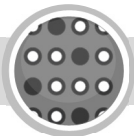


# Ivy Global

## New SAT Online Practice Test



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## New SAT Online Practice Test

This publication was written and edited by the team at Ivy Global.

Editors-in-Chief: Corwin Henville and Kristin Rose

Producers: Lloyd Min and Junho Suh

Editors: Sacha Azor, Nathan Létourneau, and Sarah Pike.

Contributors: Alexandra Candib, Cathleen Childs, Natalia Cole, Laurel Durning-Hammond, Lei Huang, Caroline Incledon, Somin Lee, and Mark Mendola.

This product was developed by Ivy Global, a pioneering education company that delivers a wide range of educational services.

E-mail: [publishing@ivyglobal.com](mailto:publishing@ivyglobal.com)

Website: <http://www.ivyglobal.com>

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# Directions



# How to Use this PDF

Welcome, students and parents! This PDF is intended to help students prepare for the SAT, a test administered by the College Board. It contains an overview of the SAT, a few basic test-taking tips, a full-length practice test, and an answer key with scoring directions.

The first key to succeeding on the SAT is knowing the test. This booklet will help you know what to expect and build your confidence. Reading the quick tips in this PDF can help you avoid common mistakes. Taking this practice test will help you become more familiar with the format, pacing, and content of the exam. Reviewing your scores, as well as any questions you missed, can help you determine what you might need to continue studying in order to do your best on test day.

This PDF is not a fully comprehensive test-prep book; for an in-depth study guide to the SAT, we recommend Ivy Global's New SAT Guide.

## The Test

The SAT is a test used by most US colleges to help make admissions decisions. It is administered in 5 sections: the Reading section, the Writing and Language section, the Math (No Calculator) section, the Math (Calculator) section, and the optional Essay. Most questions on the SAT are multiple choice, with four answer options. Some problems in the Math section are student-produced response questions: rather than selecting from a list of answer options, you will have to solve a problem and enter a number on your answer sheet. The Essay is a writing assignment, and you will be given lined paper to write your essay.

The SAT is a timed exam. You will be allowed a limited amount of time for each section. Set aside a total of 4 hours for this exam. The amount of time that you will have for each section is given on the first page of each section. If you are taking a proctored exam, your proctor will also announce the time that you are allowed for each section.

Detailed directions are provided at the beginning of each section. Read these directions carefully when taking practice exams. You should try to be totally familiar with the directions for each section by the time that you take the real SAT.

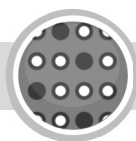
## Quick Tips

Read every question and all answer options carefully. Many students select incorrect answers when they could easily find the correct answers simply because they misread the questions or didn't look at all of the answer options. Read carefully to avoid careless errors.

Use the Process of Elimination. Sometimes the easiest way to find the correct answer is to cross out the answers in your test booklet that you know are incorrect. Don't cross answers out on your answer sheet, as stray marks could be counted as incorrect answers.

Make your best guess on every problem. You should always try to find the correct answer, but if you feel that you're stumped then you should try to make your best guess. There's no penalty for guessing.

Don't be afraid to write in your test booklet, but always remember to mark your answer on your answer sheet. The scorers won't look at your test booklet: you won't get points off for writing in it, nor will you receive credit for showing your work.



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# Practice Test





YOUR NAME (PRINT):

LAST

FIRST

MI

# SAT

## Directions

- Work on just one section at a time.
- If you complete a section before the end of your allotted time, use the extra minutes to check your work on that section only. Do NOT use the time to work on another section.

## Using Your Test Booklet

- No credit will be given for anything written in the test booklet. You may use the test booklet for scratch paper.
- You are not allowed to continue answering questions in a section after the allotted time has run out. This includes marking answers on your answer sheet that you previously noted in your test booklet.
- You are not allowed to fold pages, take pages out of the test booklet, or take any pages home.

## Answering Questions

- Each answer must be marked in the corresponding row on the answer sheet.
- Each bubble must be filled in completely and darkly within the lines.

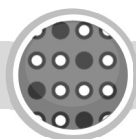
Correct ●      Incorrect ○ ⊗ ⊘ ⊙ ⊛ ⊜ ⊝

- Be careful to bubble in the correct part of the answer sheet.
- Extra marks on your answer sheet may be marked as incorrect answers and lower your score.
- Make sure you use a No. 2 pencil.

## Scoring

- You will receive one point for each correct answer.
- Incorrect answers will NOT result in points deducted. Even if you are unsure about an answer, you should make a guess.

**DO NOT BEGIN THIS TEST  
UNTIL YOUR PROCTOR TELLS YOU TO DO SO**



For automatic scoring and scaling, please visit [ivyglobal.com/study](http://ivyglobal.com/study).



## Section 1

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**Section 3 (No-Calculator)**

1	A B C D ○ ○ ○ ○	4	A B C D ○ ○ ○ ○	7	A B C D ○ ○ ○ ○	10	A B C D ○ ○ ○ ○	13	A B C D ○ ○ ○ ○
2	A B C D ○ ○ ○ ○	5	A B C D ○ ○ ○ ○	8	A B C D ○ ○ ○ ○	11	A B C D ○ ○ ○ ○	14	A B C D ○ ○ ○ ○
3	A B C D ○ ○ ○ ○	6	A B C D ○ ○ ○ ○	9	A B C D ○ ○ ○ ○	12	A B C D ○ ○ ○ ○	15	A B C D ○ ○ ○ ○

Only answers that are gridded will be scored. You will not receive credit for anything written in the boxes.

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1	○ ○ ○ ○	1	○ ○ ○ ○	1	○ ○ ○ ○	1	○ ○ ○ ○	1	○ ○ ○ ○
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3	○ ○ ○ ○	3	○ ○ ○ ○	3	○ ○ ○ ○	3	○ ○ ○ ○	3	○ ○ ○ ○
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9	○ ○ ○ ○	9	○ ○ ○ ○	9	○ ○ ○ ○	9	○ ○ ○ ○	9	○ ○ ○ ○

**Section 4 (Calculator)**

1	A B C D ○ ○ ○ ○	7	A B C D ○ ○ ○ ○	13	A B C D ○ ○ ○ ○	19	A B C D ○ ○ ○ ○	25	A B C D ○ ○ ○ ○
2	A B C D ○ ○ ○ ○	8	A B C D ○ ○ ○ ○	14	A B C D ○ ○ ○ ○	20	A B C D ○ ○ ○ ○	26	A B C D ○ ○ ○ ○
3	A B C D ○ ○ ○ ○	9	A B C D ○ ○ ○ ○	15	A B C D ○ ○ ○ ○	21	A B C D ○ ○ ○ ○	27	A B C D ○ ○ ○ ○
4	A B C D ○ ○ ○ ○	10	A B C D ○ ○ ○ ○	16	A B C D ○ ○ ○ ○	22	A B C D ○ ○ ○ ○	28	A B C D ○ ○ ○ ○
5	A B C D ○ ○ ○ ○	11	A B C D ○ ○ ○ ○	17	A B C D ○ ○ ○ ○	23	A B C D ○ ○ ○ ○	29	A B C D ○ ○ ○ ○
6	A B C D ○ ○ ○ ○	12	A B C D ○ ○ ○ ○	18	A B C D ○ ○ ○ ○	24	A B C D ○ ○ ○ ○	30	A B C D ○ ○ ○ ○

**Section 4 (Continued)**

Only answers that are gridded will be scored. You will not receive credit for anything written in the boxes.

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1	<input type="radio"/>	1	<input type="radio"/>	1	<input type="radio"/>	1	<input type="radio"/>	1	<input type="radio"/>
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Only answers that are gridded will be scored. You will not receive credit for anything written in the boxes.

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**Section 5 (Optional)**

**Important:** Use a No. 2 pencil. Write inside the borders.

You may use the space below to plan your essay, but be sure to write your essay on the lined pages. Work on this page will not be scored.

**Use this space to plan your essay.**











## Section 1



# Reading Test

65 MINUTES, 52 QUESTIONS

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

## DIRECTIONS

Every passage or paired set of passages is accompanied by a number of questions. Read the passage or paired set of passages, then use what is said or implied in what you read and in any given graphics to choose the best answer to each question.

### Questions 1-10 are based on the following passage.

The following is adapted from E.M. Forster's *A Room With a View*, originally published in 1908.

A few days after the engagement was announced Mrs. Honeychurch made Lucy and her Fiancé come to a little garden-party in the neighborhood, for naturally she wanted to show people that her daughter was marrying a presentable man.

Cecil was more than presentable; he looked distinguished, and it was very pleasant to see his slim figure keeping step with Lucy, and his long, fair face responding when Lucy spoke to him. People congratulated Mrs. Honeychurch, which is, I believe, a social blunder, but it pleased her, and she introduced Cecil rather indiscriminately to some stuffy dowagers.

At tea a misfortune took place: a cup of coffee was upset over Lucy's figured silk, and though Lucy feigned indifference, her mother feigned nothing of the sort but dragged her indoors to have the frock treated by a sympathetic maid. They were gone some time, and Cecil was left with the dowagers. When they returned he was not as pleasant as he had been.

"Do you go to much of this sort of thing?" he asked when they were driving home.

"Oh, now and then," said Lucy, who had rather enjoyed herself.

"Is it typical of country society?"

"I suppose so. Mother, would it be?"

"Plenty of society," said Mrs. Honeychurch, who was trying to remember the hang of one of the dresses.

Seeing that her thoughts were elsewhere, Cecil bent towards Lucy and said:

"To me it seemed perfectly appalling, disastrous, portentous."

"I am so sorry that you were stranded."

"Not that, but the congratulations. It is so disgusting, the way an engagement is regarded as public property—a kind of waste place where every outsider may shoot his vulgar sentiment. All those old women smirking!"

"One has to go through it, I suppose. They won't notice us so much next time."

"But my point is that their whole attitude is wrong. An engagement—horrid word in the first place—is a private matter, and should be treated as such."

Yet the smirking old women, however wrong individually, were racially correct. The spirit of the generations had smiled through them, rejoicing in

50

CONTINUE

the engagement of Cecil and Lucy because it promised the continuance of life on earth. To Cecil and Lucy it promised something quite different—personal love. Hence Cecil’s irritation and Lucy’s belief that his irritation was just.

55 “How tiresome!” she said. “Couldn’t you have escaped to tennis?”

“I don’t play tennis—at least, not in public.

The neighborhood is deprived of the romance of me being athletic. Such romance as I have is that  
60 of the Inglese Italianato.”

“Inglese Italianato?”

“E un diavolo incarnato! You know the proverb?”

She did not. Nor did it seem applicable to a  
65 young man who had spent a quiet winter in Rome with his mother. But Cecil, since his engagement, had taken to affect a cosmopolitan naughtiness which he was far from possessing.

“Well,” said he, “I cannot help it if they do  
70 disapprove of me. There are certain irremovable barriers between myself and them, and I must accept them.”

“We all have our limitations, I suppose,” said wise Lucy.

75 “Sometimes they are forced on us, though,” said Cecil, who saw from her remark that she did not quite understand his position.

“How?”

80 “It makes a difference doesn’t it, whether we fully fence ourselves in, or whether we are fenced out by the barriers of others?”

She thought a moment, and agreed that it did make a difference.

85 “Difference?” cried Mrs. Honeychurch, suddenly alert. “I don’t see any difference. Fences are fences, especially when they are in the same place.”

“We were speaking of motives,” said Cecil, on whom the interruption jarred.

90 “My dear Cecil, look here.” She spread out her knees and perched her card-case on her lap. “This is me. That’s Windy Corner. The rest of the

pattern is the other people. Motives are all very well, but the fence comes here.”

95 “We weren’t talking of real fences,” said Lucy, laughing.

“Oh, I see, dear—poetry.”

1

It can reasonably be inferred from the passage that Mrs. Honeychurch is

- A) particularly fond of Cecil.
- B) an expert seamstress with a knack for dress-making.
- C) concerned with presenting a respectable image to society.
- D) disinterested in attending the engagement party.

2

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

- A) Lines 1-5 (“A few ... man”)
- B) Lines 9-13 (“People ... dowagers”)
- C) Lines 18-19 (“They were ... dowagers”)
- D) Lines 28-30 (“Plenty of ... dresses”)

3

As used in line 39, “sentiment” most nearly means

- A) nostalgia.
- B) emotion.
- C) opinion.
- D) tenderness.

4

Which situation is most similar to the one described in lines 6-13?

- A) A distinguished war hero returning to his hometown
- B) A leader making concessions to his subjects
- C) A prized show dog being paraded before judges
- D) A criminal facing judgment in a court of law

5

The passage most strongly suggests that Cecil found the engagement party “disastrous” (line 33) because

- A) he judged the other guests at the party to be uninteresting.
- B) he was angered by the intrusion into his relationship with Lucy.
- C) he prefers playing tennis to other forms of social interaction.
- D) he would rather communicate in Italian than in English.

6

As used in line 67, “affect” most nearly means

- A) cause.
- B) feign.
- C) influence.
- D) impress.

7

Lucy’s response to Cecil in line 78 primarily serves to

- A) show Lucy’s worldly sophistication.
- B) express Lucy’s resignation to the narrowness of country society.
- C) demonstrate Lucy’s growing resentment of the differences between Cecil’s outlook and hers.
- D) indicate Lucy’s assent to Cecil’s opinions.

8

Cecil brings up fences (lines 79-81) in order to

- A) highlight his feeling that he is different from others in the community.
- B) express his frustration at being excluded from polite society.
- C) demand greater respect for his desire for privacy and seclusion.
- D) reveal an epiphany about the separations among human beings.

9

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

- A) Lines 44-46 (“An engagement ... such”)
- B) Lines 58-59 (“The neighborhood ... athletic”)
- C) Lines 70-72 (“There are ... them”)
- D) Lines 93-94 (“Motives are ... here”)



10

The comic effect of the final part of the passage (lines 90-97) comes from

- A) Lucy's enjoyment of the spirited exchange between Cecil and Mrs. Honeychurch.
- B) Cecil's growing irritation with Mrs. Honeychurch and Lucy's opinions.
- C) Lucy's teasing Cecil by pretending not to understand his point.
- D) Mrs. Honeychurch's obliviousness and inattention to the conversation.

**Questions 11-21 are based on the following passage.**

Human beings are in the process of dramatically reshaping the Earth's ecosystems. As far back as the 19th century, some scientists have noted that the current era is defined mainly by the impact of human activity. Now, there is an emerging consensus among Earth scientists that we have indeed entered a new period of geological time, the *Anthropocene epoch*.

Scientists who study the history of the Earth usually divide geological time according to major changes to the biology and climate of the Earth. For instance, the ancient *Cambrian period*, some 500 million years ago, is distinguished by a sudden explosion in the diversity of life, including the emergence of the ancestors of many modern species. More recently, the *Pleistocene epoch*, which ended about ten thousand years ago, is notable for the glaciers that swept over much of the Earth. The new Anthropocene epoch would be distinguished from all earlier times in Earth's history by the dramatic impacts of human activity on the Earth.

Though Earth scientists debate exactly when the Anthropocene began, there is a clear consensus that human changes to the environment are real and extreme. For one, many life forms have become, and are becoming, extinct as a result of human activity. For this reason, some paleontologists argue that the human impacts of the Anthropocene began at the end of the last Ice Age, around ten thousand years ago. The fossil record indicates that around that time, many large animals, like woolly mammoths and giant sloths, went extinct shortly after humans arrived in their ranges. Their sudden disappearance suggests that habitat destruction and overhunting by humans may have contributed to their demise. Indeed, many large animals, like elephants and gorillas, are endangered for those same reasons today.

The pace of human-caused extinctions has only increased in the past several hundred years. The growth and spread of human populations, caused by

CONTINUE 

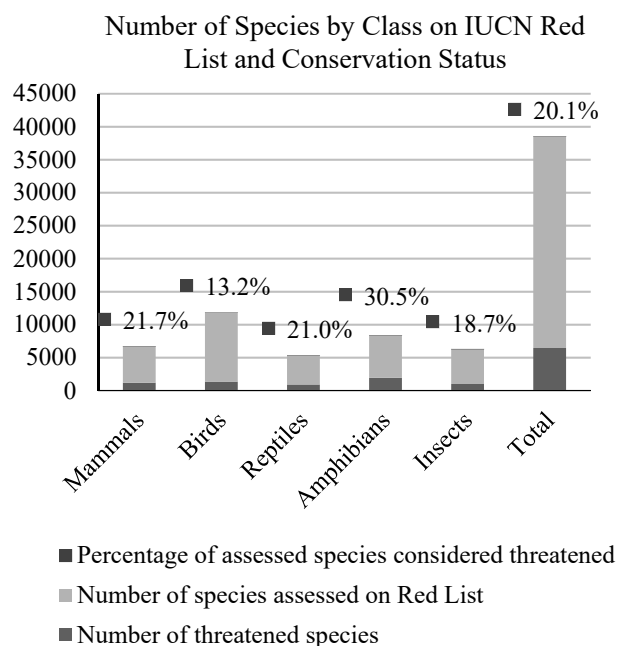


advances in seafaring technology and agriculture, has led to overexploitation of fragile ecosystems, introduction of invasive species, and pollution, causing many extinctions. Scientists have estimated the rate of extinction by studying the fossil record, monitoring existing species, and using statistical models to estimate the number of undiscovered species that have been lost. Estimates vary, but most scientists believe that diverse species are going extinct at hundreds or thousands of times the natural rate. The International Union for the Conservation of Nature, for instance, has found that, of species surveyed on its “Red List,” about a fifth of all mammals and reptiles and nearly a third of amphibians are in danger of extinction. This ongoing, rapid loss of species has been described as a mass extinction, as severe as the event that wiped out the dinosaurs 65 million years ago. To some ecologists, this steep decline in biodiversity suggests that the Anthropocene epoch began in the 17th and 18th centuries, when the rate of extinction shot up dramatically.

Human activity is also altering the climate as a whole. Since the Industrial Revolution of the 18th and 19th centuries, humans have significantly altered the atmosphere by mining and burning fossil fuels such as coal, oil, and natural gas. Some byproducts of the use of these fuels, like carbon dioxide, are greenhouse gases that trap solar energy on Earth. To assess the impact of these greenhouse gases on the Earth, scientists have had to investigate the history of the Earth’s climate. Ice cores, samples of ice layers that have trapped atmospheric chemicals over time, have supplied scientists with millennia of year-by-year information about greenhouse gas concentrations and atmospheric temperature. Evidence from ice cores clearly show that the Industrial Revolution brought about a sudden jump in carbon dioxide in the atmosphere, along with an increase in temperatures. A scientific consensus exists that this ongoing rise in temperatures has resulted in warming of the oceans, rising sea levels, and more frequent extreme weather

events. Thus, some climatologists propose that the Anthropocene’s onset occurred with the Industrial Revolution and its effects on Earth’s atmosphere.

Whenever the Anthropocene is judged to have begun, its impact is undeniable. Human activity has changed the face of the planet; the global ecosystem has been and is being reshaped, the composition of the atmosphere has been altered, and even weather patterns are changing in response to human activity. The consequences of these changes will affect life on Earth for millions of years to come, leaving a mark of human activity that may well outlive humanity itself.



11

The main purpose of the passage is to

- A) respond to controversial claims made by rival scientists.
- B) argue for potential solutions to the problems posed by climate change.
- C) describe human impacts on the Earth's environment.
- D) account for recent changes in global biodiversity.

12

The author's tone is best described as that of

- A) a dejected defeatist.
- B) a concerned observer.
- C) a jaded skeptic.
- D) an uncertain specialist.

13

The second paragraph primarily serves to

- A) explain how scientists divide geological time.
- B) provide a broad description of the Earth's history.
- C) describe the origins of the majority of the Earth's biodiversity.
- D) compare the current geological epoch to the Cambrian period.

14

As used in line 14, "explosion" most nearly means

- A) shattering.
- B) catastrophe.
- C) growth.
- D) outburst.

15

The main rhetorical effect of lines 56-59 ("This ongoing ... ago") is to

- A) suggest that the dinosaurs did not become extinct due to natural causes.
- B) make clear the extreme nature of the current extinction event.
- C) imply that humans themselves are now in danger of extinction.
- D) emphasize humanity's connections to earlier forms of life on earth.

16

Based on the passage, which choice best describes the relationship between carbon dioxide and ice cores?

- A) Carbon dioxide destroys ice cores, leading to a loss of a source of information.
- B) Ice cores remove carbon dioxide from the atmosphere, reducing its effects on the climate.
- C) Carbon dioxide is extracted from ice cores and used to fuel industrial processes.
- D) Ice cores can be studied to track changes in atmospheric carbon dioxide levels.

CONTINUE 

17

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

- A) Lines 68-71 (“Some byproducts ... Earth”)
- B) Lines 73-78 (“Ice cores ... temperature”)
- C) Lines 85-87 (“Thus, some ... atmosphere”)
- D) Lines 94-97 (“The consequences ... itself”)

18

As used in line 96, “mark” most nearly means

- A) grade.
- B) symbol.
- C) target.
- D) trace.

19

The passage most strongly suggests that

- A) some life forms are going extinct before being discovered by humans.
- B) all extinctions currently taking place result from human activity.
- C) modern extinctions are destroying the biodiversity generated in the Cambrian period.
- D) the recent increase in the extinction rate occurred as a result of human-caused climate change.

20

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

- A) Lines 11-15 (“For instance ... species”)
- B) Lines 30-33 (“The fossil ... ranges”)
- C) Lines 45-49 (“Scientists ... lost”)
- D) Lines 89-93 (“Human ... activity”)

21

Based on information from the passage and the graphic, which of the following statements can reasonably be inferred?

- A) Birds are less susceptible to human-driven extinction than other animals because they can fly to new habitats.
- B) About 20% of all assessed species are currently threatened with extinction.
- C) Mammals are the animals most sensitive to human impacts on the environment.
- D) About 18% of known insect species have recently gone extinct.

CONTINUE

**Questions 22-31 are based on the following passage.**

The following is adapted from “Television and the Public Interest,” a speech delivered by Newton N. Minow to TV executives in 1961. Minow was the chairman of the Federal Communications Commission, which regulates television and other forms of communication in the United States.

Certainly, I hope you will agree that ratings should have little influence where children are concerned. The best estimates indicate that during the hours of 5 to 6 P.M. sixty per cent of your audience is composed of children under twelve. And most young children today, believe it or not, spend as much time watching television as they do in the schoolroom.

I repeat—let that sink in, ladies and gentlemen—most young children today spend as much time watching television as they do in the schoolroom. It used to be said that there were three great influences on a child: home, school, and church. Today, there is a fourth great influence, and you ladies and gentlemen in this room control it.

If parents, teachers, and ministers conducted their responsibilities by following the ratings, children would have a steady diet of ice cream, school holidays, and no Sunday school. What about your responsibilities? Is there no room on television to teach, to inform, to uplift, to stretch, to enlarge the capacities of our children? Is there no room for programs deepening their understanding of children in other lands? Is there no room for a children’s news show explaining something to them about the world at their level of understanding? Is there no room for reading the great literature of the past, for teaching them the great traditions of freedom? There are some fine children’s shows, but they are drowned out in the massive doses of cartoons, violence, and more violence. Must these be your trademarks? Search your consciences and see if you cannot offer more to your young beneficiaries whose future you guide so many hours each and every day.

Now what about adult programming and ratings? You know, newspaper publishers take popularity

ratings too. And the answers are pretty clear: it is almost always the comics, followed by advice to the lovelorn columns. But, ladies and gentlemen, the news is still on the front page of all newspapers; the editorials are not replaced by more comics; and the newspapers have not become one long collection of advice to the lovelorn. Yet newspapers do not even need a license from the government to be in business; they do not use public property. But in television, where your responsibilities as public trustees are so plain, the moment that the ratings indicate that westerns are popular there are new imitations of westerns on the air faster than the old coaxial cable could take us from Hollywood to New York. Broadcasting cannot continue to live by the numbers. Ratings ought to be the slave of the broadcaster, not his master, and you and I both know that the rating services themselves would agree.

Let me make clear that what I am talking about is balance. I believe that the public interest is made up of many interests. There are many people in this great country and you must serve all of us. You will get no argument from me if you say that, given a choice between a western and a symphony, more people will watch the western. I like westerns too, but a steady diet for the whole country is obviously not in the public interest. We all know that people would more often prefer to be entertained than stimulated or informed. But your obligations are not satisfied if you look only to popularity as a test of what to broadcast. You are not only in show business; you are free to communicate ideas as well as relaxation.

And as Governor Collins said to you yesterday when he encouraged you to editorialize—as you know the FCC has now encouraged editorializing for years—we want you to do this; we want you to editorialize, take positions. We only ask that you do it in a fair and a responsible manner. Those stations that have editorialized have demonstrated to you that the FCC will always encourage a fair and responsible clash of opinion.

CONTINUE 

22

The main purpose of the passage is to

- A) compare and contrast various television show genres.
- B) call for higher standards in television programming.
- C) denounce television as a harmful pastime for children.
- D) note that other forms of media are as important as television.

23

The author primarily seeks to convince his audience of his point by

- A) suggesting that television could be incorporated into school curricula.
- B) mentioning the profits to be gained from drawing child audiences.
- C) raising fears that television networks could lose in competition with newspapers.
- D) making appeals to morality and a sense of civic obligation.

24

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

- A) Lines 5-8 (“And most ... schoolroom”)
- B) Lines 32-34 (“Search your ... day”)
- C) Lines 43-45 (“Yet newspapers ... property”)
- D) Lines 63-65 (“We all ... informed”)

25

The author mentions the potential consequences of “following the ratings” (lines 16-19) in order to

- A) note that children do not necessarily know what is best for them.
- B) imply that parents and teachers are sometimes overly restrictive.
- C) suggest that television should educate children about healthy diets.
- D) lament the laxness of parents and teachers during his era.

26

As used in line 18, “steady” most nearly means

- A) calm.
- B) firm.
- C) consistent.
- D) rooted.

27

In the fourth paragraph (lines 35-54), the author states that, unlike television networks, newspapers

- A) can be easily transported and enjoyed anywhere.
- B) pander to their audiences in order to stay in business.
- C) require a license from the government to operate.
- D) emphasize information over entertainment.



28

The author suggests that television networks can improve their content by

- A) making an effort to develop and air more westerns.
- B) consulting the operators of the rating services.
- C) creating programming that informs and encourages national discourse.
- D) airing shows that encourage adults rather than children to tune in.

29

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

- A) Line 35 (“Now what ... ratings”)
- B) Lines 52-54 (“Ratings ought ... agree”)
- C) Lines 58-61 (“You will ... western”)
- D) Lines 70-74 (“And as ... positions”)

30

As used in line 66, “satisfied” most nearly means

- A) convinced.
- B) fulfilled.
- C) sated.
- D) dispelled.

31

Which of the following situations is most analogous to the situation presented in lines 28-31 (“There are...violence”)?

- A) An enjoyable piece of music cannot be heard due to loud construction work nearby.
- B) A few healthy items at a buffet are surrounded by unhealthy, but tasty, options.
- C) An elected representative suppresses the viewpoints of her ideological opponent.
- D) A small number of protestors disrupt a large event taking place on a campus.

CONTINUE 

**Questions 32-42 are based on the following passages.**

**Passage 1**

The origins of life on Earth are shrouded in mystery. Scientists agree that life arose almost 4 billion years ago from non-living chemicals, a process called *abiogenesis*. However, many competing hypotheses exist to explain how this might have happened. Because Earth is the only planet in the universe known to harbor life, studying the unique chemical environment of early Earth can allow us to develop a deeper understanding of the causes of abiogenesis.

During the earliest phase of Earth’s existence, the *Hadean eon*, conditions on the newly formed planet were very different from those found today. The young Earth was intensely hot, with highly active volcanoes and frequent meteorite impacts. Unlike today’s atmosphere, which is predominantly made of nitrogen and oxygen, the Hadean atmosphere is thought to have consisted mainly of carbon dioxide, hydrogen, water vapor, and volcanic gases. Thanks to the intense pressure of this thick atmosphere, liquid water oceans probably existed despite the boiling temperatures on Earth’s surface.

Although these conditions would be totally inhospitable to modern life, this unique environment could have produced many of the building blocks of life. Scientists have discovered this by replicating the conditions of the Hadean eon in laboratories. The earliest and most famous of these experiments, conducted by Stanley Miller in the 1950s, involved passing electricity through the particular mixture of gases in the early Earth’s atmosphere. Miller found that electricity, such as that delivered by lightning strikes, could have triggered chemical reactions in the Hadean atmosphere, producing amino acids, the building blocks of proteins, as well as the nitrogenous bases and sugars that make up nucleic acids such as DNA and RNA. More recent experiments using ultraviolet light, a major component of sunlight, have found that it too could have caused organic compounds to form on Earth

during the Hadean eon.

This has led to speculation on the part of many scientists that these molecules, once synthesized in the early Earth’s oceans, could have become organized into self-replicating structures that developed into life as we know it. Nucleic acids, for instance, can both carry genetic information and catalyze chemical reactions; simple nucleic acids thus could have replicated themselves and even created proteins from amino acids, like modern life forms do. Indeed, many scientists now believe that today’s life descends from an “RNA world” that formed in this way.

**Passage 2**

It turns out that the conditions for life to arise may actually be quite common throughout the universe. At the very least, the building blocks of life as we know it—amino acids, simple sugars, and other organic compounds—seem to show up wherever we point our telescopes.

For instance, organic molecules form quite readily in the clouds of dust and gas that hang between and around stars. A number of studies have found that certain organic molecules, called PAHs, may be present in nebulae and star systems all over the universe. These molecules, made up of rings of carbon and hydrogen, have structures that might allow them to help RNA strands self-assemble in the oceans of planets; NASA scientists estimate that these molecules contain as much as 20% of the universe’s carbon and may have formed shortly after the universe began.

Scientists have also found organic molecules closer to home, within our own galaxy and Solar System. In the massive nursery of new star systems at the heart of the Milky Way, a simple form of sugar has been detected. The formation of this sugar is a key step in the creation of the more complex sugars in nucleic acids. This suggests that the raw materials for nucleic acids, and perhaps other key components of life, might be commonly incorporated into forming star systems. This

CONTINUE

certainly seems to have happened around our Sun. A number of Solar System bodies, such as the Murchison meteorite, have crashed to Earth bearing nitrogenous bases and amino acids that were formed in space, and comets currently orbiting our Sun have been found to carry amino acids as well. If the early Earth was seeded with organic molecules, either during its formation or by meteorite and comet impacts, it is plausible that this could have paved the way for abiogenesis to take place soon thereafter.

Taken together, this evidence suggests that the building blocks of life appear throughout the Milky Way galaxy and elsewhere in the universe. Earth’s status as the cradle of life may not be so special after all.

32

The main purpose of Passage 1 is to

- A) argue that Earth is the only planet in the universe that could support life.
- B) explain how the conditions of the early Earth could have given rise to life.
- C) describe a period of Earth’s history that was very different from the modern day.
- D) propose a method for creating artificial life in a laboratory.

33

As used in line 30, “particular” most nearly means

- A) fastidious.
- B) individual.
- C) detailed.
- D) specific.

34

The purpose of lines 37-41 (“More recent . . . eon”) is primarily to

- A) refute the idea that lightning strikes were responsible for creating organic compounds.
- B) emphasize the importance of the Sun to the origins of life.
- C) suggest an alternative energy source for the formation of organic compounds.
- D) propose that organic compounds may have originated in outer space.

35

Passage 1 suggests that many scientists believe that modern life descends from an “RNA world” (line 52) because

- A) RNA can perform some of the functions needed to sustain a living organism.
- B) RNA organisms would have been uniquely suited to the conditions of the Hadean eon.
- C) RNA molecules were produced in Stanley Miller’s experiments.
- D) RNA is more stable than other nucleic acids.


 CONTINUE



36

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

- A) Lines 15-19 (“Unlike today’s ... gases”)
- B) Lines 23-26 (“Although these ... life”)
- C) Lines 31-37 (“Miller found ... RNA”)
- D) Lines 48-51 (“Nucleic acids ... do”)

37

It can reasonably be inferred from Passage 2 that

- A) living organisms must have come to Earth from elsewhere in the universe.
- B) the environment of the early Earth would have destroyed organic compounds.
- C) our Solar System is unique in containing organic compounds.
- D) abiogenesis could have taken place when the universe was fairly young.

38

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

- A) Lines 56-59 (“At the ... telescopes”)
- B) Lines 65-71 (“These molecules ... began”)
- C) Lines 81-82 (“This certainly ... Sun”)
- D) Lines 93-95 (“Taken together ... universe”)

39

As used in line 61, “readily” most nearly means

- A) preparedly.
- B) easily.
- C) willingly.
- D) freely.

40

Based on Passage 2, which choice best describes the relationship between PAHs and RNA?

- A) PAHs can be combined to form RNA molecules in the presence of water.
- B) PAHs can provide support for the synthesis of RNA molecules.
- C) PAHs are a necessary precursor for the synthesis of RNA molecules.
- D) PAHs make possible the synthesis of RNA molecules even in nebulae in deep space.

41

With which of the following claims would the authors of Passages 1 and 2 most likely both agree?

- A) Life arose on Earth from non-living organic compounds.
- B) Earth’s environment is uniquely conducive to the formation of organic compounds.
- C) Earth is certainly not the only planet on which life exists.
- D) Life on Earth could only have begun with an RNA world.

42

How would the author of Passage 2 most likely respond to the claim made in lines 6-10 (“Because Earth ... abiogenesis”) of Passage 1?

- A) Life probably developed in a nebula elsewhere before arriving on Earth.
- B) Scientists do not know exactly what the early Earth’s atmosphere was like.
- C) The chemical precursors of life can form in a wide variety of environments.
- D) Modern organisms would not have been able to survive on the Hadean Earth.



**Questions 43-52 are based on the following passage.**

In general, democracies organize and carry out their elections in one of two ways. In first-past-the-post (FPTP) elections, voters choose individual candidates for office, and the candidate with the most votes wins. Elections in this kind of system are also called “winner-take-all.” In a democracy with proportional representation (PR), parties, not individuals, win seats in a legislature according to the percent of votes they receive in an election. Parties then form coalitions with each other to gain control of the government. Which system a country uses can greatly affect its politics; each has its merits and disadvantages.

These two types of election tend to foster very different styles of political debate. First-past-the-post elections tend to lead to more moderate political discussions at the national level. In elections for the presidency of the United States, for example, candidates need support from every part of the country. They cannot alienate large groups by expressing extreme views, so they must be moderate in order to have broad appeal. This moderation has its downsides, however. For one, uncommon opinions tend to be left out of public discussion. This can result in an elected government that may not fully represent citizens’ views. Extreme parties are also reduced to the role of spoilers in national elections: unable to win, but able to hurt larger parties with similar, but more moderate, viewpoints. During the US election for president in 1992, a far-right candidate, Ross Perot, drew votes from the sitting president, the center-right George H.W. Bush. This may have allowed the center-left candidate, Bill Clinton, to win the presidency.

Proportional representation, for better or worse, allows more extreme viewpoints to be represented at the national level. This can be a good thing, allowing minority groups and small, single-issue parties to have a voice in government. However, these small parties can cause problems when they join ruling coalitions. They can force the government to focus

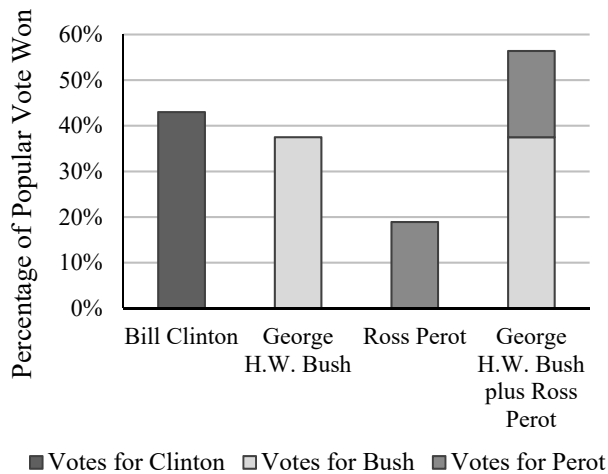
on niche agendas by threatening to leave the coalition if ignored. In some cases, radical parties that actively oppose or threaten democracy, like fascist or communist parties, can gain seats in PR elections. This occurred most famously in Germany’s Weimar Republic in the 1930s, when democratic elections gave the Nazi Party the opportunity to take power.

Each electoral system also results in different levels of voter participation. First-past-the-post systems generally result in lower overall voter participation. This could be because the rules of FPTP elections discourage voters who support candidates or parties who are not likely to win. Because votes for a losing candidate count for nothing in an FPTP election, votes for opposition parties are effectively wasted. In elections for US Senate seats and the US presidency, for instance, many states are consistently won by candidates from one party. Opposition voters in these states have little reason to show up at the polls. However, some political scientists argue that because voters vote for specific candidates in FPTP elections, those elected officials are more personally accountable to the citizens that voted for them. This sense of accountability could lead to more citizen engagement between elections.

Proportional representation, on the whole, encourages higher levels of participation. Because voters will be represented even if they are in the minority, there are far fewer wasted votes in PR elections. Perhaps for this reason, voter turnout is much higher, on average, in countries that use a PR system. On the other hand, voters in PR elections generally vote for parties rather than individuals. Because the parties appoint legislators to their seats, politicians may feel more accountable to their parties than to voters. This can lead officials to focus on within-party politics rather than the wishes of the people.

CONTINUE 

1992 US Election Outcomes



43

The passage primarily focuses on which of the following aspects of democracy?

- A) The advantages of democracy over other forms of governance
- B) The historical development of democratic ideals
- C) The potential failings of democratic systems
- D) The electoral systems used in democratic nations

44

As used in line 20, “alienate” most nearly means

- A) isolate.
- B) divert.
- C) reject.
- D) offend.

45

Based on the passage, which choice best describes the relationship between proportional representation elections and political extremism?

- A) Proportional representation elections suppress extremism by making politicians accountable to the people.
- B) Proportional representation elections allow extremists to have a voice in government.
- C) Proportional representation elections permit extremist politicians to siphon votes from mainstream parties.
- D) Proportional representation elections do not impact extremist participation in politics.

46

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

- A) Lines 6-9 (“In a democracy ... election”)
- B) Lines 26-29 (“Extreme ... viewpoints”)
- C) Lines 35-37 (“Proportional ... level”)
- D) Lines 75-76 (“On the other ... individuals”)

47

The author most likely mentioned the 1992 US presidential election in lines 30-34 in order to

- A) lament the defeat of the author’s preferred candidate in an election.
- B) demonstrate the impact that spoilers can have on elections.
- C) show how unlikely extreme candidates are to win seats in first-past-the-post systems.
- D) question the conventional wisdom regarding US presidential elections

CONTINUE

48

As used in line 68, “engagement” most nearly means

- A) betrothal.
- B) appointment.
- C) involvement.
- D) conflict.

49

The author argues that first-past-the-post elections tend to have lower voter turnout than proportional representation elections because

- A) votes for the loser in an first-past-the-post election do not affect the makeup of the government.
- B) politicians in first-past-the-post systems do not entirely share their constituents’ ideologies.
- C) politicians in proportional representation systems are directly accountable to their constituents.
- D) small parties in first-past-the-post systems can destabilize coalitions with more frequent elections.

50

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

- A) Lines 25-26 (“This can ... views”)
- B) Lines 39-43 (“However ... ignored”)
- C) Lines 53-58 (“This could ... wasted”)
- D) Lines 62-68 (“However ... elections”)

51

Which situation is most similar to the one described in lines 77-81 (“Because the ... people”)?

- A) A city councilman fielding a barrage of questions from citizens at a town hall meeting
- B) A CEO who answers to her company’s board of directors, not its shareholders
- C) A scientist submitting a research paper for review by his colleagues
- D) A company which looks at consumer trends to make decisions about future products

52

It can reasonably be inferred from the passage and graphic that

- A) A candidate can win the US presidency without earning a majority of votes.
- B) Ross Perot would have won the 1992 election had George HW Bush not been a candidate.
- C) Spoilers are typically the deciding factor in US presidential elections.
- D) Bill Clinton’s performance in the 1992 election was solely due to Ross Perot’s candidacy.

## STOP

**If you complete this section before the end of your allotted time, check your work on this section only. Do NOT use the time to work on another section.**

## Section 2



# Writing and Language Test

35 MINUTES, 44 QUESTIONS

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

## DIRECTIONS

Every passage comes with a set of questions. Some questions will ask you to consider how the writer might revise the passage to improve the expression of ideas. Other questions will ask you to consider correcting potential errors in sentence structure, usage, or punctuation. There may be one or more graphics that you will need to consult as you revise and edit the passage.

Some questions will refer to a portion of the passage that has been underlined. Other questions will refer to a particular spot in a passage or ask that you consider the passage in full.

After you read the passage, select the answers to questions that most effectively improve the passage's writing quality or that adjust the passage to follow the conventions of standard written English. Many questions give you the option to select "NO CHANGE." Select that option in cases where you think the relevant part of the passage should remain as it currently is.

Questions 1-11 are based on the following passage.

### Disputes in Ancient Greek Philosophy

People often speak of “the philosophy of Ancient Greeks” or “what the Greeks believed,” as though they had a single shared opinion. **1** However, ancient Greek philosophers held a great diversity of opinions, founding many schools of thought that have shaped the development of culture in the West and beyond.

1

- A) NO CHANGE
- B) Meanwhile, ancient
- C) Ancient
- D) Consequently, ancient

CONTINUE 

2 The thinker Epicurus developed this system of philosophy in the 4th century BCE. Epicurus and his followers challenged 3 humdrum beliefs of the time by claiming that all events happened by chance without any intervention from the gods. This stance was highly controversial in Greece’s polytheistic society. Epicurus also stated that people could achieve happiness by seeking pleasure and avoiding pain, which led many to perceive him as a hedonist. As a result, the word “epicurean” is used to this day to describe someone who enjoys luxury and self-indulgence, especially in the realm of fine dining.

2

Which choice most effectively conveys the main topic of this paragraph?

- A) One of the foremost of these philosophical movements was Epicureanism.
- B) Of course, philosophers in other parts of the world also developed many great insights.
- C) These schools often argued with one another, each claiming to have the best doctrine.
- D) Many of these philosophers held positions that Greek society considered unpopular and controversial.

3

- A) NO CHANGE
- B) routine
- C) mundane
- D) conventional

CONTINUE 



The most famous rivals of the Epicureans were the Stoics. The Stoic school of thought was founded in the 4th century **4** BCE, and its most well-known follower, the Roman emperor Marcus Aurelius, lived and wrote much later, in the 2nd century CE. The Stoics, unlike the Epicureans, believed that a **5** divine will they called the logos influenced all events. Thus, the Stoics thought that people could not control their fates, and so should cultivate self-control and composure, even in the face of hardship. Because of these teachings, the word “stoic” has now come to mean “calm,” “steady,” and even “emotionless.”

4

- A) NO CHANGE
- B) BCE, so its
- C) BCE, however its
- D) BCE, but its

5

- A) NO CHANGE
- B) divine will, they called
- C) divine will: they called
- D) divine will—they called

CONTINUE 

[1] The Cynics, another group of philosophers with roots in 4th century BCE Greece, held views similar to **6** the Stoics, but more extreme. [2] For instance, the best-known Cynic, Diogenes of Sinope, lived in a large jar in the marketplace of Athens, ate only onions, and mocked **7** famous people that everyone looked up to. [3] The Cynics claimed that desires for wealth and power clouded the mind. [4] Only if one gave up these pursuits, they said, could **8** you live a virtuous life. [5] The Cynics thus chose to live without possessions or status and rejected social norms. [6] The Cynics' distrust of societal institutions and authority has today led to the word "cynical" being used to describe people who doubt the motivations of others and criticize society. **9**

6

- A) NO CHANGE
- B) those Stoics
- C) Stoicism
- D) those of the Stoics

7

Which of the following choices is most consistent with the style of the passage as a whole?

- A) NO CHANGE
- B) famous people that were highly respected
- C) respected public figures
- D) respectful people of fame

8

- A) NO CHANGE
- B) one live
- C) they live
- D) he or she live

9

For the sake of the cohesion of this paragraph, sentence 2 should be placed

- A) where it is now.
- B) after sentence 3.
- C) before sentence 5.
- D) after sentence 5.


 CONTINUE

These Greek philosophies have had a profound influence on culture worldwide. Alexander the Great's conquest carried these ideas across the Middle East and Asia, bringing them into contact with many other cultures. In the Middle East, **10** aesthetic ideals from Cynicism influenced early Christians, leading some to give up their possessions to live in poverty in the desert. **11** Thus, though these Greek schools of thought were suppressed by later Roman authorities, their influence has continued to this day.

**10**

- A) NO CHANGE
- B) eclectic
- C) ascetic
- D) analytic

**11**

Which of the following, inserted here, would be the most relevant addition to the paragraph?

- A) In the Judeo-Christian tradition, the desert has long been associated with religious experience.
- B) In India and Central Asia, Stoicism and Buddhism may have exchanged ideas about the importance of self-control and tranquility.
- C) Indeed, Christianity quickly spread beyond the Middle East, arriving in Greece and what is now Turkey in the 1<sup>st</sup> century CE.
- D) Still, most people today would probably not say they are cynical.

CONTINUE

Questions 12-22 are based on the following passage.

### Genetically Modified Crops and the Future of Agriculture

For millennia, humans have altered the genes of the plants we eat. For as long as agriculture has existed, we have used selective breeding to raise crops with the traits we want, crossing wild plants with each other to create the domesticated varieties we eat today. In the past several decades, however, the use of genetic engineering techniques to create genetically modified (GM) crops has promised **12** essentially new benefits to agriculture while also raising concerns and spurring controversy.

Since the 1980s, scientists have developed and applied several new methods to create GM crops. Typically, scientists modify plants by creating a ring of DNA called a plasmid, which holds the desired **13** genes, then they insert this plasmid into plant cells. In some cases, scientists use bacteria that naturally infect plants with plasmids to deliver **14** there own lab-created plasmids. Alternatively, scientists might use a “gene gun,” a device that shoots microscopic gold particles coated with genetic material directly into target cells. These methods are able to reliably create plants that contain genes of scientists’ choice, turning conventional crops into **15** a genetically modified organism.

12

- A) NO CHANGE
- B) radically
- C) progressively
- D) unconventionally

13

- A) NO CHANGE
- B) genes. Whereupon, they insert
- C) genes, which are then to be inserted
- D) genes, and inserting

14

- A) NO CHANGE
- B) they’re
- C) their
- D) they

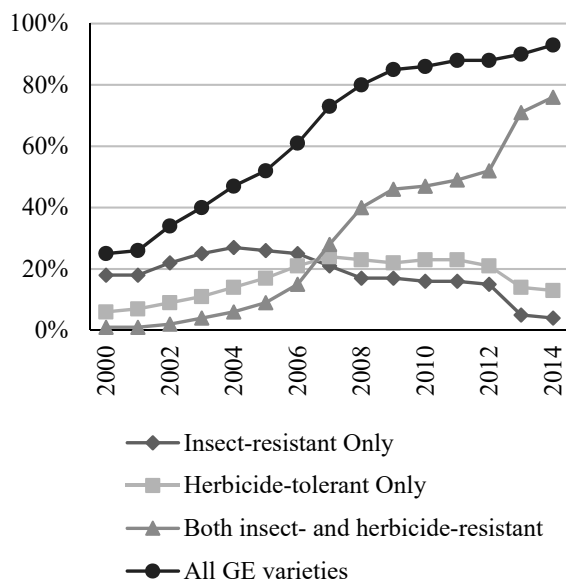
15

- A) NO CHANGE
- B) genetic modifications
- C) genetically modified organisms
- D) a genetic organism


 CONTINUE

**16** One of the foremost applications of this technology is the creation of plants that are resistant to **17** certain pests, diseases, and herbicides. Because such plants save farmers money by allowing them to use less pesticide, these GM crops have recently become very popular in the United States. The US Department of Agriculture estimates that **18** 93% of corn planted in 2014 was both insect- and herbicide-resistant, up from 25% in 2000.

Genetically Engineered (GE) Corn Varieties as a Percentage of All Corn Planted in the United States



16

Which choice most effectively conveys the main topic of this paragraph?

- A) There are a number of advantages to creating and planting GM crops.
- B) Farmers all over the world have enthusiastically embraced the use of GM crops.
- C) Most governments around the world have imposed regulations and controls on the use of this technology within their borders.
- D) As a result, scientists have much more control over the traits of GM crops than they would over conventionally bred varieties.

17

- A) NO CHANGE
- B) certain pests, and diseases, and herbicides
- C) certain pests; diseases; and herbicides
- D) certain: pests, diseases, and herbicides

18

Which of the following choices completes the sentence with accurate information from the graphic?

- A) NO CHANGE
- B) 76% of corn planted in 2014 was both insect- and herbicide-resistant, up from 1% in 2000
- C) 13% of corn planted in 2014 was both insect- and herbicide-resistant, up from 6% in 2000
- D) 18% of corn planted in 2014 was both insect- and herbicide-resistant, up from 4% in 2000

CONTINUE 

Crops can also be genetically modified to enhance their nutritional value, which is especially beneficial for people in the developing world. **19** Some scientists are also experimenting with producing GM crops with above-average yields in order to meet the needs of Earth’s rapidly growing population.

**19**

Which of the following, inserted here, would be the most relevant addition to the paragraph?

- A) Very few people in the developed world suffer from diseases of nutritional deficiency, however.
- B) New varieties of corn and rice have been developed to resist drought and heat, which will make them useful in dry countries near the Equator in Africa.
- C) “Golden rice” has been engineered so that its grains contain vitamin A, a necessary nutrient that many people in Africa and South Asia lack in their diets.
- D) Many farmers in the developing world are subsistence farmers, who grow only enough food for themselves and their families.

**CONTINUE**

[1] Despite these potential benefits, GM crops have been criticized and viewed with suspicion by many. [2] Even though there is a clear scientific consensus that food derived from GM crops is safe for human consumption, much of the general public fears that **20** they might pose unknown health risks. [3] Some conservation groups are also concerned about the effects that GM crops could have on the environment. [4] For instance, GM crops could outcompete wild plants, give rise to toxin-resistant pests, or **21** disrupting an ecosystem's food chain by damaging insect populations. [5] Clearly, the use of GM crops must be carefully studied and regulated to ensure that the benefits are not outweighed by these risks. **22**

20

- A) NO CHANGE
- B) it
- C) one
- D) he or she

21

- A) NO CHANGE
- B) disruptive to
- C) disruptor of
- D) disrupt

22

To make this paragraph most logical, sentence 4 should be placed

- A) where it is now.
- B) after sentence 1.
- C) before sentence 3.
- D) after sentence 5.

CONTINUE 

Questions 23-33 are based on the following passage.

### Science in the Medieval Islamic World

The history of science as it is taught to most Western students **23** are tragically incomplete. In many schools, teachers promote the myth that little scientific progress occurred between the fall of the Roman Empire and the Renaissance in Europe. It is true that medieval European scholars made few discoveries in the **24** natural sciences. It must be noted that scholars in the Islamic world developed and revolutionized many fields during the Middle Ages. Their discoveries laid the groundwork for future breakthroughs and made Europe's later Scientific Revolution possible.

In mathematics, Muslim thinkers produced many insights. The Persian mathematician **25** al-Khwarizmi who worked in the 9th century CE developed new methods for solving linear and quadratic equations. His work was so influential that his name gave rise to the word algorithm, a term used in modern mathematics and computer science to refer to a step-by-step method of **26** calculation, and the term algebra, from the Arabic al-jabr, also comes from al-Khwarizmi's work. He also popularized the Hindu-Arabic numerals that have become the most common way of writing numbers around the world today.

23

- A) NO CHANGE
- B) being
- C) is
- D) am

24

- A) NO CHANGE
- B) natural sciences, yet it must be noted
- C) natural sciences, even if it's noted
- D) natural sciences, while noting

25

- A) NO CHANGE
- B) al-Khwarizmi, who worked in the 9th century CE developed
- C) al-Khwarizmi who worked in the 9th century CE, developed
- D) al-Khwarizmi, who worked in the 9th century CE, developed

26

- A) NO CHANGE
- B) calculation. The term
- C) calculation, not to mention the term
- D) calculation, the term





[1] Muslim scientists also made important advances in the theory and practice of medicine. [2] For instance, the Persian doctor al-Razi revolutionized how doctors diagnosed disease. [3] In the 9th century CE, he wrote the first accurate descriptions of smallpox and measles. [4] He also challenged mistaken ancient ideas about the causes of disease. [5] A vaccine for smallpox wasn't developed until several centuries later, however. [6] Perhaps most impressively, al-Razi conducted one of history's earliest clinical trials to study **27** how effective the practice of bloodletting was as a cure for disease. **28**

27

- A) NO CHANGE
- B) the effectiveness of using bloodletting
- C) the effectiveness of bloodletting
- D) blood effects

28

Which of the following changes would most improve the focus of the passage?

- A) Move sentence 3 so that it follows sentence 4.
- B) Move sentence 5 so that it follows sentence 3.
- C) Delete sentence 5.
- D) Delete sentence 6.

CONTINUE 

**29** Throughout the medieval era, the dominant view among astronomers was the geocentric Ptolemaic model. In this view, Earth was the center of the Solar System, and the planets, Sun, and stars orbited around it. Astronomers working at the Maragha observatory in Persia, noting inconsistencies between **30** this models predictions and actual observations, developed new equations in the 13th century CE to resolve the conflict. They only updated the Ptolemaic theory, and did not discover that the Solar System is actually heliocentric, with the Earth and other planets orbiting the Sun. However, their mathematical innovations inspired Nicolaus Copernicus, several centuries later, to propose a heliocentric model that would revolutionize astronomy. **31**

29

Which choice most effectively conveys the main topic of the paragraph?

- A) On occasion, medieval Muslim scientists, like their later European counterparts, were opposed in their work by religious authorities.
- B) Muslim scientists were not afraid to challenge widely accepted scientific ideas in the areas of mathematics, medicine, or astronomy.
- C) The achievements of Muslim scientists were remarkable in light of their limited access to advanced equipment.
- D) Furthermore, Muslim astronomers made accurate observations and predictions which would fuel later discovery.

30

- A) NO CHANGE
- B) this model's
- C) this models'
- D) the model

31

Which of the following sentences, inserted here, most effectively supports the claim made in the previous sentence?

- A) It is not yet known how Copernicus found astronomy texts from the Muslim world.
- B) Copernicus faced many obstacles from Christian religious authorities after he proposed his heliocentric theory.
- C) Copernicus's equations describing planetary motion are clearly based on the work of al-Tusi, a Maragha astronomer.
- D) Copernicus was almost certainly not able to read Persian or Arabic writings himself.


 CONTINUE

In all, thinkers in the Islamic world made enormous contributions to the development of science. Had they not preserved ancient knowledge and **32** elaborated on it with their own findings, scientific and technological development might be centuries behind where it is today. **33** Even so, the accomplishments of medieval Muslim scientists should be better known around the world; more effort should be made to inform students about these pioneers of science.

32

- A) NO CHANGE
- B) elaborated with
- C) elaborated for
- D) elaborated to

33

- A) NO CHANGE
- B) For most people,
- C) Afterward,
- D) For this reason,

CONTINUE

Questions 34-44 are based on the following passage.

### The Growing Roles of Dietitians and Nutritionists

Dietitians are experts in nutrition who help people plan healthy diets. Using their wide range of knowledge and skills, these professionals ensure that their clients and patients eat nutritious foods and **34** living lifestyles that will help them be fit and healthy.

**35** Clinical dietitians might, for example, work with patients with medical conditions that involve dietary restrictions, such as **36** the disorder known as celiac disease. These patients **37** need instruction in how best to eat a nutritious and complete diet while avoiding foods that could make them sick. Other clinical dietitians might specialize in working with elderly patients, teaching them to eat foods that build strong bones and promote all-around good health.

34

- A) NO CHANGE
- B) live
- C) to live
- D) lived

35

Which choice most effectively conveys the main topic of this paragraph?

- A) Dietitians work to improve the diets of their clients in many different contexts.
- B) Some dietitians, known as clinical dietitians, work primarily in hospitals and other health care facilities to improve the health of patients.
- C) Although they are not doctors themselves, dietitians sometimes collaborate with nurses and doctors to assist in providing medical care.
- D) Dietitians are concerned first and foremost with using their expertise to improve the health of the clients they work with.

36

- A) NO CHANGE
- B) the disorder of celiac disease
- C) celiac disease
- D) celiac

37

- A) NO CHANGE
- B) will need
- C) have needed
- D) would need



Other dietitians work mainly outside of health care settings. Community dietitians work to encourage public health outside of health care settings. They may educate schoolchildren on good nutrition, or teach classes for adults living in **38** communities, with poor access to healthy groceries and fresh food. Sports dietitians collaborate with clients to help them eat right to achieve their fitness and athletic goals. Research dietitians are employed by universities to study the effects of nutrients and diets on the body. Teaching classes on dietetics to university students, **39** new dietitians are also trained by them.

Students must gain substantial skills and education in order to become dietitians. The profession requires a bachelor's degree in a related field, such as biology, anatomy, or nutrition. **40** Regardless, many dietitians go on to earn master's degrees in a specific subfield. This education helps them **41** learn a lot of stuff about biology and chemistry so that they can understand the human body and the effects that various nutrients can have on overall health. Dietitians must also **42** compliment this knowledge with good communication skills, since many interact one-on-one with patients or even speak publicly to large groups.

38

- A) NO CHANGE
- B) communities; with poor access
- C) communities with poor access
- D) communities. With poor access

39

- A) NO CHANGE
- B) they also train new dietitians
- C) training for new dietitians is also provided by them
- D) their new dietitians are also trained

40

- A) NO CHANGE
- B) In addition,
- C) For example,
- D) Certainly,

41

- Which of the following choices is most consistent with the style of the passage as a whole?
- A) NO CHANGE
  - B) get really knowledgeable about
  - C) develop a strong knowledge of
  - D) read up on

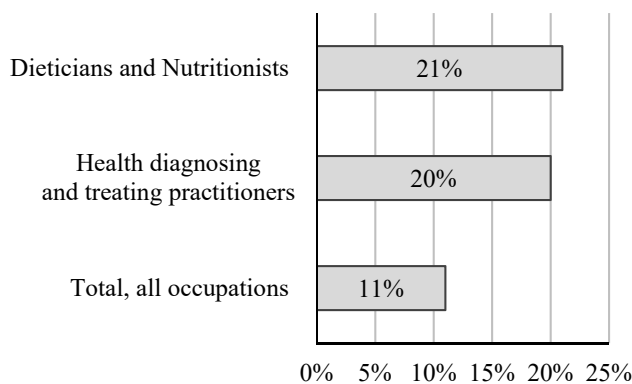
42

- A) NO CHANGE
- B) complement
- C) condescend
- D) complicate



[1] There will most likely be a great deal of demand for dietitians in the coming years. [2] As the “baby boomer” generation of the United States ages, dietitians will play an important role in ensuring the health of the growing number of elderly Americans. [3] In addition, as the US works to address its obesity epidemic, dietitians will be vital to treating and preventing obesity by helping Americans develop healthier diets. [4] By promoting good nutrition, dietitians can help their patients avoid some of the health problems associated with aging. [5] For these and other reasons, the US Bureau of Labor Statistics predicts **43** a 20% increase in the number of dietitians and nutritionists by 2022. **44**

Dietitians and Nutritionists  
Percent change in employment, projected  
2012-22



43

- A) NO CHANGE
- B) an 11% increase in the number of dietitians and nutritionists
- C) that 21% of all workers will be dietitians or nutritionists
- D) a 21% increase in the number of dietitians and nutritionists

44

For the sake of the cohesion of this paragraph, sentence 4 should be placed

- A) where it is now.
- B) before sentence 2.
- C) after sentence 2.
- D) after sentence 5.

# STOP

**If you complete this section before the end of your allotted time, check your work on this section only. Do NOT use the time to work on another section.**

## Section 3







# Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

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

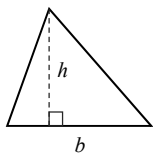
## DIRECTIONS

Questions **1-15** ask you to solve a problem, select the best answer among four choices, and fill in the corresponding circle on your answer sheet. Questions **16-20** ask you to solve a problem and enter your answer in a grid provided on your answer sheet. There are detailed instructions on entering answers into the grid before question 16. You may use your test booklet for scratch work.

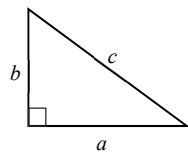
## NOTES

1. You **may not** use a calculator.
2. Variables and expressions represent real numbers unless stated otherwise.
3. Figures are drawn to scale unless stated otherwise.
4. Figures lie in a plane unless stated otherwise.
5. The domain of a function  $f$  is defined as the set of all real numbers  $x$  for which  $f(x)$  is also a real number, unless stated otherwise.

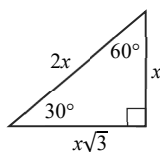
## REFERENCE



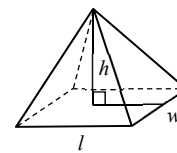
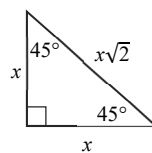
$$A = \frac{1}{2}bh$$



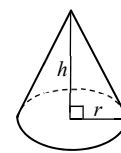
$$a^2 + b^2 = c^2$$



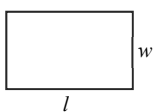
Special Triangles



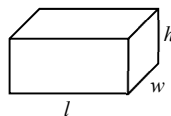
$$V = \frac{1}{3}lwh$$



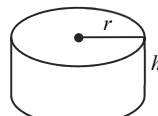
$$V = \frac{1}{3}\pi r^2 h$$



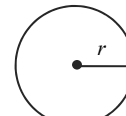
$$A = lw$$



$$V = lwh$$

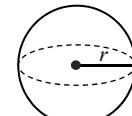


$$V = \pi r^2 h$$



$$A = \pi r^2$$

$$C = 2\pi r$$



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

There are  $360^\circ$  in a circle.

The sum of the angles in a triangle is  $180^\circ$ .

The number of radians of arc in a circle is  $2\pi$ .

CONTINUE



1

If  $p = 5.5$ , what is the value of  $|p| - |1 - p|$ ?

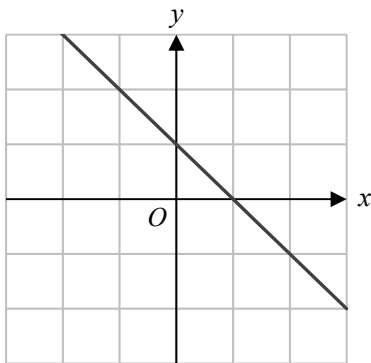
- A) 1.5
- B) 1
- C) 5.5
- D) 9.5

3

If  $(3x + 2)(5x + 1) = ax^2 + bx + 2$ , what is the value of  $a - b$ ?

- A) 2
- B) 8
- C) 22
- D) 28

2



Which of the following equations best describes the function in the figure above?

- A)  $y = x + 2$
- B)  $y = x - 2$
- C)  $y = -x + 2$
- D)  $y = -x - 2$

4

Leo is manufacturing 1 meter rulers. If the ruler differs from the expected length by more than 1 mm, he needs to throw it away. If  $x$  is the length of the ruler in meters, what absolute value inequality represents the rulers that Leo does NOT throw away?

- A)  $|x - 1| \leq 0.01$
- B)  $|x - 1| \leq 0.001$
- C)  $|x - 1| \geq 0.01$
- D)  $|x - 1| \geq 0.001$



5

If  $x^2 = 0.1$ , what is the value of  $x^{-4}$ ?

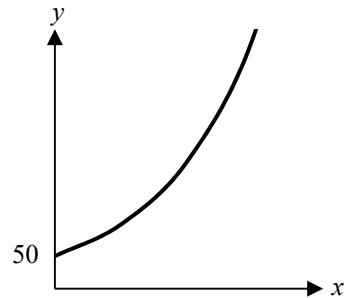
- A) 1
- B) 10
- C) 100
- D) 1000

6

If  $4n(n + 8) = 36$ , what is the product of the two solutions to this equation?

- A) -12
- B) -9
- C) 0
- D) 9

7



Every year, the population of Dwarf lop rabbits doubles in a certain country, as shown in the graph above. If there were 50 Dwarf lop rabbits last year, how many Dwarf lop rabbits will there be 4 years from now?

- A) 200
- B) 250
- C) 800
- D) 1600

8

Which of the following represents the solution set to the inequality  $2x + 1 \geq 9$ ?

- A)
- B)
- C)
- D)

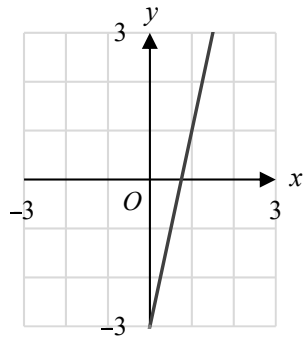


9

$f(x) = 2x - 1$ , and  $g(x)$  is a linear function that is perpendicular to  $f(x)$ . If  $(0, 4)$  is a point of  $g(x)$ , at what point do  $f(x)$  and  $g(x)$  intersect?

- A)  $(0, -1)$
- B)  $(1, 1)$
- C)  $(2, 3)$
- D)  $(3, 2)$

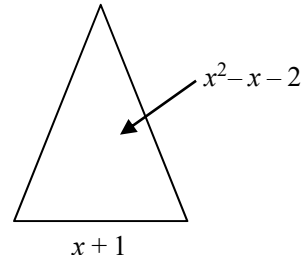
10



The graph shown above represents  $f(x) = 4x - 3$ . If  $f(a + 4) = 5$ , what is the value of  $a$ ?

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

11



The triangle above has an area of  $x^2 - x - 2$  and a base of  $x + 1$ . What is the height of the triangle?

- A)  $\frac{1}{2}(x - 2)$
- B)  $x - 2$
- C)  $2(x - 2)$
- D)  $(x - 2)(x + 1)^2$

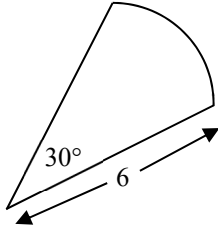
12

Which of the following is equal to  $6x^2 - 11x - 7$ ?

- A)  $(6x - 1)(x + 7)$
- B)  $(6x + 1)(x - 7)$
- C)  $(2x - 1)(3x + 7)$
- D)  $(2x + 1)(3x - 7)$



13



Note: figure is not drawn to scale.

What is the arc length of the figure above?

- A) 180
- B) 90
- C)  $\pi$
- D)  $2\pi$

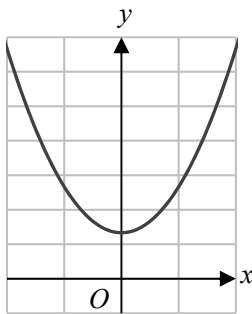
15

Which of the following expressions is equivalent

to  $\frac{15x^2 - 27x - 6}{x - 2}$ ?

- A)  $(5x + 1)$
- B)  $3(5x + 1)$
- C)  $15x^2 - 28x - 4$
- D)  $15x - 35$

14



Which of the following equations could represent an expression for the function in the figure above?

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

CONTINUE


**DIRECTIONS**

Questions **16-20** ask you to solve a problem and enter your answer in the grid provided on your answer sheet. When completing grid-in questions:

- You are required to bubble in the circles for your answers. It is recommended, but not required, that you also write your answer in the boxes above the columns of circles. Points will be awarded based only on whether the circles are filled in correctly.
- Fill in only one circle in a column.
- You can start your answer in any column as long as you can fit in the whole answer.
- For questions 16-20, no answers will be negative numbers.
- Mixed numbers**, such as  $4\frac{2}{5}$ , must be gridded as decimals or improper fractions, such as 4.4 or as  $\frac{22}{5}$ . "42/5" will be read as "forty-two over five," not as "four and two-fifths."
- If your answer is a **decimal** with more digits than will fit on the grid, you may round it or cut it off, but you must fill the entire grid.
- If there are **multiple correct solutions** to a problem, all of them will be considered correct. Enter only **one** on the grid.

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

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

CONTINUE



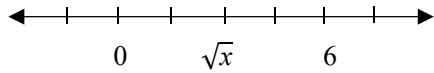
16

What is a value of  $y$  that satisfies the inequality  $|y - 5| \leq 1$ ?

18

A psychological research study at a local university pays participants \$15 if they are students and \$10 if they are non-students. If the research study pays 10 participants a total cost of \$120, how many of the participants were students?

17



What is the value of  $x$  in the number line above?

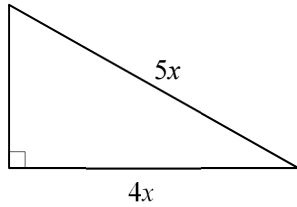
19

$$\frac{n^2 + 1}{-2n + 8} = -13$$

What is a value of  $n$  that satisfies the equation above?



20



If the perimeter of the above triangle is 72, what is the value of  $x$ ?

# STOP

**If you complete this section before the end of your allotted time, check your work on this section only. Do NOT use the time to work on another section.**



## Section 4





# Math Test – Calculator

55 MINUTES, 38 QUESTIONS

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

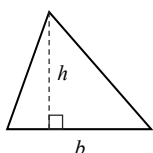
## DIRECTIONS

Questions 1-30 ask you to solve a problem, select the best answer among four choices, and fill in the corresponding circle on your answer sheet. Questions 31-38 ask you to solve a problem and enter your answer in a grid provided on your answer sheet. There are detailed instructions on entering answers into the grid before question 31. You may use your test booklet for scratch work.

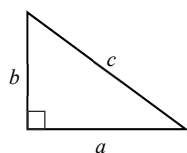
## NOTES

1. You **may** use a calculator.
2. Variables and expressions represent real numbers unless stated otherwise.
3. Figures are drawn to scale unless stated otherwise.
4. Figures lie in a plane unless stated otherwise.
5. The domain of a function  $f$  is defined as the set of all real numbers  $x$  for which  $f(x)$  is also a real number, unless stated otherwise.

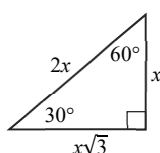
## REFERENCE



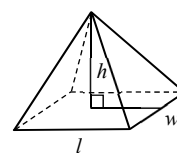
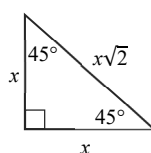
$$A = \frac{1}{2}bh$$



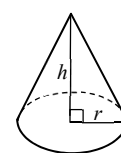
$$a^2 + b^2 = c^2$$



Special Triangles



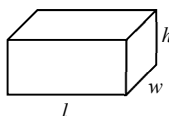
$$V = \frac{1}{3}lwh$$



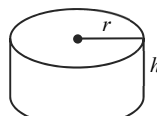
$$V = \frac{1}{3}\pi r^2 h$$



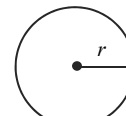
$$A = lw$$



$$V = lwh$$

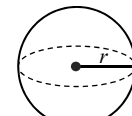


$$V = \pi r^2 h$$



$$A = \pi r^2$$

$$C = 2\pi r$$



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

There are  $360^\circ$  in a circle.

The sum of the angles in a triangle is  $180^\circ$ .

The number of radians of arc in a circle is  $2\pi$ .

CONTINUE



1

If  $f(x) = 2x + 1$  and  $g(x) = 4x - 4$ , what is  $f(0) \times g(0)$ ?

- A)  $-5$
- B)  $-4$
- C)  $4$
- D)  $8$

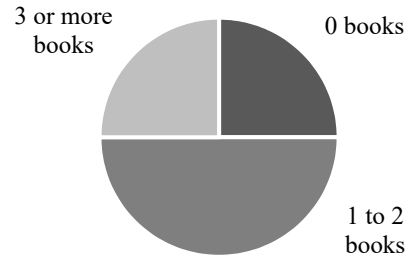
2

If  $y:z$  is equal to  $1:3$ , and  $z:a$  is equal to  $2:3$ , what ratio is equal to  $y:a$ ?

- A)  $2:9$
- B)  $1:3$
- C)  $1:2$
- D)  $2:3$

3

Books Read Per Month



A group of people are surveyed about the number of books they read each month, and the results are graphed above. If the sample accurately represents the 420,000 people in the city of Omaha, how many people in Omaha can we expect to read 3 or more books per month?

- A) 84,000
- B) 105,000
- C) 189,000
- D) 218,000

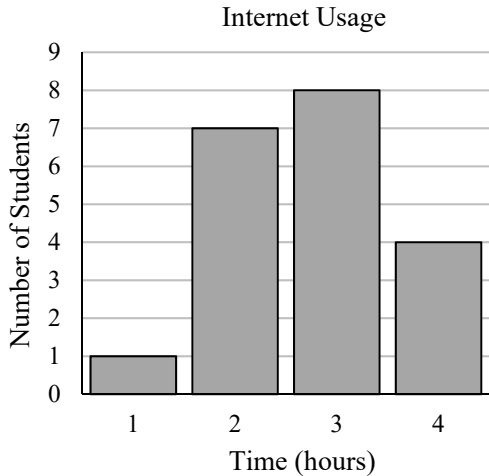
4

A printer can print at a rate of 5 pages per minute. How many hours will it take to print 300 pages?

- A) 0.5
- B) 1
- C) 1.5
- D) 3



5



Administrators at Washington High School have noticed that students are downloading and watching movies while in class. They want to determine whether it is only a few kids who are using the internet for long periods of time at school. The above graph is the result of an anonymous student survey, representing the number of hours spent on the internet per day by students at Washington High School. Which of the following statements is INCORRECT?

- A) The mode of this data set is 3 hours.
- B) The range of this data set is 3 hours.
- C) 60% of the students surveyed use the internet 3 or 4 hours per day.
- D) The median is smaller than the mean for this set of data.

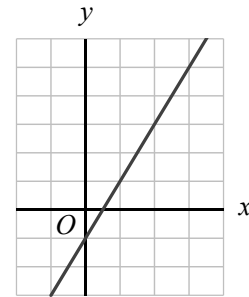
6

$$\sqrt{x+1} = 6$$

Which of the following is a value of  $x$  for the equation above?

- A) 6
- B) 34
- C) 35
- D) 36

7



Which of the following equations could represent the linear equation above?

- A)  $y = -2x - 1$
- B)  $y = -2x + 1$
- C)  $y = 2x - 1$
- D)  $y = 2x + 1$



8

If  $f(x)$  is a linear function that passes through the points  $(4, 3)$  and  $(-4, -9)$ , what is the  $y$ -intercept of  $f(x)$ ?

- A)  $(0, 2)$
- B)  $(2, 0)$
- C)  $(0, -3)$
- D)  $(-3, 0)$

9

Which of the following equations represents the function  $f(x) = 2x - 1$  shifted 2 units to the left on the  $xy$ -plane?

- A)  $g(x) = 2x - 5$
- B)  $g - 3x = 2x$
- C)  $g(x) = 2x + 1$
- D)  $g(x) = 2x + 3$

10

What is the average of  $2x + 4$ ,  $5x - 1$ , and  $-x + 3$ ?

- A)  $x + 2$
- B)  $x - 2$
- C)  $2x + 2$
- D)  $2x - 2$

11

University Students' Sleep Habits		
Hours of Sleep	University A	University B
Average	6	8
Median	4	7
Mode	5	7
Standard Deviation	3	1

A random sample of students in two different universities were surveyed for their sleep habits. The results are shown in the table above. Which of the following statements is supported by the information in this table?

- A) The hours of sleep per night varies more among students at University A than students at University B.
- B) More students attend University B than University A.
- C) More than half of the students at University B get 7 hours of sleep per night.
- D) Half of the students at University A get 6 hours of sleep per night.

12

Logan bought 36 pieces of bubble gum, which was 40% of the store's stock. How much bubble gum is remaining in the store?

- A) 54
- B) 72
- C) 80
- D) 90



13

Year	Number of Colonies
1992	41,402
1993	43,783
1994	46,164
1995	48,545

The table above shows the number of fire ant colonies found in Greenville from 1992 to 1995. Which of the following graphs best represents the number of fire ant colonies in Greenville?

- A)
- B)
- C)
- D)

14

For the inequality  $2x + y > 15$ , when  $x = 3$ , which of the following CANNOT be a possible value of  $y$ ?

- A) 9  
B) 10  
C) 11  
D) 12

15

The sum of the digits in a two digit number is 8. If 18 is subtracted from this number, the numbers' digits are reversed. Which of the following could be the original number?

- A) 32  
B) 53  
C) 62  
D) 71

16

If  $x^2 + ax + b = (x - 9)(x + 9)$ , what is the value of  $ab$ ?

- A) -81  
B) 0  
C) 81  
D) 1458



17

$$\frac{2}{x} + \frac{3}{y} + \frac{5}{xy} = \frac{A}{xy}$$

What is the expression for  $A$ ?

- A)  $2x + 3y + 5xy$
- B)  $2y + 3x + 5$
- C)  $2x + 2y + 5$
- D)  $10xy$

18

A company polls a group of 1,067 people randomly selected to represent New York City. The company determines that 10% of the sample group does not like cheese, while the remaining 90% does like cheese. The poll is true with a 3% margin of error 19 times out of 20. If there are 8.5 million people in New York City, what is the best estimate for the number who do not like cheese?

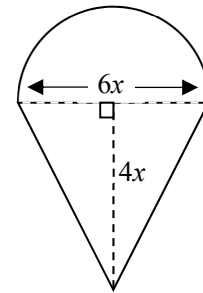
- A) 850,000 people
- B) Between 425,000 and 1,275,000 people
- C) Between 595,000 and 1,105,000 people
- D) Between 722,500 and 977,500 people

19

$f(2) = 3$  and  $f(-6) = -13$ . If  $f(x)$  is a linear function, what is the  $y$ -intercept of  $f(x)$ ?

- A)  $-1$
- B)  $0$
- C)  $1$
- D)  $2$

20



What is the perimeter of the figure outlined by the solid line, in terms of  $x$ ?

- A)  $5x + 3\pi x$
- B)  $5x + 6\pi x$
- C)  $10x + 3\pi x$
- D)  $10x + 6\pi x$





21

If  $5^{x+4} = 25^{x+3}$ , what is the value of  $x$ ?

- A)  $-2$
- B)  $-1$
- C)  $0$
- D)  $1$

22

Sam can run 4 miles in 48 minutes. If Ahn can run twice as fast as Sam, how many minutes does it take Ahn to run 6 miles?

- A) 24
- B) 30
- C) 36
- D) 48

23

Drink Sales for July		
Drink Flavor	16 oz.	24 oz.
Vanilla	1525	3200
Mocha	$m$	175
Espresso	$s$	4500
Total	3000	7875

A beverage company offers three different flavors of energy drinks. Each flavor is also offered in two different sizes. The table above shows the number of cans sold in each category during the month of July. If 16 oz. cans represented 20% of the total Espresso cans sold, how many 16 oz. cans of Mocha,  $m$ , did the company sell?

- A) 1125
- B) 575
- C) 465
- D) 350

24

If  $(x + 2)^2 = 4$ , what is a solution for  $x$ ?

- A)  $-4$
- B)  $-2$
- C)  $2$
- D)  $8$



**Questions 25 and 26 refer to the following information.**

Scientists study a group of large dogs, allocating each of them 1600 calories per day.  $\frac{1}{2}$  of these calories come from carbohydrates, and  $\frac{1}{4}$  of these calories come from fats.

25

How many more carbohydrate calories than fat calories is each dog allocated per day?

- A) 150
- B) 250
- C) 400
- D) 800

26

When the dogs are active, the scientists increase the dogs' daily caloric intake by 25%. Of these calories, 1,000 are from carbohydrates. What percentage of the remaining calories come from other, non-carbohydrate sources?

- A) 25
- B) 50
- C) 60
- D) 75

27

$$\begin{aligned} 5x + 3y &= 3c \\ 2y &= c - 4x \end{aligned}$$

If  $x + y = 6$ , what is the value of  $c$  for the system of equations above?

- A) 2
- B) 3
- C) 4
- D) 5

28

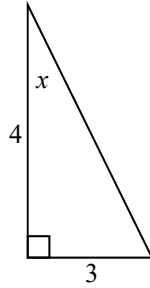
Hours of Exercise Per Week		
	Number of Students	
Hours Per Week	Class A	Class B
0	0	3
1	4	0
2	2	5
3	4	1

The table above shows the number of hours spent exercising per week by students in Class A and Class B. Which statement best describes the relationship of the median and mean of the hours of weekly exercise between the two classes?

- A) Class A has a higher median than Class B and Class B has a higher mean than Class A.
- B) Class B has a higher median than Class A and Class B has a higher mean than Class A.
- C) Class A and B have the same median, and Class B has a lower mean than Class A.
- D) Class A and B have the same median, and Class A has a lower mean than Class B.



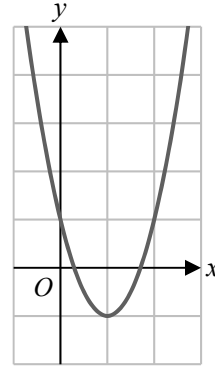
29



In the figure above, what is the value of  $\sin(x)$ ?

- A)  $\frac{3}{5}$
- B)  $\frac{3}{4}$
- C)  $\frac{4}{5}$
- D)  $\frac{5}{3}$

30



The function  $f(x) = ax^2 + bx + c$  is graphed above. Which of the following must be positive?

- A)  $ab$
- B)  $b - a$
- C)  $-c$
- D)  $ac$


**DIRECTIONS**

Questions **31-38** ask you to solve a problem and enter your answer in the grid provided on your answer sheet. When completing grid-in questions:

- You are required to bubble in the circles for your answers. It is recommended, but not required, that you also write your answer in the boxes above the columns of circles. Points will be awarded based only on whether the circles are filled in correctly.
- Fill in only one circle in a column.
- You can start your answer in any column as long as you can fit in the whole answer.
- For questions 31-38, no answers will be negative numbers.
- Mixed numbers**, such as  $4\frac{2}{5}$ , must be gridded as decimals or improper fractions, such as 4.4 or as  $\frac{22}{5}$ . "42/5" will be read as "forty-two over five," not as "four and two-fifths."
- If your answer is a **decimal** with more digits than will fit on the grid, you may round it or cut it off, but you must fill the entire grid.
- If there are **multiple correct solutions** to a problem, all of them will be considered correct. Enter only **one** on the grid.

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

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

CONTINUE



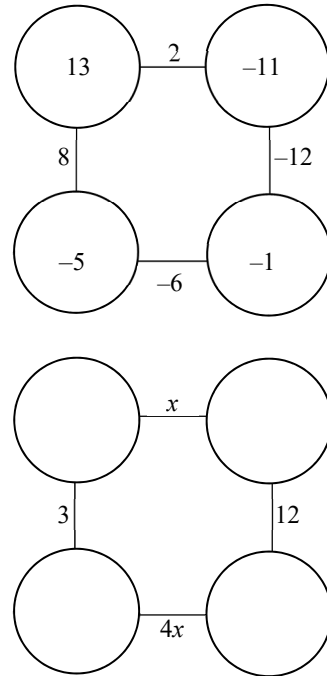
31

Linda works 6 hours a day on Monday and Wednesday, 8 hours a day on Thursday and Friday, and 5 hours on Sunday. If she is paid \$495 at the end of the week, what is Linda's hourly wage?

32

If the ratio of  $A$  to  $B$  is 2:3 and the ratio of  $A$  to  $C$  is 5:6, what is  $\frac{B}{C}$ ?

33



The figure above is an example of a completed bubble square. The numbers next to the line connecting the two adjacent circles is the sum of the numbers inside each of the two circles. What is the value of  $x$ ?

CONTINUE



34

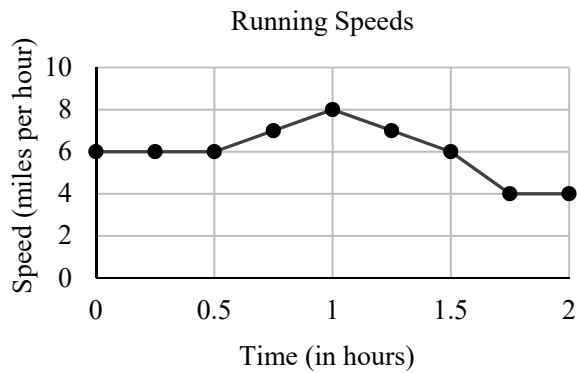
$$\frac{5}{x^2 + 6x + 8} = \frac{A}{x + 2} + \frac{B}{x + 4}$$

In the above equation, what is the value of  $A + B$  if  $A$  is equal to 2.5?

36

If a sector of a circle with an angle of  $60^\circ$  has an area of  $24\pi$ , what is the radius of the circle?

35



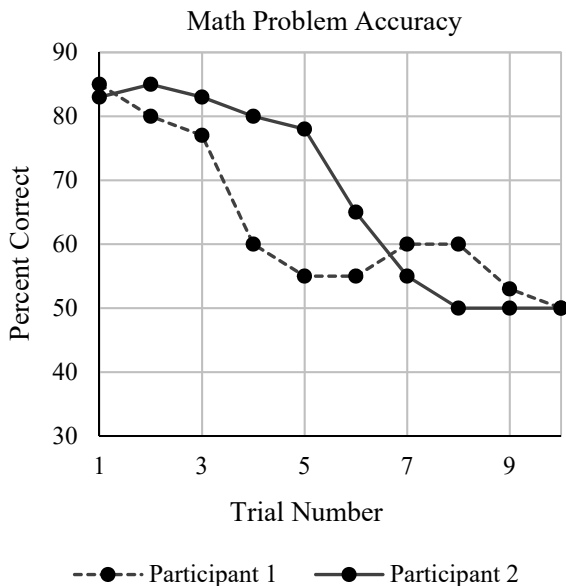
The graph above shows Rebecca's running speeds during a 2 hour run. What is the total distance, in miles, that Rebecca ran during the first hour of her run?

CONTINUE



**Questions 37 and 38 refer to the following information.**

In a psychology experiment, participants are asked to solve simple math problems presented on a computer screen. The data is analyzed by calculating what percentage of the questions that the participant answers correctly during one trial. The trials are presented back to back with no breaks in between. The results are shown below.



37

The duration of the experiment is 50 minutes and consists of 10 trials each lasting 5 minutes. If a new math problem is presented every 6 seconds, how many math problems are presented during one trial?

38

Trials 6 through 8 focus on spatial reasoning problems in math. The lab wants to determine whether the average accuracy is greater for Participant 1 or for Participant 2 during these trials. The percent of math problems correct for both participants during trials 6 through 8 is always divisible by 5. What is the difference between the average number of problems correct for Participant 1 and Participant 2 during trials 6 through 8? (Round your answer to the nearest integer.)

# STOP

**If you complete this section before the end of your allotted time, check your work on this section only. Do NOT use the time to work on another section.**





Essay



# Essay (Optional)

**50 MINUTES**

**Turn to the lined pages of your answer sheet to write your essay.**

---

## **DIRECTIONS**

This essay is optional. It is a chance for you to demonstrate how well you can understand and analyze a written passage. Your essay should show that you have carefully read the passage and should be a concisely written analysis that is both logical and clear.

You must write your entire essay on the lines in your answer booklet. No additional paper will be provided aside from the Planning Page inside your answer booklet. You will be able to write your entire essay in the space provided if you make use of every line, keep tight margins, and write at a suitable size. Don't forget to keep your handwriting legible for the readers evaluating your essay.

You will have 50 minutes to read the passage in this booklet and to write an essay in response to the prompt provided at the end of the passage.

## **REMINDERS**

- What you write in this booklet will not be evaluated. Write your essay in the answer booklet only.
  - Essays that are off-topic will not be evaluated.
-

As you read the following passage, consider how Alan Levinovitz uses

- evidence, like examples or facts, to support his arguments.
- logical reasoning to develop his ideas and to connect his claims to his evidence.
- stylistic or persuasive techniques, such as the choice of particular words or appeals to his readers' emotions, to give power to the ideas put forth.

**Adapted from Alan Levinovitz, "Blame Sugar? We've been doing that for over 100 years." © 2015 The Conversation.**

- 1 After a successful soda tax was passed last year in Berkeley, California, copycat laws are being proposed across the US, often with the support of nutritionists, medical professionals and a majority of the voting public. On May 28, the Illinois chapter of the American Academy of Pediatrics endorsed an act that would use a tax on sugary drinks.
- 2 Research has implicated sugar in the rising obesity rate and in health conditions like Type 2 Diabetes. Some researchers, including Robert Lustig, a pediatric endocrinologist from the University of California San Francisco, have described sugar as toxic. Lustig's criticisms can verge on apocalyptic. Sugar is "evil," "toxic" and "poisonous." Journalists, policymakers, and food activists have become devoted followers, and they support his call to regulate sugar "like alcohol and tobacco."
- 3 But this furor over sugar isn't anything new. Crusaders have been warning about the evil effects of sugar for hundreds of years, with no positive effect on our health. And isn't that the goal of this kind of rhetoric? Without attending to this history of bias and failed rhetoric, we may be doomed to continue repeating it
- 4 Social history reveals a consistent pattern of irrational beliefs about sugar. In 1974, pediatrician William Crook wrote a letter to a medical journal in which he named cane sugar "a leading cause of hyperactivity" (what we now call ADHD). Researchers debated Crook's claim for decades. The scientific consensus now? According to the National Institute of Mental Health, "more research discounts this idea than supports it."
- 5 Going back further in time, the demonization of sugar gets increasingly absurd. In 1968, holistic lifestyle crusader Jerome Irving Rodale wrote *Natural Health, Sugar, and the Criminal Mind*, the thesis of which is evident from the title.
- 6 The scapegoating of sugar dates to at least to the 18th century, when people lived in mortal fear of sexuality. British author Jonas Hanway blamed sugar for creating "fantastic desires and bad habits in which nature has no part." Children, he warned, were particularly susceptible to sugar's detrimental effects, which also included "scurvy [and] weak nerves."
- 7 Anti-sugar advocates like Lustig have adopted a fire-and-brimstone approach: Demonize a macronutrient. Tell people they should consider removing sugar and sugary foods from their pantries, that it is toxic, [and] that we need to regulate it like cigarettes, alcohol, and other drugs of abuse.

- 8 But before we ransack our kitchens, it's worth pausing to heed a warning from Stanford epidemiologist John PA Ioannidis. In his seminal 2007 article, *Why Most Published Research Findings Are False*, Ioannidis helps explain the endless flipflopping on nutritional guidelines. "For many current scientific fields," he writes, "claimed research findings may often be simply accurate measures of the prevailing bias."
- 9 Real science, as Ioannidis reminds us, is slow and humble. Only time will tell if the current level of sugar alarmism is warranted, or if many years from now the comparison of sugar to cocaine will look a bit ridiculous. The research on sugar might be right – but our history of bias shows that we have a tendency to jump the gun on sugar due to moral furor.
- 10 That doesn't mean that excessive sugar consumption is safe, nor that we should accept sugar's role in our national diet. So how do we address these problems?
- 11 Perhaps extremism, not sugar, is the real enemy. If that's the case, the best approach to fixing our culinary culture doesn't involve demonization or government regulation, strategies that promote dichotomous thinking – clean or unclean, toxic or safe – which experts warn may contribute to eating disorders while having marginal positive effects on overall public health.
- 12 There are other strategies available. We could recognize that a healthy attitude toward food needn't involve worrying about which foods are healthy. We could focus on making convenience food fresher, more diverse, and more affordable, because not everyone has a local farmers' market, or money to shop there, or time to cook, or a backyard garden in which to grow heirloom vegetables.
- 13 We could also strive to make home cooking more feasible by funding community cooking classes and reintroducing home economics. Culinary students – children and adults alike – could learn to prepare and appreciate delicious meals without feeling coerced, guilty or frightened. And they would do so in kitchens equipped, as all good kitchens are, with sugar.

Write an essay in which you explain how Alan Levinovitz builds an argument to persuade his audience that the dangers of sugar consumption may be overstated and that there is a need to reconsider the best way to deal with the issue of sugar consumption in the U.S. In your essay, analyze how Levinovitz uses one or more of the features listed in the box above (or features of your own choice) to strengthen the logic and persuasiveness of his argument. Be sure that your analysis focuses on the most relevant features of the passage.

Your essay should not explain whether you agree with Levinovitz's claims, but rather explain how he builds an argument to persuade his audience.



# Answers





# Answers

## Part 1

### Section 1

- |       |       |       |       |
|-------|-------|-------|-------|
| 1. C  | 14. C | 27. D | 40. B |
| 2. A  | 15. B | 28. C | 41. A |
| 3. C  | 16. D | 29. D | 42. C |
| 4. C  | 17. B | 30. B | 43. D |
| 5. B  | 18. D | 31. B | 44. D |
| 6. B  | 19. A | 32. B | 45. B |
| 7. D  | 20. C | 33. D | 46. C |
| 8. A  | 21. B | 34. C | 47. B |
| 9. C  | 22. B | 35. A | 48. C |
| 10. D | 23. D | 36. D | 49. A |
| 11. C | 24. B | 37. D | 50. C |
| 12. B | 25. A | 38. B | 51. B |
| 13. A | 26. C | 39. B | 52. A |

### Section 2

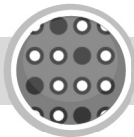
- |       |       |       |       |
|-------|-------|-------|-------|
| 1. C  | 12. B | 23. C | 34. B |
| 2. A  | 13. D | 24. B | 35. B |
| 3. D  | 14. C | 25. D | 36. C |
| 4. D  | 15. C | 26. B | 37. A |
| 5. A  | 16. A | 27. C | 38. C |
| 6. D  | 17. A | 28. C | 39. B |
| 7. C  | 18. B | 29. D | 40. B |
| 8. B  | 19. C | 30. B | 41. C |
| 9. D  | 20. B | 31. C | 42. B |
| 10. C | 21. D | 32. A | 43. D |
| 11. B | 22. A | 33. D | 44. C |

### Section 3

- |      |       |       |                       |
|------|-------|-------|-----------------------|
| 1. B | 6. B  | 11. C | 16. $4 \leq y \leq 6$ |
| 2. C | 7. D  | 12. D | 17. 9                 |
| 3. A | 8. A  | 13. C | 18. 4                 |
| 4. B | 9. C  | 14. A | 19. 5 or 21           |
| 5. C | 10. A | 15. B | 20. 6                 |

### Section 4

- |       |       |       |                   |
|-------|-------|-------|-------------------|
| 1. B  | 11. A | 21. A | 31. 15            |
| 2. A  | 12. A | 22. C | 32. $\frac{5}{4}$ |
| 3. B  | 13. C | 23. D | 33. 3             |
| 4. B  | 14. A | 24. A | 34. 0             |
| 5. D  | 15. B | 25. C | 35. 6.5           |
| 6. C  | 16. B | 26. B | 36. 12            |
| 7. C  | 17. B | 27. B | 37. 50            |
| 8. C  | 18. C | 28. C | 38. 1             |
| 9. D  | 19. A | 29. A |                   |
| 10. C | 20. C | 30. D |                   |



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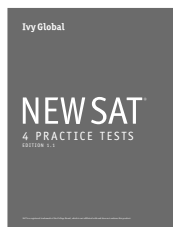
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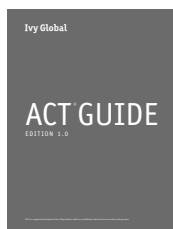
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