PSAT/NMSQT

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PSAT/NMSQT®

Preliminary SAT/National Merit Scholarship Qualifying Test

Test Book

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1

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2

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Reading Test

60 MINUTES, 47 QUESTIONS

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

DIRECTIONS

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

Questions 1-9 are based on the following passage.

This passage is adapted from Rabih Alameddine, *An Unnecessary Woman*. ©2013 by Rabih Alameddine.

I love Javier Marías's work. I've translated two of his novels: *A Heart So White* and *Tomorrow in the Battle Think on Me*. I'll consider a third after I read the French translation of the final volume of *Your Face Tomorrow*, although at more than thirteen hundred pages, I'll probably balk at that as well.

But I digress, as usual.

In one of his essays, Marías suggests that his work deals as much with what didn't happen as with what happened. In other words, most of us believe we are who we are because of the decisions we've made, because of events that shaped us, because of the choices of those around us. We rarely consider that we're also formed by the decisions we didn't make, by events that could have happened but didn't, or by our lack of choices, for that matter.

More than fifty years ago, on a gloomy day when hope followed my shrimp of an ex-husband out the door, or so I thought at the time, my friend Hannah led me by the hand to a bookstore owned by one of her relatives. The relative, a second cousin once removed, had opened the bookstore as a lark, a ground-floor store with an inadequate picture window in a distressed building off a main street and no foot traffic. There were more stupid stuffed toys than there were books, and everything was covered with dust. The bookstore had as much chance of making it as I did.

Yet of all things, the flint that sparked a flame in my soul was the huge, darkly stained oak desk where the owner sat. To a practically penniless twenty-year-old divorcée, sitting behind such a desk so grand, so luxurious—something to aspire to. I needed grandeur in my life.

Hannah told her relative he should hire me, and he informed her that he wanted to hire someone with more experience and, just as important, with more class. He spoke as if I weren't there, as if I were invisible, as if his face were hidden behind a perforated printout. Hannah, my champion, wouldn't accept defeat. She explained that I loved books and read constantly, that I knew more about them than he ever would, and, just as important, that I could dust and clean and scrub and mop. He'd have the cleanest bookstore in the city, I piped up, the most sparkling, a diamond. I would rid it of its acrid and musty odor. He pretended to mull over the offer before deciding to hire me for the time being (still talking to Hannah and not me), until he could bring in someone else to be the face of the bookstore.

What I didn't know at the time was that the first face he offered the job to belonged to a pretty girl whose family was so classy that they immigrated to Brazil and one of their scions had recently become the governor of São Paulo. The girl left without ever showing her countenance in the bookstore. The second didn't show up either; she married and no longer needed or wished to be employed.

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Had either of these women made an appearance, my life would have been altogether different. I didn't realize how the fate of those two had influenced mine until a few years ago when the owner mentioned it in passing. He hadn't thought for a moment that I could do the job. He credited my success to his diligent training.

I worked for the paperback dilettante for fifty years, and mine was the only face anyone associated with my bookstore.

1

Which choice best describes the passage?

A) A character relates an anecdote and analyzes its applications to another character's life.

B) A character relates to a friend an important chapter from a third character's life.

C) An observation about an author's work leads into a personal narrative that supports that observation.

D) The plot of a work of fiction is summarized, and that work's relationship to its author's life is considered.

2

What does the narrator imply about her own narrative style?

A) She likes to rely heavily on a recurring phrase.

B) She has a tendency to go off on tangents.

C) She uses dialogue to reveal characters' thoughts.

D) She admits to using extreme exaggerations.

3

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

A) Line 7 ("But I . . . usual")

B) Lines 10-13 ("In other . . . around us")

C) Lines 17-21 ("More than . . . relatives")

D) Lines 27-28 ("The bookstore . . . did")

4

What can reasonably be inferred about Hannah's motive in taking the narrator to apply for the job in the bookstore?

A) She is trying to take the narrator's mind off the breakup of her marriage.

B) She wants the job for herself.

C) She suspects that the narrator will not keep the job for long.

D) She thinks the narrator will improve the store's image.

5

The description of the bookstore (lines 21-28) creates an impression of

A) intellectualism.

B) playfulness.

C) age and disuse.

D) disuse and mellowness.

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6

In the passage, the narrator equates the bookstore's chances for success with her own

A) prospects for the future.
B) fondness for literature.
C) romantic aspirations.
D) physical appearance.

7

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

A) Lines 25-27 ("There were . . . dust")
B) Lines 27-28 ("The bookstore . . . did")
C) Lines 29-31 ("Yet . . . sat")
D) Lines 31-34 ("To a . . . life")

8

As used in line 38, "class" most nearly means

A) division.
B) grade.
C) refinement.
D) structure.

9

Which choice provides the best evidence for the conclusion that the bookstore owner initially ignored the narrator?

A) Lines 35-38 ("Hannah . . . class")
B) Lines 38-40 ("He spoke . . . printout")
C) Lines 40-41 ("Hannah . . . defeat")
D) Lines 41-44 ("She explained . . . mop")

Questions 10-18 are based on the following passage and supplementary material.

This passage is adapted from Kathleen D. Vohs, "It's Not 'Mess.' It's Creativity." ©2013 by The New York Times Company.

Messy or tidy—which is better?

Historically, the evidence has favored the tidy camp. The anthropologist Mary Douglas noted almost 50 years ago a connection between clean, open spaces and moral righteousness. More recently, psychologists have shown that the scent of citrus cleaning products is enough to raise people's ethical standards and promote trust. Conversely, in another study, people were found to associate chaotic wilderness with death.

But if messiness is so bad, why do so many people tolerate, and even embrace, it?

Not long ago, two of my colleagues and I speculated that messiness, like tidiness, might serve a purpose. Since tidiness has been associated with upholding societal standards, we predicted that just being around tidiness would elicit a desire for convention. We also predicted the opposite: that being around messiness would lead people away from convention, in favor of new directions.

We conducted some experiments to test these intuitions, and our hunches were borne out.

For our first study, we arranged rooms in our laboratory to look either tidy, with books and papers stacked and orderly, or messy, with papers and books strewn around haphazardly. Then we invited 188 adults to visit our laboratory individually, ostensibly for a consumer-choice study. Each subject was assigned to either a messy or a tidy room, where he or she was shown a menu from a deli that made fruit smoothies. The smoothies were said to come with a "boost" (added ingredients) from which there were three options to choose—a health, wellness or vitamin boost.

We created two versions of the menu. Half of the subjects saw a menu that had the word "classic" highlighting the health boost option, whereas the other half saw the health boost highlighted by the word "new." Then our subjects made their choices.

As predicted, when the subjects were in the tidy room they chose the health boost more often—almost twice as often—when it had the "classic" label: that is, when it was associated with convention. Also as predicted, when the subjects were in the messy room, they chose the health boost more often—more

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than twice as often—when it was said to be "new": that is, when it was associated with novelty. Thus, people greatly preferred convention in the tidy room and novelty in the messy room.

Given that divergence from the status quo is the essence of ingenuity, we conducted a second experiment to test whether messiness fostered creativity.

Forty-eight research subjects came individually to our laboratory, again assigned to messy or tidy rooms. This time, we told subjects to imagine that a Ping-Pong ball factory needed to think of new uses for Ping-Pong balls, and to write down as many ideas as they could. We had independent judges rate the subjects' answers for degree of creativity, which can be done reliably.

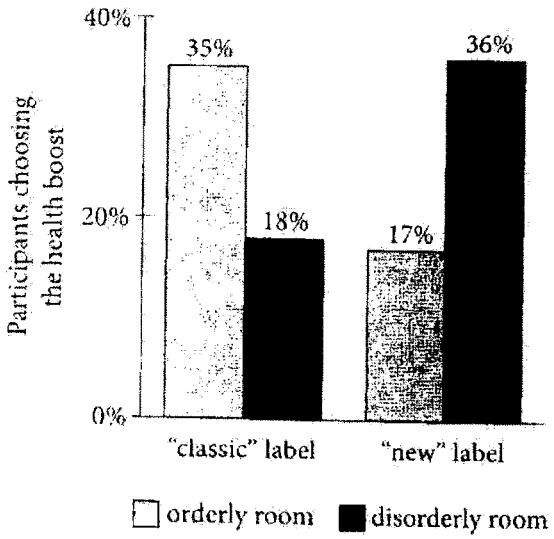
When we analyzed the responses, we found that the subjects in both types of rooms came up with about the same number of ideas, which meant they put about the same effort into the task. Nonetheless, the messy room subjects were more creative, as we expected. Not only were their ideas 28 percent more creative on average, but when we analyzed the ideas that judges scored as "highly creative," we found a remarkable boost from being in the messy room—these subjects came up with almost five times the number of highly creative responses as did their tidy-room counterparts.

(These results have been confirmed by independent researchers at Northwestern University, who found that subjects in a messy room drew more creative pictures and were quicker to solve a challenging brainteaser puzzle than subjects in a tidy room.)

Our findings have practical implications. There is, for instance, a minimalist design trend taking hold in contemporary office spaces: out of favor are private walled-in offices—and even private cubicles. Today's office environments often involve desk sharing and have minimal "footprints" (smaller office space per worker), which means less room to make a mess.

At the same time, the working world is abuzz about cultivating innovation and creativity, endeavors that our findings suggest might be hampered by the minimalist movement. While cleaning up certainly has its benefits, clean spaces might be too conventional to let inspiration flow.

Participants' Choice of Health Boost Option Grouped by Menu Label



Adapted from Kathleen D. Vohs et al., "Physical Order Produces Healthy Choices, Generosity, and Conventionality, Whereas Disorder Produces Creativity." ©2013 by Kathleen D. Vohs et al.

10

As used throughout the passage, "convention" most nearly means

A) formality.
B) resolution.
C) custom.
D) regulation.

11

As used in line 8, "promote" most nearly means

A) advocate.
B) publicize.
C) endorse.
D) encourage.

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12

Based on the passage, one assumption the author made when evaluating the results of the Ping-Pong balls experiment is that

A) subjects felt more relaxed in the neat laboratory rooms.

B) each new idea was the result of a similar amount of exertion.

C) highly creative ideas would be less likely to succeed on a mass-market scale.

D) the independent judges considered the messiness of the subjects' environment.

13

Which choice best supports the idea that the state of order in an environment has a pronounced effect on the upper edge of the range of creativity?

A) Lines 59-61 ("We . . . reliably")

B) Lines 62-64 ("When . . . ideas")

C) Lines 65-67 ("Nonetheless . . . expected")

D) Lines 69-73 ("we found . . . counterparts")

14

In lines 74-79, the reference to the Northwestern University study serves mainly to

A) provide additional support for the findings of the author's second study.

B) broaden the range of perspectives presented in the discussion.

C) offer an example of an experiment with findings applicable to daily life.

D) respond to arguments against the findings of the author's first study.

15

Based on the passage, which claim would the author most likely make about companies that follow the minimalist design trend?

A) They are likely to be groundbreakers in innovation.

B) They are less likely to value open spaces in the workplace.

C) Their employees are less likely to exhibit originality.

D) Their employees' performance on collaborative projects is likely to improve.

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16

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

A) Lines 50-53 ("Given . . . creativity")

B) Lines 80-83 ("There . . . cubicles")

C) Lines 84-85 ("Today's . . . footprints")

D) Lines 88-91 ("At the . . . movement")

17

According to the graph, what percentage of participants in the disorderly room chose the health boost when it was labeled "classic"?

A) 17%

B) 18%

C) 35%

D) 36%

18

Which statement about participants in the author's first study is best supported by the data in the graph?

A) Participants in the disorderly room were equally likely to choose the "classic" health boost as to choose the "new" health boost.

B) Participants in the orderly room were around twice as likely to choose the "new" health boost as were those in the disorderly room.

C) Participants in the disorderly room were equally likely to choose the vitamin boost as to choose the wellness boost.

D) Participants in the disorderly room were around twice as likely to choose the "new" health boost as were those in the orderly room.

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Questions 19-27 are based on the following passages.

Passage 1 is adapted from Nancy Stamp, "Restoring Tomato Flavor." ©2013 by The Scientist. Passage 2 is adapted from Ferris Jabr, "Creating Tastier and Healthier Fruits and Veggies with a Modern Alternative to GMOs." ©2014 by Scientific American.

Passage 1

Tomatoes are the #1-selling fruit or vegetable in the world today. Yet consumers complain about blandness of supermarket tomatoes and yearn for the old-timey summer-fresh, off-the-vine taste.

Tomato taste is a unique combination of five tastants—sweet, sour, salty, bitter, and savory (umami) compounds—as well as the aroma of volatiles, many from the breakdown of the carotenoid pigments, such as the bright red antioxidant lycopene. The modern tomato plant was bred to produce more fruit, diluting the relatively fixed amount of nutrients and tastants the plant has to offer. But that is only part of the story.

Researchers at the University of California, Davis, recently discovered that a genetic mutation that occurred about 70 years ago, and was then selected by breeders for its effect of causing tomatoes to ripen uniformly, came at the cost of less sugar and carotenoids in the fruit. Breeders also grew gas-able fruit, cultivars that respond well to ethylene to trigger ripening during postharvest, thus allowing tomatoes to be picked while still green. However, it is difficult to gauge when green tomatoes have matured to the point of forming the seed gel so rich in acid and umami. If picked too soon, the fruit will not ripen well.

Even for the mature green tomatoes, postharvest ethylene gassing by itself cannot fully substitute for the flavor developed by true vine ripening. For example, green fruit receives most of its sugar from leaves but also has chloroplasts that, when bathed in sunshine, can make more sugar directly within the fruit. Picked and stored fruit, of course, is stored in the dark, and thus neither receives nor produces sugar. And because tomatoes are a delicate fruit, they are also bred for a tougher (and distasteful) skin to withstand picking, packing, and transport. The final nail in the flavor coffin is refrigeration. Despite knowing it ruins the taste by reducing the volatiles so crucial for good flavor, wholesalers and retailers refrigerate tomatoes to prolong shelf life during distribution.

Passage 2

Horticultural scientist Harry Klee is determined to rescue the industrial tomato from its current gustatory doldrums. Through a series of large taste tests, he has evaluated nearly 200 varieties of heirloom tomatoes—older cultivars preserved by small groups of farmers and gardeners and sold at some grocery stores and farmers markets.

Heirlooms are known for their vibrant colors and fantastic flavor, but their skin easily cracks and scars, they often go soft quickly, and they come from plants that do not make enough fruit to meet the demands of large commercial farmers.

In his research, Klee has learned that many heirlooms are tastier than standard supermarket tomatoes not because they have more sugar but because they are chock-full of a much more complex component of flavor: pungent chemicals known as volatile organic compounds that waft off plants and into our nostrils (think freshly cut grass or the alluring smell of citrus). In a 2012 study Klee and his colleagues discovered that people actually enjoy a tomato with moderate levels of sugar if it contains enough of an aromatic compound named geranial. Klee suspects that geranial and other volatiles not only give a tomato its scent but also magnify the fruit's innate sweetness. In follow-up studies, he created tomatoes that lacked geranial and other fragrant molecules. People did not like them. If a tomato had average to high sugar levels but no volatiles, volunteers did not perceive it as sweet.

Lately, Klee has been trying to make hybrid plants that give growers and consumers the best of both tomato worlds, old and new. In the past three years he and his colleagues have mated the most delicious heirlooms they could find with modern conventional tomatoes to create crossbreeds that yield well, are firm and smooth-skinned, and taste great. Klee routinely stocks up on cheap electric toothbrushes, which he and his team use to gently but thoroughly rattle tomato flowers, gathering the pollen that falls off in test tubes so they can play matchmaker. All the while, the breeders have been using hole punches to collect bits of leaves and analyze the plants' DNA, looking for genetic patterns that correspond to high levels of volatiles, for instance, or flawless skin. "Genetic analysis has definitely informed crossing decisions," Klee says. "Our work has really accelerated in the last couple of years with the emergence of the tomato genome sequence."

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19

The main purpose of Passage 1 is to

A) examine the techniques used for enhancing the taste of modern tomatoes.

B) identify several influences on the physical appearance of modern tomatoes.

C) discuss key phases of the process used to distribute modern tomatoes.

D) describe some of the factors contributing to the blandness of modern tomatoes.

20

In the context of Passage 1, lines 5-13 serve to

A) highlight how best to cultivate modern tomatoes.

B) emphasize the hardiness and variety of modern tomato plants.

C) establish a link between the taste and the breeding of modern tomatoes.

D) raise concerns about the nutritional value of the modern tomato.

21

As used in line 12, "fixed" most nearly means

A) stable.

B) immobile.

C) repaired.

D) obsessive.

22

Passage 1 supports which claim about the modern tomato industry?

A) It employs breeding practices that result in visually unappealing produce.

B) It creates a long-lasting product at the cost of flavor.

C) It supports researchers who try to improve the taste of its produce.

D) It enhances the quality of its produce by mimicking natural processes.

23

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

A) Lines 14-19 ("Researchers . . . fruit")

B) Lines 19-22 ("Breeders . . . green")

C) Lines 33-35 ("Picked . . . sugar")

D) Lines 38-42 ("Despite . . . distribution")

24

As used in line 53, "meet" most nearly means

A) assemble.

B) confront.

C) satisfy.

D) introduce.

25

The description in Passage 2 of Klee's most recent research indicates that it is based on the assumption that

A) both customers and producers will benefit from improvements in the quality of conventional tomatoes.

B) moderate to high levels of sugar will make tomatoes more appetizing to humans than will any other feature.

C) consumers have little interest in produce that contains high levels of volatiles.

D) organically grown tomatoes are superior to genetically modified versions.

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26

In Passage 2, Klee's description of his crossbreeding efforts suggests that recent scientific advances have helped to increase the

A) potential quality of the products available to the public.

B) number of research studies that have applications beyond agriculture.

C) funding of investigations to reexamine previous findings.

D) frequency of debates concerning the value of genome analysis.

27

Which statement best describes the relationship between the two passages?

A) Passage 2 describes scientific research that is designed to address an issue identified in Passage 1.

B) Passage 2 explains a modern approach that exposes the shortcomings of a claim made in Passage 1.

C) Passage 2 discusses a significant exception to the generalizations highlighted in Passage 1.

D) Passage 2 criticizes a controversial scientific method used to justify the main argument in Passage 1.

Questions 28-37 are based on the following passage.

This passage is adapted from US Secretary of State George C. Marshall, "The Marshall Plan." Delivered June 5, 1947, at Harvard University, two years after the end of the Second World War.

In considering the requirements for the rehabilitation of Europe, the physical loss of life and the visible destruction of cities, factories, mines, and railroads were correctly estimated, but it has become obvious during recent months that this visible destruction was probably less serious than the dislocation of the entire fabric of the European economy.

The farmer has always produced the foodstuffs to exchange with the city dweller for the other necessities of life. This division of labor is the basis of modern civilization. At the present time it is threatened with breakdown. The town and city industries are not producing adequate goods to exchange with the food-producing farmer. Raw materials and fuel are in short supply. Machinery is lacking or worn out. The farmer or the peasant cannot find the goods for sale which he desires to purchase. So the sale of his farm produce for money which he cannot use seems to him an unprofitable transaction. He, therefore, has withdrawn many fields from crop cultivation and is using them for grazing. He feeds more grain to stock and finds for himself and his family an ample supply of food, however short he may be on clothing and the other ordinary gadgets of civilization. Meanwhile people in the cities are short of food and fuel. So the governments are forced to use their foreign money and credits to procure these necessities abroad. This process exhausts funds which are urgently needed for reconstruction. Thus a very serious situation is rapidly developing which bodes no good for the world. The modern system of the division of labor upon which the exchange of products is based is in danger of breaking down.

The truth of the matter is that Europe's requirements for the next three or four years of foreign food and other essential products—principally from America—are so much greater than her present ability to pay that she must have substantial additional help, or face economic, social, and political deterioration of a very grave character.

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The remedy lies in breaking the vicious circle and restoring the confidence of the European people in the economic future of their own countries and of Europe as a whole. The manufacturer and the farmer throughout wide areas must be able and willing to exchange their products for currencies the continuing value of which is not open to question.

It is logical that the United States should do whatever it is able to do to assist in the return of normal economic health in the world, without which there can be no political stability and no assured peace. Our policy is directed not against any country or doctrine but against hunger, poverty, desperation, and chaos. Its purpose should be the revival of a working economy in the world so as to permit the emergence of political and social conditions in which free institutions can exist. Such assistance, I am convinced, must not be on a piece-meal basis as various crises develop. Any assistance that this Government may render in the future should provide a cure rather than a mere palliative.

It would be neither fitting nor efficacious for this Government to undertake to draw up unilaterally a program designed to place Europe on its feet economically. This is the business of the Europeans. The initiative, I think, must come from Europe. The role of this country should consist of friendly aid in the drafting of a European program and of later support of such a program so far as it may be practical for us to do so. The program should be a joint one, agreed to by a number of, if not all, European nations.

28

In the passage, Marshall states that the death and obvious physical ruin caused in Europe by the war

A) were more extensive than world leaders had expected.

B) are difficult to quantify because they are unprecedented in scale.

C) had been properly taken into account in planning for reconstruction.

D) may be the most serious of all the factors affecting postwar life.

29

A significant contrast that Marshall draws in discussing the fundamental nature of an economy is between

A) rural and urban production.

B) raw materials and finished goods.

C) town residents and city residents.

D) domestic and foreign resources.

30

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

A) Lines 4-8 ("it has . . . economy")

B) Lines 9-12 ("The farmer . . . civilization")

C) Lines 36-42 ("Europe's . . . character")

D) Lines 50-54 ("It is . . . peace")

31

Based on the passage, there were insufficient resources for rebuilding Europe after the war in part because European governments were

A) spending too much money on transportation improvements.

B) focused unduly on strengthening their devalued currencies.

C) compelled to purchase essential goods from other countries.

D) grossly ineffective as a result of widespread corruption.

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32

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

A) Lines 13-16 ("The town . . . supply")
B) Lines 27-31 ("Meanwhile . . . reconstruction")
C) Lines 46-49 ("The manufacturer . . . question")
D) Line 68 ("The initiative . . . Europe")

33

What main effect do the phrases "very serious," "bodes no good," and "danger of breaking down," used in lines 32-35, have on the tone of Marshall's description of the situation?

A) The phrases create a pessimistic tone that calls attention to the situation's hopelessness.
B) The phrases create an indecisive tone that reinforces the situation's uncertain outcome.
C) The phrases create an earnest tone that emphasizes the critical nature of the situation.
D) The phrases create an exhausted tone that reflects international weariness with the situation.

34

In the passage, Marshall indicates that achieving sound economic conditions in Europe requires

A) a ban on importing foreign products.
B) a reestablishment of citizens' confidence.
C) a change in governmental leaders.
D) an adoption of a new type of currency.

35

As used in line 51, "return" most nearly means

A) reversal.
B) reinstatement.
C) repayment.
D) response.

36

In context, Marshall's use of the words "cure" and "palliative" (line 63) suggests that the assistance provided by the United States must

A) address each new problem as it arises.
B) heal all who have suffered injuries.
C) be thorough and comprehensive.
D) focus on individuals rather than nations.

37

It can most reasonably be inferred from the passage that Marshall believes the United States should

A) provide food, machinery, and fuel to European farmers.
B) be frugal in its plans to revive the European economy.
C) help resolve additional European crises as they develop.
D) defer to the Europeans in deciding on appropriate solutions.

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Questions 38–47 are based on the following passage and supplementary material.

This passage is adapted from Elizabeth Pennisi, "Seagrasses Partner with Clams to Stay Healthy." ©2012 by American Association for the Advancement of Science.

Not much to look at and sometimes quite mucky, seagrass beds have been called the ugly ducklings of marine conservation. They lack the charisma of coral reefs, yet like reefs, these beds form a highly productive and diverse ecosystem, acting as the nursery for many kinds of fish as well as a home to sea turtles, manatees, and a host of other sea creatures. Seagrasses help cycle nutrients, and experts estimate they provide $1.9 trillion in ecosystem services per year worldwide. At the heart of seagrasses' success may be a small clam.

Seagrasses are saltwater flowering plants that grow along coasts and make up 0.2% of the ocean's ecosystems. They produce an amount of biomass that beats that of the Amazonian rain forest and is on par with that of corn and sugarcane crops. Their roots and stems trap organic matter and sediment, causing buildups of rich mud that can be waist deep.

This muck is a potential threat to the grass: Decaying organic matter produces a lot of sulfide, creating what could be an unhealthy environment for plant roots. Researchers had assumed that the oxygen released from seagrass roots combined with enough of the surrounding sulfide to neutralize this toxic element. Not so. "We found that in most seagrass beds, it's much more complex," marine ecologist Tjisse van der Heide says. "They have a trick to speed up oxidation" that relies on a symbiotic relationship with bacteria that consume sulfides.

Van der Heide first began to suspect that seagrass depended on bacteria while doing fieldwork in Mauritania. He and his colleagues found thousands of 1-centimeter lucinid clams living among the seagrass roots. Gills make up much of the clam's innards: That's where sulfide-oxidizing bacteria live. They sustain the clam by providing nutrients in much the way that zooxanthellae sustain coral.

Following up on their clam observation, the researchers took 110 samples of seagrass beds with a 15-centimeter-wide tube that cut cores 20 centimeters deep into the sediment. They filtered out and weighed all the organisms in the sediment and dried and weighed the seagrass in each core. "The more bivalves we found in the core, the more seagrass we found in the core," suggesting a beneficial partnership, Van der Heide says.

Wondering if this cohabitation was unique to Mauritania, the researchers combed the literature for studies describing the communities inside other seagrass beds, finding 84 covering tropic, subtropic, and temperate sites on six continents. Lucinid clams were found associated with 11 of 12 seagrass genera, the one exception being a seagrass that grew on bare rock.

Next, Van der Heide explored the potential of this relationship in the lab. He grew seagrass alone, clams alone, and the two organisms together under different conditions, including one in which he and his colleagues injected sulfide into the sediment semiweekly. On its own, the seagrass was able to process some of the sulfide, but sulfide gradually increased in concentration and interfered with seagrass growth. The clams alone got rid of the introduced sulfide but didn't get any bigger. But both the clams and the seagrass thrived when together, getting rid of the sulfide and growing as well, Van der Heide's team reports. The roots seemed to provide the clams with more ready access to oxygen, which "was necessary for the bivalves to consume that sulfide in an efficient manner," Van der Heide explains.

"The elegant experimental design provides compelling evidence for the benefits of the interaction between seagrasses and the associated bivalve," says Carlos Duarte, a marine ecologist at the University of Western Australia in Perth.

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Figure 1

Effect of Sulfide and Lucinid Clams on Seagrass Root Biomass

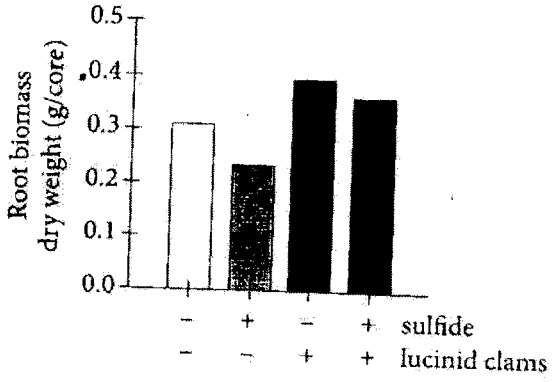
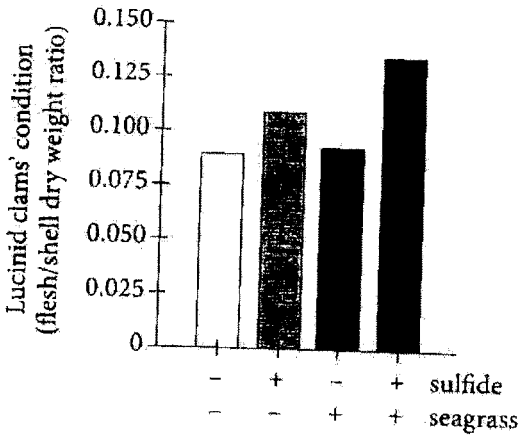


Figure 2

Effect of Sulfide and Seagrass on Lucinid Clams' Condition



Adapted from Tjisse van der Heide et al., "A Three-Stage Symbiosis Forms the Foundation of Seagrass Ecosystems." ©2012 by American Association for the Advancement of Science.

38

The main purpose of the passage is to

A) describe a study showing how one species helps to limit the spread of another species.

B) present research that reveals a mutually beneficial relationship between different species.

C) explain how changing environmental conditions pose a threat to multiple species in an ecosystem.

D) analyze the process by which one species can take over the ecological niche of another species.

39

As used in line 15, "beats" most nearly means

A) exceeds.

B) subdues.

C) strikes.

D) counteracts.

40

It can reasonably be inferred from the passage that sulfide accumulates around seagrass roots due to

A) an overabundance of lucinid clams.

B) the presence of sulfide-oxidizing bacteria.

C) an excess of key root nutrients.

D) the physical characteristics of the seagrass.

41

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

A) Lines 14-16 ("They . . . crops")

B) Lines 17-19 ("Their . . . deep")

C) Lines 28-30 ("They . . . sulfides")

D) Lines 33-35 ("He and . . . roots")

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CONTINUE

1

42

As used in lines 37 and 38, "sustain" most nearly means

A) withstand.

B) affirm.

C) prolong.

D) nourish.

43

Which choice provides the best evidence that Van der Heide was trying to determine whether seagrass and lucinid clams together respond differently to additional sulfide in the sediment than does either seagrass alone or lucinid clams alone?

A) Lines 42-44 ("They . . . each core")

B) Lines 45-47 ("The more bivalves . . . says")

C) Lines 52-55 ("Lucinid . . . rock")

D) Lines 57-61 ("He grew . . . semiweekly")

44

Which statement about the oxygen released by seagrass roots is best supported by information in the passage?

A) It impedes the growth of sulfide-oxidizing bacteria in the gills of lucinid clams.

B) It serves the same role for lucinid clams that zooxanthellae serve for coral.

C) It is not sufficient to eliminate sulfide accumulation in the absence of lucinid clams.

D) It becomes more concentrated as sediment builds up around seagrass roots.

45

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

A) Lines 35-36 ("Gills . . . live")

B) Lines 37-38 ("They . . . coral")

C) Lines 61-64 ("On its . . . growth")

D) Lines 64-65 ("The clams . . . bigger")

46

Which conclusion is best supported by the experimental results shown in figure 1?

A) Sulfide had a positive effect on the root biomass of seagrass when lucinid clams were absent.

B) Seagrass had a greater root biomass in the absence of lucinid clams and injected sulfide than when exposed to both lucinid clams and injected sulfide.

C) The presence of lucinid clams had a positive effect on the root biomass of seagrass regardless of whether sulfide was present.

D) Lucinid clams had a positive effect on the root biomass of seagrass in direct proportion to the concentration of sulfide in the sediment.

47

Regarding the claim that clams and seagrass "thrived when together" (line 66) in the experiment, which statement is best supported by the information in the two figures?

A) The clams thrived more when seagrass was present than in any condition without seagrass.

B) Increasing the quantity of sulfide when clams were present helped seagrass thrive.

C) Decreasing the quantity of sulfide when seagrass was present helped clams thrive.

D) The introduction of sulfide when both clams and seagrass were present benefited clams but not seagrass.

STOP

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

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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

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

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

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

Questions 1-11 are based on the following passage.

My Kingdom for mtDNA

The University of Leicester, working with the Richard III Society and the Leicester City Council, undertook an ambitious archaeological project in August 2012. The group, in as short a time as seven months, 1 were able to announce to the world that it had done something 2 remarkable: it had found a lost king.

1

A) NO CHANGE
B) was
C) are
D) will be

2

A) NO CHANGE
B) remarkable,
C) remarkable—because—
D) remarkable; because

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CONTINUE

The group had uncovered the lost grave of King Richard III, the last English king to die in battle. He died at the Battle of Bosworth in 1485 at the age of 32, and his grave "went missing" 3 sometime, around 1538 when the church under which he was buried was destroyed, and with it, all the records of burial.

4 Some time passed, and the king stayed missing. When human remains were found under a parking lot in Leicester at the site that many historians believed had housed that long-destroyed church, scientists and historians alike paid attention. The evidence pointed to the fact that these were the remains of 5 a human. Many thought that it was possible that this corpse could be the one that had been 6 wondered about for centuries. But historians needed help.

3

A) NO CHANGE
B) sometime around 1538,
C) sometime—around 1538,
D) sometime, around 1538;

4

The writer wants to begin this paragraph with a sentence that emphasizes the amount of time the king had been missing. Which choice most effectively accomplishes this goal?

A) NO CHANGE
B) For many years, historians had thought about the different places the king could be buried.
C) Over five hundred years after his death, historians finally began the physical search for the long-lost king's burial site.
D) The mystery of the king's burial place had been around for a while.

5

The writer wants to provide additional specific details that show why many thought that the remains might be those of Richard III. Given how Richard III was described earlier in the passage, which choice best accomplishes this goal?

A) NO CHANGE
B) a male human being.
C) an individual who lived in the 1400s.
D) a man who died in his early thirties, likely from battlefield wounds.

6

A) NO CHANGE
B) wondered over
C) guessed on
D) thought on

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CONTINUE

2

Scientists used a special type of DNA test to explore the possibility that the remains were those of Richard III. They analyzed mitochondrial DNA (or mtDNA), which is the DNA that exists within mitochondria, the organelles that convert chemical energy into a form that bodies can use. 7 Transmitted exclusively from mother to child, mtDNA is incredibly useful when tracing female lines of descent. A mother will pass on the mtDNA to all of her children, regardless of gender, but the mtDNA will only continue to be transmitted 8 through the generations if female descendants of a family have female descendants. Therefore, if a female line of descent remains 9 not broken, then the mtDNA is passed on.

7

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

> The word "mitochondria" comes from the Greek words for "thread" and "granule."

Should the writer make this addition here?

A) Yes, because it provides additional detail for the definition of the word "mitochondria."
B) Yes, because it illustrates the relationship between mitochondria and mtDNA.
C) No, because it interrupts the paragraph's explanation of mtDNA with a loosely related detail.
D) No, because it repeats information about word origins provided elsewhere in the passage.

8

A) NO CHANGE
B) and passed down from generation to generation
C) through generations of future descendants
D) in female descendants

9

A) NO CHANGE
B) not broken up,
C) unbroke,
D) unbroken,

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CONTINUE

2

Richard III shared mtDNA with his sister Anne of York because they had the same mother, Cecily Neville. Historians were able to meticulously trace an all-female lineage from Anne of York through more than five hundred years, ending at a man named Michael Ibsen, born in 1957. Ibsen is Neville's seventeenth-generation grandson and would have the same mtDNA as Richard III and Anne of York.

10 Scientists needed to find mtDNA in order to analyze it. In each lab, mtDNA samples from the teeth and femur were analyzed and found to be an exact match with Ibsen's mtDNA. **11** The mystery was solved. The lost king had been found.

10

Which choice best introduces the paragraph?

A) NO CHANGE

B) The scientists had to take some of the bones to be analyzed.

C) An advantage of mtDNA is that there is a lot of it within each cell, so scientists have plenty of material to study.

D) Scientists worked with the lower jaw and the femur bone, bringing them to two laboratories that specialize in the study of ancient DNA.

11

Which choice most effectively combines the underlined sentences?

A) The mystery was solved, and yet the lost king had been found.

B) Because the mystery was solved, the lost king had been found.

C) The mystery was solved; the lost king had been found.

D) While the mystery was solved, the lost king had been found.

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CONTINUE

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

Modeling Sustainability with Living Buildings

In response to their clients' growing commitment to environmental sustainability, 12 buildings are increasingly designed by architects that meet the requirements for a variety of green building certifications. One of the most 13 exhausting of these certifications is that for the "living building," which requires meeting the extensive criteria enumerated in the Living Building Challenge. Although its requirements may be daunting, this challenge is worth embracing for those who seek to set the highest standards for sustainable building.

12

A) NO CHANGE
B) architects are increasingly designing buildings
C) building design is increasing by architects
D) architects' designs are increasing for buildings

13

A) NO CHANGE
B) outrageous
C) rigorous
D) draining

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CONTINUE

2

Living buildings have numerous environmental advantages over both traditional **14** buildings, and less stringently certified green buildings. A living building must not only avoid depleting finite energy and water resources but also provide its own. **15** In conclusion, to meet the Living Building Challenge's requirements for energy and water usage, the Omega Center for Sustainable Living in Rhinebeck, New York, was designed with a solar power **16** system that generates nearly 2,000 kilowatt hours of energy in excess of what the building uses per year. An Eco-Machine filtration system makes groundwater potable. In addition, an underground cistern collects rainwater for use in toilets. These and other features **17** is resulting in a building that is entirely self-sustaining.

14

A) NO CHANGE
B) buildings, and,
C) buildings and
D) buildings; and

15

A) NO CHANGE
B) For instance,
C) By contrast,
D) However,

16

A) NO CHANGE
B) system; which
C) system, that
D) system, it

17

A) NO CHANGE
B) are resulting
C) has resulted
D) result

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CONTINUE

Living buildings do have one 18 drawback. That drawback is a high price tag. However, a 2009 cost analysis of buildings with different green designations reveals that despite their high initial cost, living buildings are the most economically advantageous choice in the long run. The results of the analysis indicate a payback period, the estimated amount of time it would take to recoup the additional expenses associated with constructing a living building. 19 The general rule that temperate climates lead to longer payback periods than hot and humid climates do does have some exceptions. A high-rise mixed-use building in the cool climate of Boston, Massachusetts, would recoup the cost in just 8–13 years. 20 The payback period for a school in Phoenix, Arizona, would be twice as long. Fortunately, living buildings are becoming more affordable as the high cost of some green building materials decreases, in part due to growing demand for them.

Payback Period for Living Buildings in Selected Cities

	K–8 school (years)	Low-rise office (years)	Mid-rise office (years)	High-rise mixed-use building (years)
Portland, OR (temperate climate)	10–15	25–30	18–23	13–18
Atlanta, GA (hot, humid climate)	8–13	21–26	15–20	13–18
Phoenix, AZ (hot, arid climate)	12–17	20–25	16–21	11–16
Boston, MA (cool climate)	6–11	16–21	10–15	8–13

Adapted from Cascadia Green Building Council et al., "Living Building Financial Study: Cost Comparison Matrix." ©2009 by International Living Future Institute.

18

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

A) drawback:
B) drawback; this is
C) drawback, which can be summed up as
D) drawback, and that drawback is

19

Which choice best summarizes the data in the table?

A) NO CHANGE
B) Payback periods vary substantially with type of building and climate.
C) High-rise mixed-use buildings have longer payback periods than do K–8 schools.
D) The payback period for a living building is excessive, regardless of location or type.

20

Which choice most effectively uses data from the table to develop a contrast to the previous sentence?

A) NO CHANGE
B) Similar buildings elsewhere, however, typically take twice as long.
C) For a low-rise office building in the temperate climate of Portland, Oregon, recouping the cost would take as long as 25–30 years.
D) K–8 schools generally recoup their costs in less time.

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CONTINUE

2

Some detractors argue that it's not necessary to go to what they consider the extremes required for a living building; instead, **21** we advocate taking small steps toward increased energy efficiency. Those small steps shouldn't be disregarded, but the big steps have the greatest potential to help people envision a truly sustainable future. **22** Although living buildings are probably not feasible for every community, they could be considered in places where their costs can be quickly recouped.

21

A) NO CHANGE
B) they
C) you
D) I

22

The writer wants to end the paragraph with a forward-looking statement that focuses on a positive aspect of living buildings. Which choice most effectively accomplishes this goal?

A) NO CHANGE
B) To that end, the Environmental Protection Agency has developed a program called WaterSense to help residents of all kinds of buildings save water and money.
C) With the "living building" certification, buildings can serve as models that inspire and propel communities to the next level of environmental sustainability.
D) The detractors have a point—all measures that decrease a building's environmental impact, no matter how small, should be taken into consideration.

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CONTINUE

2

Questions 23-33 are based on the following passage.

Hello, Stranger

In 2010, 23 twenty-six-year-old Brandon Stanton arrived in New York City, where he knew no one, with nothing but two suitcases. Prior to his arrival, he had been traveling around the United States, taking photographs and posting them on his blog. In Philadelphia, he called his collection of photos "Bricks and Flags"; in Pittsburgh, "Yellow Steel Bridges" 24. When he first got to New York, overwhelmed by the 25 compactness of people, he called the collection of photos he took "Humans of New York."

23

A) NO CHANGE
B) twenty-six-year-old, Brandon Stanton
C) twenty-six-year-old, Brandon Stanton,
D) twenty-six-year-old Brandon Stanton,

24

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

—names he derived from his first impressions of those cities

Should the writer make this addition here?

A) Yes, because it provides context for the discussion of the New York project that follows.
B) Yes, because it helps explain why Stanton ended up choosing New York City as his final destination.
C) No, because the information contradicts people's conventional perceptions of those cities.
D) No, because it blurs the focus of the paragraph on how "Humans of New York" first came about.

25

A) NO CHANGE
B) frequency
C) density
D) solidity

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CONTINUE

It was in New York that his already extremely popular blog 26 got its name, eventually attracting over 1.5 million followers on Facebook and over 33,000 on Twitter. To date, Stanton has photographed and spoken to around 10,000 strangers through his work on "Humans of New York," and his best efforts have been published in a book of the same name. At first Stanton's goal was to make a geographic census of the city, tagging each of his photos on an interactive map. The project, however, evolved as he got to know his subjects and began posting 27 snippets of his casual interviews with them—the happiest moment in their life, what they love most about their partner, or what their greatest struggle has been—as captions beneath the picture. This text managed to add another layer of humanity to each of the photos, the cumulative result 28 of this is a poignant tapestry of youth and aging, achievement and misfortune, wealth and 29 poverty, and, love and loss.

26

Which choice best sets up the information that follows in the sentence?

A) NO CHANGE
B) became an online phenomenon,
C) was first discovered by an agent,
D) was turned into a book,

27

A) NO CHANGE
B) stray bits and bobs from
C) things from
D) microscopic fragments from

28

A) NO CHANGE
B) of it
C) of which
D) DELETE the underlined portion.

29

A) NO CHANGE
B) poverty, and
C) poverty and,
D) poverty; and,

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CONTINUE

People often wonder how Stanton **30** takes such professional-looking photographs without any formal training. After all, he is merely a young man walking the streets with a fancy camera when he approaches. How does he persuade people to let him take their picture, let alone open up to him? It wasn't easy. **31** Therefore, Stanton was turned down at least 90 percent of the time—especially by women, who were understandably wary of having **32** her picture taken by a man they didn't know.

30

Which choice most effectively introduces the paragraph?

A) NO CHANGE
B) derives satisfaction from wandering the city all day.
C) has been able to draw such intimate details from complete strangers.
D) continually finds new ways of posing his subjects.

31

A) NO CHANGE
B) However,
C) Initially,
D) Moreover,

32

A) NO CHANGE
B) one's
C) his or her
D) their

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CONTINUE

2

Over time, Stanton realized that it isn't the words he uses to ask people's permission that makes the difference but the energy he gives off. If he exudes genuine, curious, confident energy and crouches low to the ground to appear less threatening, he's able to make his potential subjects feel comfortable. Now Stanton **33** estimates that he gets a yes about two-thirds of the time. For an endeavor that began as one giant risk that no one could see paying off, this is a switch in odds Stanton is both extremely proud of and humbled by. In only a few years, he has gone from not knowing a single soul in the city to meeting at least 10,000—and to reaching far more than that through his wonderful photos and text.

33

A) NO CHANGE
B) estimated
C) has estimated
D) had estimated

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CONTINUE

Questions 34-44 are based on the following passage.

Food, Lodging, and Freedom from Wi-Fi

Ten years ago, I drove through the snow to a nineteenth-century mansion in the countryside. I was then escorted to a private cabin that held a bed, a piano, a large desk, and a picture window. Six deer immediately grouped below my window, **34** they watched me as I began to write. I wrote all day until I went to the dining hall for dinner. There I met a novelist whose work I'd admired for years, a filmmaker who **35** later went on and won an Oscar, and many other artists and writers, including a poet who became one of my closest friends. This was my first experience in an artists' colony, and I continue to work in one whenever I can.

34

A) NO CHANGE
B) they were watching
C) and watching
D) watching

35

A) NO CHANGE
B) went on to win
C) went on and later won
D) later went on to win

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2

[1] Many artistic **36** communities, often called colonies, residencies, or retreats—were built in bucolic settings by Gilded Age philanthropists. [2] Though they exist today in urban as well as rural settings, colonies still provide much-needed serenity for writers. [3] These residencies vary: some require a fee, but many don't; some provide free **37** meals, but others don't, some take place in cabins in the Midwest, and others take place in villas in France. [4] The goal was to provide a peaceful place for artists to work. [5] Many offer the one resource artists find so elusive yet so necessary for focused **38** work; freedom from the Internet. **39**

36

A) NO CHANGE
B) communities:
C) communities—
D) communities

37

A) NO CHANGE
B) meals; but others don't,
C) meals, but others don't;
D) meals but others don't,

38

A) NO CHANGE
B) work: and that is
C) work, but
D) work:

39

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

A) where it is now.
B) after sentence 1.
C) after sentence 2.
D) after sentence 5.

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CONTINUE

2

Most artists' colonies can be found on the website for the Alliance of Artists Communities, a comprehensive database listing hundreds of colonies. If you are a serious artist and you require some degree of solitude to concentrate, an artists' colony may be for you. Surprisingly, it may also be more accessible to you than you might think, even if you are new to 40 there creative field.

Each residency requires an application, usually consisting of a project description, a short biography, a résumé, a work sample, and a small fee. I had a substantial amount of work on my résumé when I applied, but 41 I was anxious to get started on my next book. The application process can be extremely competitive; 42 some applications even ask for recommendations from established artists. Groups of judges change from year to year and, with them, tastes and values; a panel that accepts you one year may reject

40

A) NO CHANGE
B) their
C) you're
D) your

41

Which choice provides appropriate support for a claim made earlier in the passage?

A) NO CHANGE
B) many colonies welcome artists working on their first projects.
C) the founders of the colonies wanted to help me anyway.
D) all I really cared about was the peace and quiet.

42

Which choice most effectively sets up the idea expressed in the next sentence?

A) NO CHANGE
B) applications often contain multiple sections and demand large time commitments.
C) it is good to know exactly what each application requires before beginning the process.
D) you may need to apply many times before you are invited to be a guest.

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CONTINUE

2

you the next, so volume is key. Your application must 43 contain no grammatical errors, your work sample must represent your best effort, and your résumé, however short, must reflect a serious intention to pursue your artwork as a career.

Creating a compelling application can be difficult. 44 Therefore, once you've learned to articulate your ideas clearly and put your best work forward, you'll be on a path that might lead you to a place of inspiration and focus.

43

A) NO CHANGE
B) hold
C) enclose
D) carry

44

A) NO CHANGE
B) On the other hand,
C) In fact,
D) For example,

STOP

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

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Math Test – No Calculator

25 MINUTES, 17 QUESTIONS

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

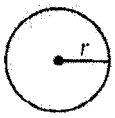
DIRECTIONS

For questions 1-13, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 14-17,** solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 14 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

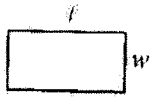
NOTES

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

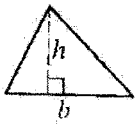
REFERENCE



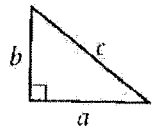
$A = \pi r^2$
$C = 2\pi r$



$A = \ell w$



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



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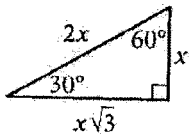
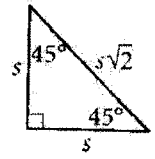
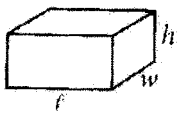
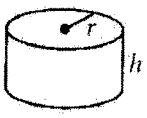




Special Right Triangles

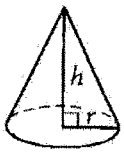


$V = \ell wh$

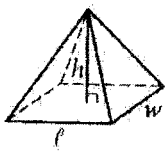


$V = \pi r^2 h$

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



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



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

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

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CONTINUE

Which of the following is equivalent to $4x + 6 = 12$?

A) $2x + 4 = 6$

B) $x + 3 = 3$

C) $3x + 2 = 4$

D) $2x + 3 = 6$

The function g is defined as $g(x) = 5x + a$, where a is a constant. If $g(4) = 31$, what is the value of a ?

A) 30

B) 22

C) 11

D) -23

A dance teacher ordered outfits for students for a dance recital. Outfits for boys cost \$26, and outfits for girls cost \$35. The dance teacher ordered a total of 28 outfits and spent \$881. If b represents the number of outfits the dance teacher ordered for boys and g represents the number of outfits the dance teacher ordered for girls, which of the following systems of equations can be solved to find b and g ?

A) $26b + 35g = 28$
$b + g = 881$

B) $26b + 35g = 881$
$b + g = 28$

C) $26g + 35b = 28$
$b + g = 881$

D) $26g + 35b = 881$
$b + g = 28$

An architect designing a roadway plans to use solar-powered glass panels of equal size in the design. The architect estimates a 20-mile-long road will use 30,000 panels equally spaced. At this rate, which of the following equations represents the number of solar panels, P, for a road that is m miles long?

A) $P = 20m$

B) $P = 1{,}500m$

C) $P = 30{,}000m$

D) $P = 20m + 30{,}000$

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CONTINUE

5

What is the slope of the line with equation $3 - y = 6 - 2x$ in the xy-plane?

A) 6

B) 3

C) 2

D) -2

6

The equivalence between the total energy and the mass of an object is predicted by the special theory of relativity and can be expressed by the formula $E = mc^2$, where E is the total energy, m is the mass of the object, and c is the speed of light. Which of the following correctly expresses m in terms of E and c ?

A) $m = \frac{E}{c^2}$

B) $m = \frac{c^2}{E}$

C) $m = Ec^2$

D) $m = E - c^2$

7

$$r(x) = x^2 + 5x - 4$$
$$q(x) = 2x^2 - 3x + 4$$

The functions r and q are defined above. Which of the following is equivalent to $3r(x) + 6q(x)$?

A) $15x^2 - 3x + 12$

B) $15x^4 - 3x^2 + 12$

C) $3x^2 - 2x$

D) $27x^2 - 18x$

8

Which of the following is equivalent to $(1 - p)(1 + p + p^2 + p^3 + p^4 + p^5 + p^6)$?

A) $1 - p^8$

B) $1 - p^7$

C) $1 - p^6$

D) $1 - p^5$

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CONTINUE

9

If $\frac{\sqrt{72}-\sqrt{32}}{2}=2^a$, what is the value of a ?

A) 2

B) $\frac{1}{2}$

C) $-\frac{1}{2}$

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

10

In the xy-plane, which of the following is true of the circle with equation $(x+0.5)^2+(y-0.5)^2=0.5$ and the line with equation $x+y=0$?

A) The line never intersects the circle.

B) The line is tangent to the circle.

C) The line cuts the circle into two arcs of unequal lengths.

D) The line cuts the circle into two arcs of equal lengths.

11

An object hangs from a spring. The formula $\ell = 30 + 2w$ relates the length ℓ, in centimeters, of the spring to the weight w, in newtons, of the object. Which of the following describes the meaning of the 2 in this context?

A) The length, in centimeters, of the spring with no weight attached

B) The weight, in newtons, of an object that will stretch the spring 30 centimeters

C) The increase in the weight, in newtons, of the object for each one-centimeter increase in the length of the spring

D) The increase in the length, in centimeters, of the spring for each one-newton increase in the weight of the object

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CONTINUE

12

A certain product costs a company $65 to make. The product is sold by a salesperson who earns a commission that is equal to 20% of the sales price of the product. The profit the company makes for each unit is equal to the sales price minus the combined cost of making the product and the commission. If the sales price of the product is $100, which of the following equations gives the number of units, u, of the product the company sold to make a profit of $6,840 ?

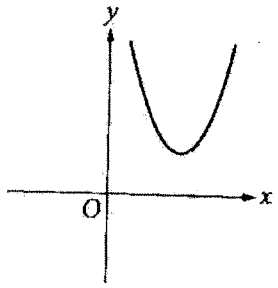
A) $(100(1 - 0.2) - 65)u = 6{,}840$

B) $(100 - 65)(1 - 0.8)u = 6{,}840$

C) $0.8(100) - 65u = 6{,}840$

D) $(0.2(100) + 65)u = 6{,}840$

13



The graph of the equation $y = 3x^2 + bx + 5$, where b is a constant, is shown in the xy-plane above. Which of the following could be the value of b ?

A) 9

B) 0

C) −6

D) −15

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CONTINUE

11

$$y - x^2 + 2 = 9x$$
$$y = 4x + 4$$

If (x, y) is a solution to the system of equations above and $x > 0$, what is the value of x ?

15

An industrial printer prints a minimum of 40 brochures per minute and a maximum of 50 brochures per minute, depending on the complexity of the brochure design. What is one possible number of minutes the printer will take to print 3200 brochures?

16

$$8x - 4y = 7$$
$$5y - 4x = 10$$

What is the value of y in the solution of the system of equations above?

17

What is the sum of the solutions to the equation $0 = 2x^2 - 5x - 3$?

STOP

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

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Math Test – Calculator

45 MINUTES, 31 QUESTIONS

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

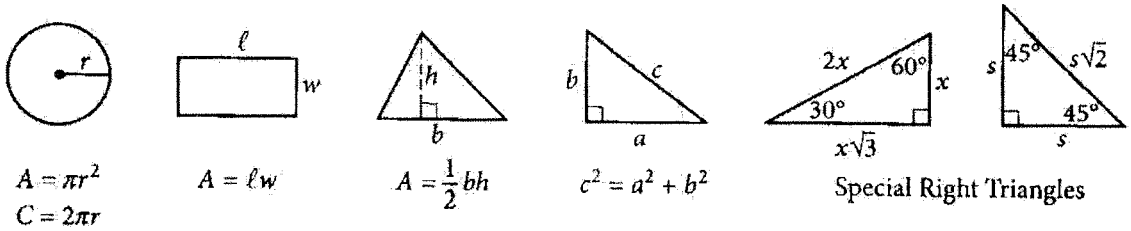
DIRECTIONS

For questions 1-27, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 28-31**, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 28 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

NOTES

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

REFERENCE



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

$A = \ell w$

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

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

Special Right Triangles

$V = \ell wh$

$V = \pi r^2 h$

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

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

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

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

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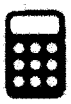


1

For what value of x does $\frac{1}{2}(x+9) = 3$?

A) -6

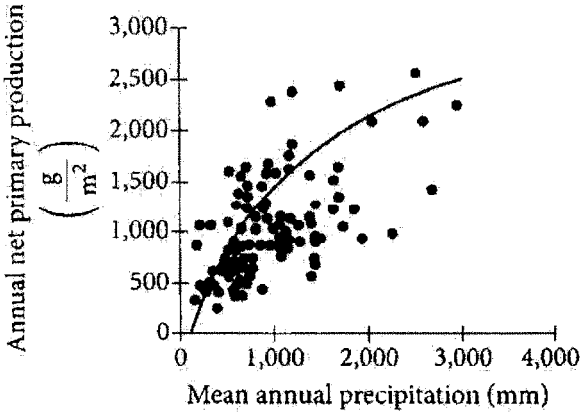
B) -3

C) $-\frac{3}{2}$

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

2

The scatterplot below shows the relationship between annual net primary production, in grams of dry plant biomass per square meter (g/m^2), and mean annual precipitation, in millimeters (mm), for different types of ecosystems. The curve in the figure models the relationship.



Based on the curve in the figure, the predicted annual net primary production, in g/m^2, for an ecosystem that receives a mean annual precipitation of 3,000 mm lies in which of the following intervals?

A) Between 500 and 1,000

B) Between 1,000 and 2,000

C) Between 2,000 and 3,000

D) Greater than 3,000

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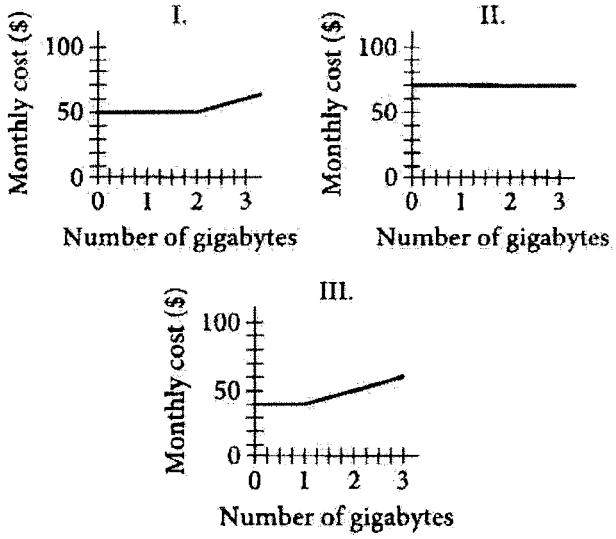
CONTINUE

A mobile network provider offers the following types of monthly data plans for a mobile phone.

Basic plan: \$40 for the first gigabyte of data and a rate of \$10 per gigabyte after the first gigabyte

Deluxe plan: \$50 for the first 2 gigabytes of data and a rate of \$10 per gigabyte after the first 2 gigabytes

Unlimited plan: \$70 per month with no additional charge



The graphs above illustrate the three service plans, not necessarily in the same order. Which of the following statements correctly identifies the graph with the service plan it represents?

A) Graph I represents the basic plan.

B) Graph II represents the basic plan.

C) Graph II represents the unlimited plan.

D) Graph III represents the deluxe plan.

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CONTINUE

Questions 4-6 refer to the following information.

Annie's Moving Company rents trucks and provides professional movers. The charges per moving truck and for professional movers are as follows:

Moving truck: $40 per day plus $0.75 per mile driven
Professional movers: $15 per hour per person

4

Mayumi rented a moving truck for one day and drove it a total of 122 miles. What was the total cost of renting the moving truck?

A) $40.00
B) $91.50
C) $131.50
D) $162.00

5

Roberto is moving from one apartment to another in the same building. He would like to hire 2 professional movers from 9 a.m. to 11 a.m. to move his furniture. What will be the cost to hire the professional movers?

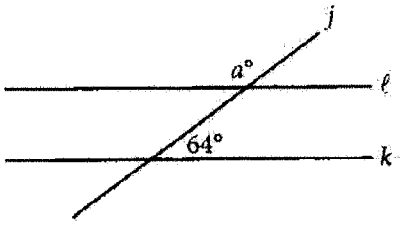
A) $15
B) $30
C) $45
D) $60

6

Annie's Moving Company provided a quote for a truck and 2 professional movers. The truck will be used for one day, and the total distance traveled will be 40 miles. The 2 professional movers will be needed from 3 p.m. to 7 p.m. To the nearest whole percent, what percent of the total cost is the cost of the professional movers?

A) 60%
B) 63%
C) 75%
D) 80%

7



Note: Figure not drawn to scale.

In the figure above, lines ℓ and k are parallel. What is the value of a ?

A) 26
B) 64
C) 116
D) 154

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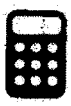
CONTINUE



8

An elementary school teacher is ordering x workbooks and y sets of flash cards for a math class. The teacher must order at least 20 items, but the total cost of the order must not be over \$80. If the workbooks cost \$3 each and the flash cards cost \$4 per set, which of the following systems of inequalities models this situation?

A) $x + y \geq 20$
$3x + 4y \leq 80$

B) $x + y \geq 20$
$3x + 4y \geq 80$

C) $3x + 4y \leq 20$
$x + y \geq 80$

D) $x + y \leq 20$
$3x + 4y \geq 80$

9

$$PV = nRT$$

The equation above represents the ideal gas law, where P is the pressure of an ideal gas, V is the volume of the gas, n is the amount of the gas, R is the gas constant, and T is the absolute temperature of the gas. Which of the following equations can be used to calculate absolute temperature?

A) $T = \frac{PV}{nR}$

B) $T = \frac{nR}{PV}$

C) $T = PVnR$

D) $T = PV - nR$

10

In retail stores, the conversion rate is the quotient of the number of people who make a purchase during a certain time period by the total number of people who enter the store during the same time period. Data were collected at one store for five hours, and the results are shown in the table below.

Hour	Period of time	Number of people who entered the store	Number of people who made a purchase
1	9:00 a.m.–10:00 a.m.	8	5
2	10:00 a.m.–11:00 a.m.	12	9
3	11:00 a.m.–12:00 p.m.	17	8
4	12:00 p.m.–1:00 p.m.	42	23
5	1:00 p.m.–2:00 p.m.	20	15

Based on the data above, which two hours have the same conversion rate?

A) 1 and 5

B) 2 and 3

C) 2 and 5

D) 3 and 4

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CONTINUE

11

$$4a^2 + 20ab + 25b^2$$

Which of the following is a factor of the polynomial above?

A) $a + b$

B) $2a + 5b$

C) $4a + 5b$

D) $4a + 25b$

12

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

A) x^2

B) $2x^2$

C) $2x^2 + x$

D) $2x^2 + 2x$

13

Which of the following is equivalent to $\sqrt[n]{2^{3n} \cdot 5^{n+2}}$, where $n > 0$?

A) 200

B) $40 \cdot \sqrt[n]{25}$

C) $40 + \sqrt[n]{25}$

D) $10{,}000 \cdot \sqrt[n]{100}$

14

Net Tangible Assets (billions of dollars)

Company	2012	2013
A	112.8	117.8
B	49.8	61.2
C	10.4	13.8

The table above lists the value of the net tangible assets of three companies in two consecutive years. What is the mean increase in the value of the net tangible assets, in billions of dollars, for the three companies from 2012 to 2013?

A) 5.9

B) 6.3

C) 6.6

D) 6.7

15

On a certain day, the exchange rate for 1 euro is 1.36 US dollars. On the same day, the exchange rate for 1 British pound is 1.70 US dollars. On that day, if Sally exchanges 1 British pound for US dollars and then exchanges that amount for euros, how many euros will she receive?

A) 0.34

B) 0.80

C) 0.91

D) 1.25

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CONTINUE

16

Thomas installed a new stove in his restaurant. At the time of installation, the stove had a value of $800. Thomas estimates that each year the value of the stove will depreciate by 20% of the previous year's estimated value. What is the estimated value of the stove exactly 2 years after Thomas installed it?

A) $480

B) $512

C) $556

D) $640

17

A 2014 Gallup-Purdue Index Report describes a survey of people with an associate's degree and a survey of people with a bachelor's degree. It was reported that in the samples studied, 54% of associate's degree holders and 57% of bachelor's degree holders work full time for an employer. The two statements below are included in the 2014 report.

1. For results based on the total sample of associate's degree respondents, the margin of sampling error is ±3.8 percentage points.
2. For results based on the total sample of bachelor's degree respondents, the margin of sampling error is ±0.9 percentage points.

Assuming the margin of error was calculated in the same way for both samples, which of the following statements explains why the two reported margins of error are different?

A) The samples might not have been random samples.

B) There are more people with an associate's degree than with a bachelor's degree.

C) The sample size of the associate's degree sample was smaller than the sample size of the bachelor's degree sample.

D) The sample size of the associate's degree sample was larger than the sample size of the bachelor's degree sample.

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CONTINUE

18

$$x + 2y = 5$$
$$3x + 4y = 15$$

If (x, y) is the solution of the system of equations above, what is the value of y ?

A) -5

B) 0

C) 2

D) 5

19

The kinetic energy E_k of an object of mass m moving at speed v is $E_k = \frac{1}{2}mv^2$. If the speed of an object is increased by a factor of 3, how will its kinetic energy change?

A) Its kinetic energy will increase by a factor of 9.

B) Its kinetic energy will decrease by a factor of 9.

C) Its kinetic energy will increase by a factor of 3.

D) Its kinetic energy will decrease by a factor of 3.

20

Sara has a 45-minute study hall period each day and plans to use several of these periods to read a 720-page book. Assuming that Sara will read 40 pages of the book per hour, how many entire study hall periods will she need to read the entire book?

A) 16

B) 18

C) 22

D) 24

21

As part of a promotion, a radio show host gave away 3 pairs of tickets each day until all the tickets were gone. The relationship between the number of pairs of tickets, y, that remained at the end of each day and the number of days, x, since the promotion began can be modeled by the equation $y = 60 - 3x$. If this equation is graphed on the xy-plane, what will the x-intercept of the graph represent?

A) The number of pairs of tickets that were given away each day

B) The number of pairs of tickets at the start of the promotion

C) The number of days it took to give away 3 pairs of tickets

D) The number of days it took to give away all the pairs of tickets

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CONTINUE

Questions 22-25 refer to the following information.

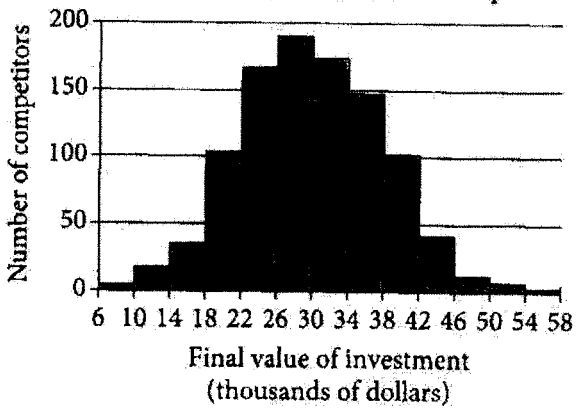
A brokerage company held a virtual stock investment competition. Each of 1,001 competitors submitted a selection of stocks worth $25,000, and the company tracked the value of the virtual investments for one year. The table and histogram below summarize the value of the competitors' investments after one year.

Results of a Virtual Investment Competition

Final value of investment	Number of competitors
$6,000 to $9,999	5
$10,000 to $13,999	17
$14,000 to $17,999	35
$18,000 to $21,999	104
$22,000 to $25,999	167
$26,000 to $29,999	190
$30,000 to $33,999	173
$34,000 to $37,999	147
$38,000 to $41,999	101
$42,000 to $45,999	41
$46,000 to $49,999	11
$50,000 to $53,999	8
$54,000 to $57,999	2

Mean	$29,926
Median	$29,476

Results of a Virtual Investment Competition



22

Of the following, which is closest to the percent increase in the mean value of the $25,000 virtual investment for the 1,001 competitors?

A) 5%
B) 18%
C) 20%
D) 30%

23

If the brokerage company chooses 35 of the competitors at random for a reception, about how many of the 35 competitors chosen would be expected to have had their $25,000 virtual investment decrease in value by more than $7,000 ?

A) 2
B) 7
C) 10
D) 14

24

If the brokerage company chooses one competitor at random from those whose virtual investments gained at least $13,000, which of the following is closest to the probability that the competitor chosen at least doubled the $25,000 virtual investment?

A) 1%
B) 6%
C) 9%
D) 17%

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CONTINUE

25

The histogram shows that the results for the 1,001 competitors are approximately normally distributed. A normal distribution has the property that about 68% of the data fall within one standard deviation of the mean. Which of the following is closest to the standard deviation of the data in the histogram?

A) $4,000
B) $8,000
C) $12,000
D) $16,000

26

The table below shows the atmospheric pressure at various heights above sea level.

Height above sea level in kilometers (x)	Atmospheric pressure in kilopascals (y)
2.5	77.96
5	55.33
7.5	39.50
10	27.14
12.5	19.03
15	13.55

Which of the following equations would best model the data shown in the table, where a and b are constants?

A) $y = ax + b$, where $a < 1$ and $b > 1$
B) $y = ax + b$, where $a > 1$ and $b > 1$
C) $y = a(b)^x$, where $a > 1$ and $0 < b < 1$
D) $y = a(b)^x$, where $0 < a < 1$ and $b > 1$

27

A metal rod with an initial temperature of 85 degrees Fahrenheit (°F) is heated so that its temperature increases at a constant rate of 1.5°F per minute. At the same time, another rod with an initial temperature of 92°F is being heated so that its temperature increases at a constant rate of 0.25°F per minute. After how many seconds will the two metal rods be at the same temperature?

A) 6
B) 7
C) 336
D) 380

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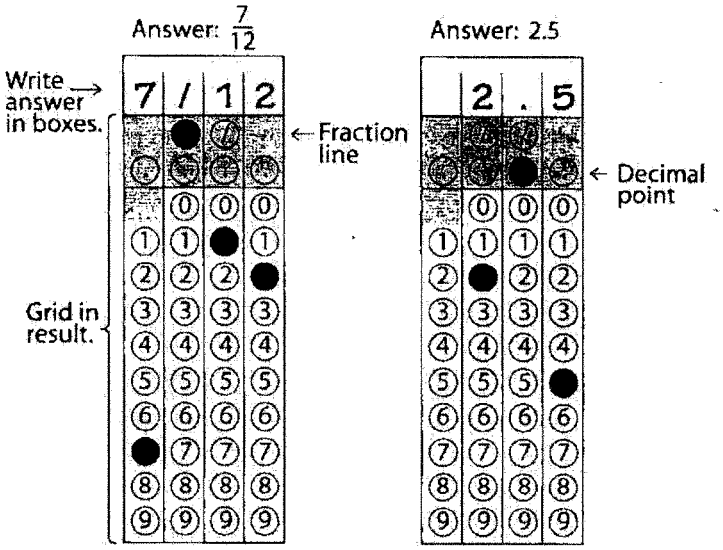
CONTINUE

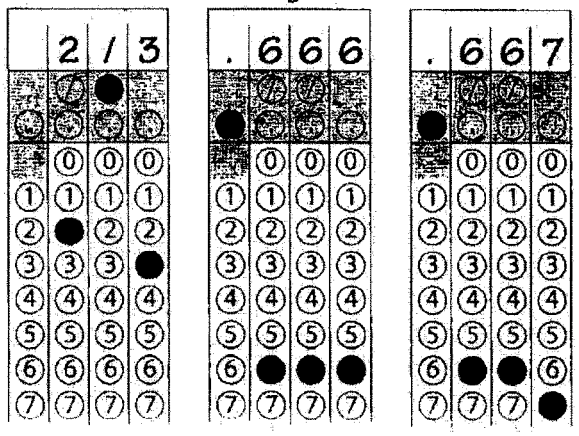
DIRECTIONS

For questions 28-31, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

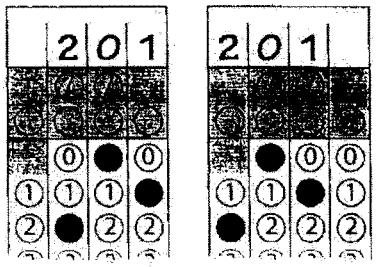
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.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



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



Answer: 201 – either position is correct



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

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CONTINUE

4

28

What is the x-coordinate of the x-intercept of the line with equation $5y + \frac{2}{3}x = 10$ in the xy-plane?

29

A rubber ball bounces upward one-half the height that it falls each time it hits the ground. If the ball was originally dropped from a distance of 20.0 feet above the ground, what was its maximum height above the ground, in feet, between the third and fourth time it hit the ground?

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CONTINUE

Questions 30 and 31 refer to the following information.

Flowers in Leta's Assortment by Color and Type

Color	Type			Total
	Petunia	Rose	Zinnia	
Pink	6	6	4	16
Red	8	4	4	16
White	2	8	6	16
Total	16	18	14	48

Leta has a large assortment of petunia, rose, and zinnia flowers. All of the flowers in the assortment are either pink, red, or white. The table above shows the number of flowers by color and type.

30

Leta separates out the white flowers and picks one of them at random. What is the probability that the flower Leta picks is a rose? (Express your answer as a decimal or as a fraction, not as a percent.)

31

Leta wants to create a floral arrangement using two additional types of flowers, calla lilies and carnations. The ratio of calla lilies to carnations in the floral arrangement will be the same as the ratio of roses to petunias displayed in the table. If Leta uses 27 calla lilies, how many carnations will she use?

STOP

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

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Answer Key

Wednesday, Oct. 11, Test Form

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

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

Math Test – No Calculator	
SECTION 3	
1	D
2	B
3	C
4	B
5	C
6	A
7	A
8	B
9	B
10	D
11	D
12	A
13	C
14	1
15	64 <= x <= 80
16	9/2, 4.5
17	5/2, 2.5

Math Test – Calculator	
SECTION 4	
1	B
2	C
3	C
4	C
5	D
6	B
7	C
8	A
9	A
10	C
11	B
12	B
13	B
14	C
15	D
16	B
17	C
18	B
19	A
20	D
21	D
22	C
23	A
24	B
25	B
26	C
27	C
28	15
29	5/2, 2.5
30	1/2, .5
31	24

NOTE: For schools participating in the test administration study given in fall 2017, correct answers will not be provided.

Saturday, Oct. 14, Test Form

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

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

Math Test – No Calculator	
SECTION 3	
1	C
2	A
3	C
4	D
5	U
6	B
7	C
8	A
9	A
10	B
11	C
12	B
13	D
14	64
15	22.4
16	3/2, 1.5
17	121

Math Test – Calculator	
SECTION 4	
1	C
2	B
3	A
4	B
5	B
6	C
7	A
8	C
9	D
10	A
11	D
12	C
13	B
14	C
15	B
16	D
17	D
18	A
19	C
20	C
21	D
22	B
23	B
24	A
25	D
26	A
27	D
28	20
29	28
30	4
31	2.84

U = This question will not be scored.

Answer Key (continued)

Wednesday, Oct. 25, Test Form

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

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

Math Test – No Calculator	
SECTION 3	
1	C
2	A
3	B
4	A
5	C
6	B
7	A
8	C
9	B
10	D
11	D
12	C
13	B
14	8
15	60
16	12
17	11

Math Test – Calculator	
SECTION 4	
1	A
2	C
3	D
4	C
5	D
6	D
7	B
8	C
9	C
10	A
11	A
12	D
13	A
14	B
15	D
16	D
17	D
18	B
19	C
20	B
21	C
22	B
23	A
24	D
25	A
26	B
27	B
28	1320
29	1/8, .125
30	33
31	7/10, .7

Score Conversion

Score conversions shows how raw scores are converted into test scores, cross-test scores, and subscores.

IMPORTANT TO NOTE

- The section score for the Evidence-Based Reading and Writing section is calculated by adding the Reading Test score to the Writing and Language Test score and multiplying that figure by 10.
- The section score for the Math section is calculated by multiplying the Math Test score by 20.
- There is no advantage or disadvantage in taking either the Wednesday, Oct. 11, Saturday, Oct. 14, or Wednesday, Oct. 25, test form.

Score Conversion

Wednesday, Oct. 11, Test Form

Raw Score (# of correct answers)	Reading Test Score	Writing and Language Test Score	Math Test Score
48			38
47	38		38
46	37		37.5
45	36		37.5
44	36	38	37
43	35	38	36.5
42	34	37	35.5
41	34	37	34.5
40	33	36	34
39	33	35	33
38	32	34	32
37	31	34	31.5
36	31	33	31
35	30	32	30.5
34	30	32	30
33	29	31	29.5
32	29	30	29
31	28	30	28.5
30	28	29	28
29	27	29	27.5
28	27	28	27
27	26	28	26.5
26	26	27	26
25	25	27	25.5
24	25	26	25
23	24	26	24.5
22	24	25	24
21	23	24	23.5
20	23	23	23
19	22	23	22.5
18	22	22	22
17	21	21	21.5
16	20	20	21
15	20	19	20.5
14	19	19	20
13	18	18	19.5
12	18	17	18.5
11	17	16	18
10	17	16	17.5
9	16	15	16.5
8	16	14	16
7	15	14	15
6	14	13	14
5	13	12	13
4	12	12	12
3	11	11	11
2	10	10	10
1	9	9	9
0	8	8	8

Score Conversion (continued)

Saturday, Oct. 14, Test Form

Raw Score (# of correct answers)	Reading Test Score	Writing and Language Test Score	Math Test Score
*			
47	38		38
46	38		37.5
45	37		37
44	37	38	36.5
43	36	38	35.5
42	36	37	34.5
41	35	37	33.5
40	34	36	33
39	34	36	32
38	33	35	31.5
37	32	34	31
36	32	33	30.5
35	31	32	30
34	30	31	29.5
33	29	31	29
32	29	30	28.5
31	28	30	28.5
30	28	29	28
29	27	28	27.5
28	27	28	27
27	26	27	26.5
26	26	27	26.5
25	25	26	26
24	25	26	25.5
23	24	25	25
22	24	25	24.5
21	23	24	24
20	22	23	23.5
19	22	23	23
18	21	22	23
17	21	21	22.5
16	20	20	22
15	19	20	21.5
14	19	19	21
13	18	18	20
12	18	17	19.5
11	17	16	19
10	17	16	18
9	16	15	17.5
8	16	14	16.5
7	15	14	15.5
6	14	13	14.5
5	13	12	13.5
4	12	12	12.5
3	11	11	11.5
2	10	10	10
1	9	9	9
0	8	8	8

*Due to the unscored question (see page 11) on the Oct. 14 Test Form, the highest possible Raw Score for Math is 47.

Wednesday, Oct. 25, Test Form

Raw Score (# of correct answers)	Reading Test Score	Writing and Language Test Score	Math Test Score
48			38
47	38		37.5
46	37		37
45	37		36
44	36	38	35
43	36	37	34
42	35	37	33
41	34	36	32.5
40	34	35	31.5
39	33	34	31
38	33	33	30.5
37	32	33	30
36	31	32	29.5
35	31	31	29
34	30	31	29
33	29	30	28.5
32	29	30	28
31	28	29	27.5
30	27	29	27
29	27	28	26.5
28	26	28	26.5
27	26	27	26
26	25	27	25.5
25	25	26	25
24	24	25	24.5
23	23	25	24
22	23	24	24
21	22	23	23.5
20	21	22	23
19	21	21	22.5
18	20	21	22
17	20	20	21.5
16	19	19	21
15	19	18	20.5
14	18	17	20
13	18	17	19
12	17	16	18.5
11	17	15	18
10	16	15	17
9	16	14	16.5
8	15	14	15.5
7	14	13	14.5
6	13	12	13.5
5	12	12	12.5
4	11	11	11.5
3	11	10	10.5
2	10	9	10
1	9	9	9
0	8	8	8