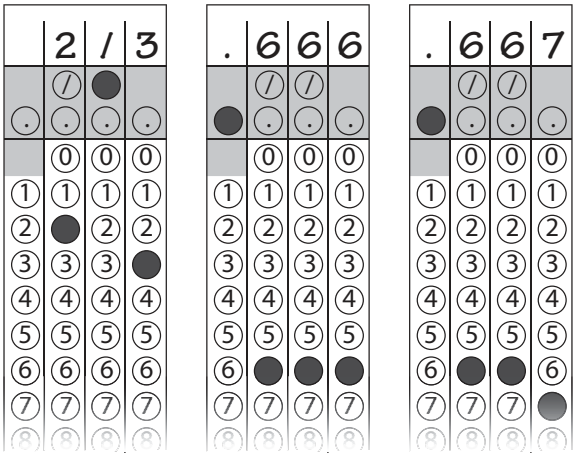
DIRECTIONS

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

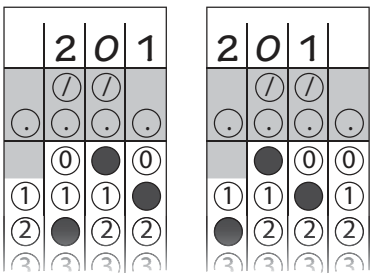
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
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 $3\frac{1}{2}$.)
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.

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31

A limestone stalactite grew in length at a rate of $\frac{1}{8}$ of a millimeter per year. At this rate, how many years would it take for this stalactite to grow a total of 4.0 millimeters?

32

$$x + y = 10$$
$$x - y = 4$$

The solution to the given system of equations is (x, y). What is the value of $2x$?

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33

If $3\sqrt{x-3}+10=22$, what is the value of $x-3$?

34

Average speed (mph)	Number of laps
$0 \leq s < 140$	4
$140 \leq s < 145$	20
$145 \leq s < 150$	32
$150 \leq s < 155$	57
$155 \leq s < 160$	52
$160 \leq s < 165$	35

The table gives the average speed s, in miles per hour (mph), of each lap around the track for one racing team. For how many laps was the average speed greater than or equal to 150 mph?

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35

Long jump distances (meters)

Aditi	4.2	3.8	3.2	4.0	4.3
Bella	x	4.4	3.7	3.8	4.6

Aditi and Bella each attempted the long jump five times during a track meet, and their distances are shown in the table. The mean distance for Bella's attempts was 0.3 meter greater than the mean distance for Aditi's attempts. What is the value of x?

36

What is the x-coordinate of the x-intercept of the line with equation $\frac{5}{4}x + \frac{2}{3}y = 1$ when it is graphed in the xy-plane?

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37

What is the perimeter of an equilateral triangle with a height of $5\sqrt{3}$?

38

$$y = -3$$
$$y = x^2 + 10x + a$$

In the system of equations shown, a is a positive constant. For which value of a does the system have exactly one distinct real solution?

STOP

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

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