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# Practice Test

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# Reading Test

## 65 MINUTES, 52 QUESTIONS

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

### DIRECTIONS

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

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

This passage is adapted from Susan Muaddi Darraj, *The Inheritance of Exile: Stories from South Philly*. ©2007 by Susan Muaddi Darraj. The story is set in the 1960s; Siham and her husband Nader have recently emigrated from Jerusalem to Philadelphia.

Siham enjoyed exploring their new neighborhood, taking long, early afternoon walks through South Philadelphia. The streets were perfectly arranged, organized, like a grid. Numbers ran north and south, names ran east and west. Or was it the other way around? She and Nader lived on 9th and Passyunk, in what they called the Italian Market, but Siham felt it was an island, lonely, despite the flow of people. The positive aspect of it was that Siham found everything at the Italian Market, from tomatoes to fresh coffee beans to bath towels, sold by everyone from leathery Vietnamese women to Sicilian men with mustaches like Nader's to young Irish women with green eyes and red curls scooped back into bandannas. Some of these Philadelphia people were immigrants like her, and others were the children of immigrants, having had an entire generation to adjust.

Sometimes, the Italian Market reminded her of the Old City quarter of Jerusalem, full of men yelling out the prices of vegetables and women peddling their crafts, their embroidered pillowcases and blouses. They even targeted tourists with photo frames and wall hangings that said in embroidered English, "God Bless Our Home" or "Home Is Where the Heart Is." In Jerusalem, she could bargain with

the peddlers. In fact, they were insulted if you did not engage them in some level of negotiations. But in the Italian Market, the price was set. She knew because she'd once tried to talk the fruit man down two dollars. "Hey lady, no bargaining! This is already a bargain, ahw-ight?" Even this talent was taken from her here, rendered null. Nader claimed that her ability to bring prices down in the Khan al-Zeit bazaar was what had won his heart.

*She was examining the leather wallets at the stand next to the entrance to the Dome of the Rock when he approached. They each bought a wallet, although she paid eight shekels and he paid fourteen. As Siham walked away, Nader called after her, "How did you do that?"*

*She did not answer. So he asked, "Can you come shopping with me? I have a few more things to buy today and I could use your help."*

*45 Siham took one look at his pleated trousers, linen blazer and shiny, lace-up shoes and kept walking. Ignored him, who was so obviously, as she'd thought one of these returning American Arab nouveau rich. He probably sold bananas on the city streets in 50 America but made himself look rich when he return home to visit the "Old Country." Sickening.*

*She entered one of the coffee shops and sat at a small table in the corner, reading her newspaper and sipping the bitter Turkish qahwa from the small, 55 enameled cup.*

*"May I join you?"*

*She looked up and saw Linen Blazer bent slightly over, her table, staring eagerly at her.*

*"No."*

1

1

60     *With a chuckle, he sat down anyway. He ordered coffee for himself with an imperious wave of his hand. The other men in the café stared at them curiously, stopping their conversations to see who was this Amerkani sitting with the eldest daughter of Doctor 65 Abdallah al-Medani. Aware of their scrutiny, Siham stood up and left.*

What an ill-timed first meeting! she thought to herself now. She'd dismissed him as a self-centered piece of fluff who had become lost among the casinos 70 and dance clubs of America. Thank God he'd sought her out, asked people about her. He came to her parents' house and entertained her family by bringing boxes of sweets, giving her little sister Nadia rides on his shoulders, and by singing—he had such a 75 deep, wonderful voice. He had especially charmed her mother by complimenting her cooking, the spice in her falafel, and the texture of the laban in her mansaff. One month later, after he and his family had formally asked for her hand in marriage, Siham 80 applied for a visa to the States. Nader had recently become a citizen himself, so she filed happily as "spouse of U.S. citizen." They were going to wed. To marry. I marry. You marry. We marry.

1

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

- A) an illustration of Siham's experiences in Philadelphia to a description of a dream she has about Jerusalem.
- B) a depiction of Siham's current relationship with her husband to a discussion of the start of that relationship.
- C) an account of Siham's feelings about life in Philadelphia to a recollection of the events that led her there.
- D) an analysis of Siham's experiences in the United States to an anecdote showing why she misses Jerusalem.

2

One main idea of the passage is that moving to a new country can

- A) fuel a desire for new experiences.
- B) create a sense of both familiarity and loss.
- C) transform an individual's self perception in a fundamental way.
- D) lead one to judge other people unfairly.

3

Which paragraph of the passage most fully develops the idea stated in the answer to the previous question?

- A) The first paragraph (lines 1-18)
- B) The second paragraph (lines 19-35)
- C) The fifth paragraph (lines 45-51)
- D) The last paragraph (lines 67-83)

4

In the context of the passage, the sentence "Or was it the other way around?" (lines 5-6) mainly serves to

- A) show that Siham has a basic knowledge of her neighborhood but is still figuring out the details.
- B) reveal that Siham is anxious about the possibility of getting lost in her neighborhood.
- C) suggest that Siham likes her neighborhood but sees it as the opposite of what she is used to.
- D) indicate that Siham is frustrated by the way streets are arranged in her neighborhood.

5

As used in line 18, "adjust" most nearly means

- A) alter.
- B) modify.
- C) revise.
- D) adapt.

1

1

6

According to the passage, an important difference between the Italian Market in Philadelphia and the market in the Old City of Jerusalem is that sellers in Jerusalem

- A) would reduce the price of an item to make a sale.
- B) represented many different ethnic groups.
- C) sometimes resented their customers' behavior.
- D) mainly sold everyday household goods.

7

Which choice best describes Nader's behavior and attitude in his first meeting with Siham?

- A) Persistent
- B) Shy
- C) boastful
- D) Indifferent

8

What does the passage most clearly suggest about Siham's family?

- A) They encouraged Siham to be suspicious of strangers.
- B) They thought Nader's family was inferior to theirs.
- C) They were prominent within the local community.
- D) They were reluctant to travel to the United States.

9

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

- A) Lines 6-8 ("She and... people")
- B) Lines 52-55 ("She entered... cup")
- C) Lines 62-65 ("The other... al-Medani")
- D) Lines 71-75 ("He came... voice")

10

As used in line 68, "dismissed" most nearly means

- A) released.
- B) excused.
- C) forgotten.
- D) rejected.

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

Passage 1 is adapted from a speech delivered in 1949 by Harry's Truman, "Address in New York City at the Cornerstone Laying of the United Nations Building." Passage 2 is adapted from a speech delivered in 1950 by Ralph 1, Bunche, "Some Reflections on Peace in Our Time." ©1950 by the Nobel Foundation. Truman was president of the United States. Bunche was an American diplomat. The United Nations is an international peacekeeping organization that was founded in 1945.

**Passage 1**

We who are close to the United Nations sometimes forget that it is more than the procedures, the councils, and the debates, through which it operates. We tend to overlook the fact that the organization is the living embodiment of the principles of the charter—the renunciation of aggression and the joint determination to build a better life for the whole world.

Line 5 But if we overlook this fact, we will fail to realize the strength and power of this great organization. We will fail to understand the true nature of this new force that has been created in the affairs of our time.

The United Nations is essentially an expression of the moral nature of man's aspirations. The charter clearly shows our determination that international problems must be settled on a basis acceptable to the conscience of mankind.

Because the United Nations is the dynamic expression of what all the peoples of the world desire, 20 because it sets up a standard of right and justice for all nations, it is greater than any of its members. The compact that underlies the United Nations cannot be ignored—and it cannot be infringed or dissolved.

We in the United States, in the course of our own history, have learned what it means to set up an organization to give expression to the common desire for peace and unity. Our Constitution expressed the will of the people that there should be a United States. And through toil and struggle the 30 people made their will prevail.

In the same way, I think, the charter and the organization served by these buildings express the will of the people of the world that there shall be a United Nations.

35 This does not mean that all the member countries are of one mind on all issues. The controversies which divide us go very deep. We should understand that these buildings are not a monument to the

unanimous agreement of nations on all things. But 40 they signify one new and important fact. They signify that the peoples of the world are of one mind in their determination to solve their common problems by working together.

**Passage 2**

The United Nations strives to be realistic. It 45 understands well the frailties of man. It is realized that if there is to be peace in the world, it must be attained through men and with man, in his nature and mores, just about as he now is. Intensive effort is exerted to reach the hearts and minds of men with 50 the vital pleas for peace and human understanding, to the end that human attitudes and relations may be steadily improved. But this is a process of international education, or better, education for international living, and it is at best gradual...

55 The United Nations itself is but a cross section of the world's peoples. It reflects, therefore, the typical fears, suspicions, and prejudices which bedevil human relations throughout the world. In [it]... may be found individual qualities of goodness and 60 badness, honesty and subterfuge, courage and timorousness, internationalism and chauvinism. It could not be otherwise. Still, the activities of all are within the framework of a great international organization dedicated to the imperative causes of 65 peace, freedom, and justice in the world.

The United Nations, inescapably, is an organization at once of great weakness and great strength.

Its powers of action are sharply limited by the 70 exigencies of national sovereignties.... [N]arrow, exclusively self-centered nationalism persists as the outstanding dynamic of world politics and is the prime obstacle to enduring peace. The international well-being, on the one hand, and national 75 egocentrism, on the other, are inevitably at cross-purposes. The procedures and processes of the United Nations as a circumscribed international parliament are unavoidably complex and tedious.

The United Nations was established in the hope 80 not on the assumption, that the five great powers would work harmoniously toward an increasingly better world order. The existing impasse between West and East and the resultant "cold war" were foreseen by those who formulated the United 85 Nations Charter in the spring of 1945 in the misleading, but understandably jubilant, atmosphere of [World War II's] triumphant end. Nevertheless

the United Nations has exhibited a fortunate flexibility which has enabled it to adjust to the regrettable circumstances of the discord among the great powers and to continue to function effectively.

11

The main purpose of Passage 1 is to

- A) analyze the political factors underlying a conflict.
- B) offer a reflection on the significance of an institution.
- C) outline the negotiations that helped forge an agreement
- D) hint at the reasons for the failure of an initiative.

12

In Passage 1, Truman implies that an accurate view of the true character of the United Nations can be obscured by

- A) petty conflicts among the member nations that comprise the organization.
- B) insufficient knowledge of the historical events that inspired the creation of the organization.
- C) excessive value placed on the past successes of the organization.
- D) active engagement in the day-to-day activities of the organization.

13

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

- A) Lines 1-4 (“We who... operates”)
- B) Lines 4-8 (“We tend... world”)
- C) Lines 9-10 (“But if... organization”)
- D) Lines 13-14 (“The United... aspirations”)

14

As used in lines 7, 15, and 42, “determination” most nearly means

- A) judicial decision.
- B) firm intention.
- C) accurate measurement.
- D) common designation.

15

In Passage 1, Truman discusses the US Constitution primarily to

- A) imply that proceedings in the United Nations are conducted much like congressional proceedings in the US.
- B) suggest an analogous relationship between the purpose served by the Constitution and that served by the United Nations’ charter.
- C) point out that US representatives to the United Nations are uniquely qualified to understand the objectives of the organization.
- D) emphasize that the guidelines provided in the United Nations’ charter derive from the principles outlined in the Constitution.

16

As used in line 82, “order” most nearly means

- A) structure.
- B) command.
- C) category.
- D) sequence.

1

1

17

In passage 2, Bunche indicates that the United Nations has been able to achieve some success on the world stage because it has

- A) maintained strict adherence to the standards put forth in its original charter.
- B) invested significant resources in its educational programs promoting human justice.
- C) instituted strong measures when dealing with conflicts from within.
- D) been willing to make accommodations in the face of international disagreements.

18

Which statement best describes the relationship between the passages?

- A) Passage 2 questions the value of an institution that Passage 1 depicts as model of human idealism.
- B) Passage 2 considers the negative effects of a policy that Passage 1 regards as overwhelmingly beneficial.
- C) Passage 2 discusses the challenges inherent in an enterprise that Passage 1 sees as a powerful force for good.
- D) Passage 2 argues for the transformation of an organization that Passage 1 views as already effective in meeting its goals

19

Based on the passages, Truman and Bunche would most likely agree that the United Nations

- A) can fulfill its stated mission if it expands the principles laid out in its charter.
- B) could increase its global impact if it extended its membership to additional countries.
- C) serves a crucial function that cannot be performed by individual member countries.
- D) should actively promote its goals to overcome widespread resistance to them.

20

Based on Passage 1, Truman would most likely respond to Bunche's claim about the United Nations in lines 55-58 by

- A) pointing out that people's enduring interest in global cooperation transcends these kinds of limitations.
- B) countering that these types of attitudes are less characteristic of nations belonging to the United Nations than they are of other nations.
- C) arguing that such shortcomings have little bearing on the actual implementation of the United Nations' policy.
- D) agreeing that fears and prejudices have been a major obstacle to the success of the United Nations.

21

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

- A) Lines 21-23 ("The compact ... dissolved")
- B) Lines 24-27 ("We in... unity")
- C) Lines 36-37 ("The controversies ... deep")
- D) Lines 40-43 ("They ... together")

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

This passage is adapted from *Nick Lane, Oxygen: The Molecule That Made the World*. ©2002 by Nick Lane.

Tucked away in the "Scientific Correspondence" section of *Nature* in May 1999 was 2 short paper on the size of crustaceans- the class that includes shrimps, crabs and lobsters- -in polar regions. This paper solved a long-standing riddle rather neatly: the relationship between gigantism and oxygen availability. The authors, Gauthier Chapelle of the Royal Institute of Natural Sciences in Belgium, and Lloyd Peck of the British Antarctic Survey, examined length data for nearly 2,000 species of crustaceans from polar to tropical latitudes and from marine to freshwater environments. They focused on a single group, known as amphipods, which are cold-blooded, shrimp-like creatures, ranging in length from a couple of millimetres [1/12 inch] to about 9 centimetres [3 1/2 inches]. The amphipods are not exclusively marine, and are best known to most of us as sandhoppers, or the shiny brown animals that leap about when potted plants are moved in the garden. The thousands of marine species of amphipod are a cornerstone of polar food chains, being the staple diet of juvenile cod, which are in turn preyed on by seals, and the seals by polar bears. In some bottom sediments, amphipods are found at an extraordinary density of 40,000 per square metre [4,000 per square foot]. These tiny creatures offer even more of a square meal in polar waters: the largest Antarctic species are some five times larger than their tropical cousins- -true giants by amphipod standards. In this respect, amphipods are not alone. For the past hundred years or so, scientists have catalogued numerous giant species in polar seas. Although polar gigantism is usually ascribed to the low temperatures and reduced metabolic rates of cold-blooded animals, the relationship is not straightforward. Surprisingly, polar gigantism had never been satisfactorily explained. The trouble is that the inverse correlation between size and temperature is curved rather than linear, and has a number of puzzling exceptions. In particular, many species achieve far greater sizes in freshwater environments than they ought to on the basis of temperature alone. Freshwater amphipods from Lake Baikal in Russia, for example, are twice as large as those in the seal the same temperature.

Then Chapelle and Peck had a clever idea and applied it to their amphipod data. What if the true correlation was not with water temperature at all, but with the dissolved oxygen concentrations? Oxygen dissolves better in cold water and is nearly twice as soluble in polar seas than in tropical waters. The salt content also affects the solubility of oxygen, which dissolves 25 per cent better in fresh water than in saline. The highest oxygen saturation is therefore in large freshwater lakes verging on the Arctic tundra, such as Lake Baikal- and this is where the largest crustaceans are to be found. When Chapelle and Peck replotted their length data against the oxygen saturation of the water, they got a nearly perfect fit.

While it is true that a correlation says nothing about mechanism, it seems likely that inadequate oxygen availability limits size in many species, or conversely, that high oxygen [lowers] the barrier to gigantism.

Of course the dependence of giants on high oxygen means that they are perilously susceptible to falling oxygen levels. In a stark closing line, Chapelle and Peck predict that giant amphipods will be among the first species to disappear if global temperatures rise, or if oxygen levels decline. We can hardly begin to imagine what effect this might have on the rest of the food chain.

22

The primary purpose of the passage is to

- A) describe the positions in a scientific debate about a natural phenomenon.
- B) explain how scientists reconciled conflicting theories regarding a natural phenomenon.
- C) present scientists' research on likely future changes to a natural phenomenon.
- D) discuss how scientists arrived at a new explanation for a natural phenomenon.

23

Which choice best states the main idea of the passage?

- A) Gigantism in amphipods is probably caused by the low temperatures of polar seas.
- B) The availability of oxygen is likely a significant influence on amphipod body size.
- C) There is a positive correlation between amphipod length and the saltiness of water.
- D) Declining oxygen concentrations in polar seas threaten giant amphipods.

24

In the first sentence, the author uses the words “tucked away” and “short” most likely to

- A) imply that other scientist unfairly dismissed Chapelle and Peck’s paper.
- B) suggest that Chapelle and Peck’s paper might initially have been easy to overlook.
- C) indicate that Chapelle and Peck’s paper was not as rigorous as it should have been.
- D) present Chappelle and Peck’s paper as representative pf a declining trend among researches.

25

The author indicates that the measurements of crustacean length that Chapelle and Peck used were drawn from

- A) numerous species that inhabit diverse locations.
- B) species that previous studies had neglected.
- C) only those species that display polar gigantism.
- D) a combination of living and extinct species.

26

As used in line 17, “exclusively” most nearly means

- A) solely.
- B) incompatibly.
- C) fashionably.
- D) conspicuously.

27

As presented in the passage, the conventional view of polar gigantism is unsatisfactory because

- A) the correlation between animal body size and water temperature is the exact opposite of what the conventional view assumes.
- B) in warm blooded animals body size increases as water temperature increases, which the conventional view suggests should not happen.
- C) the relationship between animal body size and water oxygen concentration is weaker than the conventional view predicts.
- D) the relationship between decreasing water temperature and increasing animal body size is not as direct as the conventional view suggests.

28

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

- A) Lines 30-32 (“For the ... seas”)
- B) Lines 36-37 (“Surprisingly ... explained”)
- C) Lines 37 -40 (“The trouble ... exceptions”)
- D) Lines 47-49 (“What ... concentrations”)

29

The passage suggests that the difference noted in lines 43- 45 (“Freshwater ... temperature”) arises in part because

- A) oxygen dissolves better in the cold water of Lake Baikal than in warm tropical waters.
- B) salt is less soluble in warm freshwater lakes than in cold lakes such as Lake Baikal.
- C) temperatures in Lake Baikal tend to be significantly higher than in polar seas.
- D) the water in Lake Baikal is less salty than is comparably cold seawater.

30

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

- A) Lines 32- 35 (“Although ... straightforward”)
- B) Lines 40-42 (“In particular ... alone”)
- C) Lines 49-51 (“Oxygen... waters”)
- D) Lines 51-54 (“The salt... saline”)

31

According to the passage, Chapelle and Peck believe that increases in global temperatures could

- A) lead to the extinction of giant amphipods.
- B) increase the range of giant amphipods.
- C) cause giant amphipods to grow even larger.
- D) confine giant amphipods to freshwater areas.

**Questions 32-41 are based on the following passage and supplementary materials.**

This passage and accompanying figure are adapted from Christopher H. Achen and Larry M. Bartels, *Democracy for Realists: Why Elections Do Not Produce Responsive Government*. ©2016 by Princeton University Press.

William Nordhaus first called scholars' attention to the fact that voters' short time horizons might induce a “political business cycle” in democratic political systems, with incumbents' efforts to stimulate the economy producing regular peaks in economic growth around election times. The first extensive empirical analysis of political business cycles, by Edward Tufte, provided statistical evidence of electoral cycles in transfer payments,<sup>1</sup> income growth, unemployment, and inflation, as well as considerable qualitative evidence of specific efforts by incumbents to produce those cycles. Incumbent US president Richard Nixon in 1972 was a particularly energetic manipulator of everything from the money supply to effective dates of increases in Social Security benefits and payroll taxes; as Tufte delicately put it, “The extremes of 1972 were special because Richard Nixon was special.”

Tufte worried that political manipulation of economic policy could generate significant social costs due to wasteful government spending and other forms of “economic instability and inefficiency” aimed at making the economy flourish around election time —“a bias toward policies with immediate, highly visible benefits and deferred, hidden costs —myopic policies for myopic voters.” However, a good deal of subsequent empirical research has produced less clear-cut results. As one observer put it, “while the general logic behind the theory is quite persuasive, the empirical evidence for electoral-economic cycles is spotty at best.”

We believe that a variety of problems contribute to the spotty empirical support for electoral cycles in economic outcomes. The power of statistical tests to detect pre-election fluctuations in economic conditions may be quite modest in short time series with few elections. Some studies focus on secondary measures of economic performance such as unemployment and inflation rather than income growth, which is clearly of primary electoral importance. Others are insensitive to important institutional details, such as whether the timing of elections is fixed or variable.

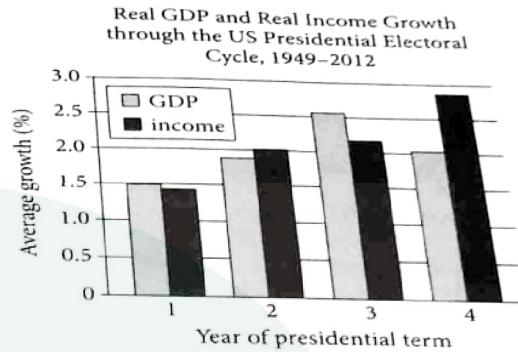
We do not pretend to offer a thorough review and  
 45 assessment of empirical evidence regarding political business cycles here. Instead, we provide a very simple test of whether economic performance has fluctuated in the run-ups to recent US presidential elections in the way one might expect if incumbent  
 50 presidents were catering to myopic economic voters. The results of this test are reported in the following figure, which summarizes average growth rates in real GDP (gross domestic product) per capita and real disposable income<sup>2</sup> per capita in each year of the  
 55 presidential election cycle, from inauguration (year 1) to reelection (year 4), from 1949 through 2012.

We have two distinct reasons to expect a stronger electoral cycle in real disposable income growth than  
 60 in GDP growth. First, since voters are much more responsive to income growth than to GDP growth, incumbents have much more to gain from manipulating income growth. Second, as a practical matter, it is probably a good deal easier for  
 65 incumbents to manipulate income growth — for example, through transfer payments and tax cuts — than to manipulate the pace of real economic output through macroeconomic policy.

As one might expect, given these considerations,  
 70 the most striking aspect of the figure is the marked increase in average income growth (though not in GDP growth) in presidential election years. Moreover, the average election year income growth rate exceeds the corresponding GDP growth rate by  
 75 40% - just as we would expect if incumbents tailored their economic policies to appeal to an electorate that is much more attentive to election-year income growth than to election-year GDP growth.

<sup>1</sup> Payments made to individuals by the federal government through various social benefit programs

<sup>2</sup> Money available to spend or save after taxes have been accounted for



32

One important function of the repetition of “myopic” in line 26 is to

- A) imply a connection between poor policies and voters’ own failings.
- B) emphasize that voters’ reactions to policies can be unpredictable.
- C) suggest that politicians exploit voters’ lack of interest in policy making.
- D) question whether voters believe that policy changes can lead to immediate economic growth.

33

The authors of the passage suggest that some researchers studying political business cycles have made which mistake?

- A) They have assumed that voters' preferences fluctuate more than may actually be the case.
- B) They have included economic data that may have relatively little influence on voting decisions.
- C) They have overemphasized the fact that electoral cycles are not uniform in length.
- D) They have failed to account for long-term economic trends that may shape voters' perceptions.

34

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

- A) Lines 32-34 ("We believe...outcomes")
- B) Lines 34-37 ("The power...elections")
- C) Lines 37-41 ("Some...importance")
- D) Lines 41-43 ("Others...variable")

35

As used in line 43, "fixed" most nearly means

- A) repaired.
- B) resolute.
- C) corrupted.
- D) stable.

36

The sentence in lines 44-46 ("We do...here") primarily serves to

- A) indicate the limited scope of the authors' approach.
- B) admit to a minor flaw in the authors' methodology.
- C) highlight a valid approach different from ■ the authors.
- D) establish the purely theoretical nature of the authors' argument.

37

The authors of the passage suggest that GDP growth in unlikely to support the theory of political business cycles in US presidential elections in part because

- A) most of the short-term benefits of GDP growth accrue to only a small proportion of waters.
- B) the tools incumbents can use to manipulate GDP growth are politically unpopular.
- C) GDP growth follows disposable income growth and thus does not require direct manipulation.
- D) it is difficult for incumbents to be about GDP growth in time with electrical cycles.

38

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

- A) Lines 51-57 ("The results...2012")
- B) Lines 58-60 ("We have...GDP growth")
- C) Lines 60-63 ("First...income growth")
- D) Lines 63-68 ("Second...policy")

1

1

39

Data in the figure best support which statement about economic growth during presidential terms between 1949 and 2012?

- A) The average real GDP growth rate rose steadily throughout presidential terms.
- B) The average real income growth rate exceeded that of real GDP in the first two years of presidential terms.
- C) The average real income growth rate increased each year of presidential terms.
- D) The average real GDP growth rate in year 3 of presidential terms was twice that observed in year 1.

40

Which statement best describes the relationship between the data presented in the figure and Tufte's analysis of political business cycles?

- A) The data greatly broaden the scope of Tufte's analysis.
- B) The data are largely in agreement with Tufte's analysis.
- C) The data prove the negative consequences predicted in Tufte's analysis.
- D) The data undermine one assumption of Tufte's analysis.

41

The authors of the passage would most likely agree with which statement about the data for year 3 and year 4 shown in the figure?

- A) The change in average real income growth over that period may be exaggerated by an extreme outlier in the data set.
- B) The change in average real income growth in that period is probably a side effect of efforts to encourage real GDP growth.
- C) The changes in both average real income growth and average real GDP growth in that period benefited incumbent presidents.
- D) The change in the average real income growth in that period is at least partly the result of presidential actions.

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

This passage is adapted from Melinda Wenner Moyer, "The Myth of Antioxidants." ©2013 by Scientific American, a division of Nature America, Inc.

Line David Gems's life was turned upside down in 2006 by a group of worms that kept on living when they were supposed to die. As assistant director of the Institute of Healthy Aging at University College London, Gems regularly runs experiments on *Caenorhabditis elegans*, a roundworm that is often used to study the biology of aging. In this case, he was testing the idea that a buildup of cellular damage caused by oxidation – technically, the chemical removal of electrons from a molecule by highly reactive compounds, such as free radicals – is the main mechanism behind aging. According to this theory, rampant oxidation mangles more and more lipids, proteins, snippets of DNA and other key components of cells over time, eventually compromising tissues and organs and thus the functioning of the body as a whole.

Gems genetically engineered the roundworms so they no longer produced certain enzymes that act as naturally occurring antioxidants by deactivating free radicals. Sure enough, in the absence of the antioxidants, levels of free radicals in the worms skyrocketed and triggered potentially damaging oxidative reactions throughout the worms' bodies. Contrary to Gems's expectations, however, the mutant worms did not die prematurely. Instead they lived just as long as normal worms did. The researcher was mystified. "I said, 'Come on, this can't be right,'" he recalls. "'Obviously something's gone wrong here.'" He asked another investigator in his laboratory to check the results and do the experiment again. Nothing changed. The experimental worms did not produce these particular antioxidants; they accumulated free radicals as predicted, and yet they did not die young – despite suffering extreme oxidative damage.

Other scientists were finding similarly confounding results in different lab animals. In the U.S., Arlan Richardson, director of the Barshop Institute for Longevity and Aging Studies at the University of Texas Health Science Center in San Antonio, genetically engineered 18 different strains of mice, some of which produced more of certain antioxidant enzymes than normal and some of which produced fewer of them than normal. If the damage

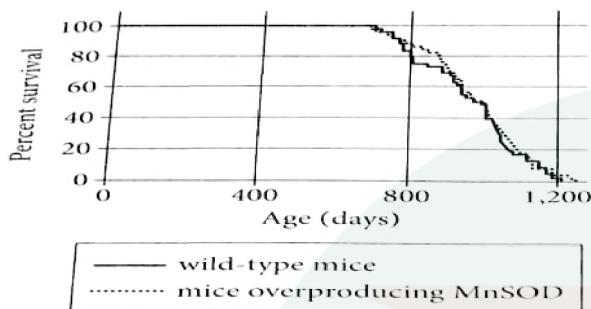
caused by free radical production and subsequent oxidation was responsible for aging, then the mice with extra antioxidants in their bodies should have lived longer than the mice missing their antioxidant enzymes. Yet "I watched those ... life span curves, and there was not an inch of difference between them," Richardson says. He published his increasingly bewildering results in a series of papers between 2001 and 2009.

Meanwhile, a few doors down the hall from Richardson, physiologist Rochelle Buffenstein has spent the past 11 years trying to understand why the longest – living rodent, the naked mole rat, is able to survive up to 25 to 30 years – around eight times longer than a similarly sized mouse. Buffenstein's experiments have shown that naked mole rats possess lower levels of natural antioxidants than mice and accumulate more oxidative damage to their tissues at an earlier age than other rodents. Yet paradoxically, they live virtually disease-free until they die at a very old age.

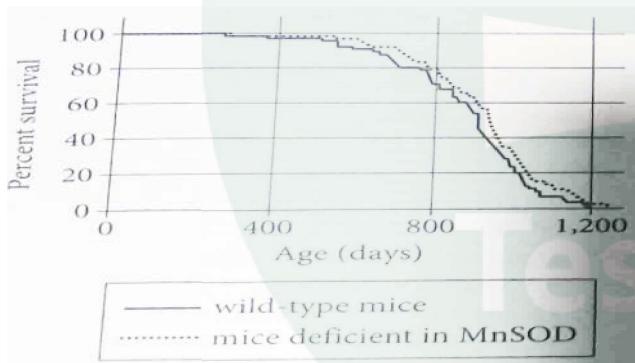
To proponents of the long-standing oxidative damage theory of aging, these findings are nothing short of heretical. They are, however, becoming less the exception and more the rule. Over the course of the past decade, many experiments designed to further support the idea that free radicals and other reactive molecules drive aging have instead directly challenged it. What is more, it seems that in certain amounts and situations, these high-energy molecules may not be dangerous but useful and healthy, igniting intrinsic defense mechanisms that keep our bodies in tip-top shape. These ideas not only have drastic implications for future antiaging interventions, but they also raise questions about the common wisdom of popping high doses of antioxidant vitamins. If the oxidative-damage theory is wrong, then aging is even more complicated than researchers thought – and they may ultimately need to revise their understanding of what healthy aging looks like on the molecular level.

**Figure 1**

Life Spans of Wild-Type Mice and Mice Overproducing Antioxidant Enzyme MnSOD

**Figure 2**

Life Spans of Wild-Type Mice and Mice Deficient in Antioxidant Enzyme MnSOD



adapted from Viviana I. Perez et al., "Is the Oxidative Stress of Aging Dead?" ©2009 by Elsevier B.V.  
the figures are from Richardson's experiment used in the passage.

42

The primary purpose of the passage is to

- A) discuss findings that challenge a conventional theory about aging.
- B) explain the development of an innovative theory about aging.
- C) reconcile seemingly contradictory theories about aging.
- D) describe the practical applications of a new theory about aging.

43

The passage most clearly indicates that Gems uses *Caenorhabditis elegans* in his experiments primarily because this species of roundworm is

- A) more readily available to researchers like Gems than are other species.
- B) well suited to the subject of Gems's research.
- C) favored by researchers at University College London.
- D) capable of surviving for long periods of time through ongoing research.

44

As used in line 16, "compromising" most nearly means

- A) impairing.
- B) implicating.
- C) compelling.
- D) settling.

45

Based on the passage, what had Gems assumed about the oxidative damage theory of aging before he tested the theory?

- A) It had broad commercial applications for antiaging interventions.
- B) It accounted for only part of the larger mechanism behind aging that scientists have yet to fully understand.
- C) It was difficult to evaluate using experimental designs traditionally used to conduct research on aging.
- D) It was fundamentally sound as a means of describing the biology of aging.

46

Together with lines 12-17 (“According...whole”), which choice provides the best evidence for the answer to the previous question?

- A) Lines 3-7 (“As assistant...aging”)
- B) Lines 7-12 (“In this...aging”)
- C) Lines 25-26 (“Contrary...prematurely”)
- D) Lines 82-86 (“If the...level”)

47

As used in line 31, “check” most nearly means

- A) examine.
- B) restrain.
- C) break.
- D) expose.

48

The passage most strongly suggests that in the field of aging, findings such as those by Gems, Richardson, and Buffenstein are

- A) highly controversial, although they are likely to become less so.
- B) inspiring other studies, although they are likely to continue doing so only for a short time.
- C) currently undervalued, although they may become overvalued as scientific attitudes change.
- D) misunderstood by experts, although this is likely to change as more such findings are published.

49

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

- A) Lines 38-45 (“In the...normal”)
- B) Lines 50-54 (“Yet...2009”)
- C) Lines 67-70 (“To proponents...rule”)
- D) Lines 74-78 (“What...shape”)

50

It can most reasonably be inferred that the author believes the research described in the passage is

- A) noteworthy, because it may assist scientists in identifying new species for use in research on aging.
- B) significant, because it may lead to changes how aging in humans is understood.
- C) revealing, because it has contributed to a new understanding of the cause of oxidation.
- D) necessary, because it will drive scientists to reevaluate how free radicals and antioxidant are defined.

1

1

51

Based on information provide in the passage and in figure 2, what is one way in which the mice deficient in MnSOD most likely differed from wild-type mice?

- A) The mice deficient in MnSOD most likely had shorter life spans.
- B) The mice deficient in MnSOD most likely experienced age-related tissue decline earlier.
- C) The mice deficient in MnSOD most likely started producing antioxidants at an older age.
- D) The mice deficient in MnSOD most likely accumulated more free radicals in their tissue cells.

52

Each figure represents data about the average life span of an experimental group of mice and the average life span of a control group (wild-type mice). Information from the passage best supports which interpretation of these data?

- A) The average life spans of the experimental groups exhibited differences from those of the control groups that were nominal but noteworthy.
- B) The average life spans of the experimental groups exhibited differences from those of the control groups that could not be properly assessed because the data were incomplete.
- C) The average life spans of the experimental groups and those of the control groups were in line with the oxidative damage theory of aging.
- D) The average life spans of the experimental groups exhibited no meaningful differences from those of the control groups.

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Do not turn to any other section.**

# 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.**

### Location Matters for Ecologists

Monitoring animal populations **1** provide ecologists with crucial information about species that may require conservation efforts. As research on giant tortoise in the Seychelles Island demonstrates, though, the sizes of these populations can vary based on locality even within a small range of territory. **2** For this reason, monitoring needs to be conducted at a variety of sites.

1

- A) NO CHANGE
- B) are providing
- C) provides
- D) have provided

2

- A) NO CHANGE
- B) In the meantime,
- C) Regardless,
- D) Furthermore,

2

2

The Seychelles atoll of Aldabra, which measures **3** only 60 square miles, is become to the only known species of long-lived, land-dwelling giant tortoises to survive in the wild on islands in the Indian Ocean. In 1973 and 1974, a team of British scientists began monitoring their populations, recording the number of **4** tortoises, at designated points, throughout the atoll. The scientists identified subpopulations in distinct territories, including Cinq Cases, Takamaka, and **5** Malabar; then they estimated population size and density for each area. The survey was repeated more than 20 years later, in 1997, using the same geographical coordinates.

3

- A) NO CHANGE
- B) only an area the size of 60 square miles,
- C) only 60 square miles in size,
- D) an extent of only 60 square miles,

4

- A) NO CHANGE
- B) tortoises at designated points
- C) tortoises: at designated points
- D) tortoises at designated points,

5

- A) NO CHANGE
- B) Malabar and
- C) Malabar;
- D) Malabar

2

2

If the Malabar location alone had been studied, the researchers might well have come to the conclusion that giant tortoises were thriving, during the period of study, the number of tortoises at that site grew from 1,998 to 3,856. The parts of the atoll **6** with the smallest areas provided far different results, however. At Cinq Cases the population fell by 33 percent, from **7** 2,075 to 1,285 tortoises. Takamaka saw an even greater population decline of 41 percent. **8** They estimate that the overall tortoise population dropped from 129,415 to 100,473 across multiple sites.

1973-1974			
Location	Area sampled (hectares)	Estimated population density (tortoises per hectare)	Estimated population size (number of tortoises)
Cinq Cases	2,075	27.36	56,776
Takamaka	1,285	14.18	18,227
Malabar	320	6.24	1,998
	1997		
Location	Area sampled (hectares)	Estimated population density (tortoises per hectare)	Estimated population size (number of tortoises)
Cinq Cases	2,075	18.35	38,086
Takamaka	1,285	8.31	10,677
Malabar	320	12.05	3,856
Change in Population Size			
Cinq Cases	33% decline		
Takamaka	41% decline		
Malabar	93% increase		

Adapted from David Boum et al. "The Rise and Fall of the Aldabra Giant Tortoise Population." ©1999 by the Royal Society.

6

Which choice provides accurate information from the table to support the point made in the sentence?

- A) NO CHANGE
- B) more densely populated by tortoises in the initial survey
- C) that were not included in the initial survey
- D) sampled in 1973-1974

7

Which choice provides accurate information from the table to support the point made in the sentence?

- A) NO CHANGE
- B) 27.35 to 18.35
- C) 56,776 to 18,227
- D) 56,776 to 38,086

8

- A) NO CHANGE
- B) These
- C) Researchers
- D) Residents

2

2

Separating out the different regions of the atoll for study allowed scientists to make nuanced hypotheses about Aldabran tortoises. They theorized that human activity **9** accounted for the initially low density of tortoises at sites such as Malabar; because this interference was removed shortly before observations began, tortoises in these places recovered rapidly.

**10** The researchers therefore inferred that protecting tortoises from humans had achieved significant results. They further inferred that additional study was needed to find other environmental factors that might be causing the falloff in the densely populated areas.

Studies like this one that compare population dynamics at different locations are essential for learning the causes of population change and determining where more research is needed. Although limited budgets and logistical issues can restrict the number of sites scientists can observe, **11** they must also make sure that their observations do not interfere with animal habitats.

9

- A) NO CHANGE
- B) was in account of
- C) was accountant to
- D) accounted

10

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

- A) The researchers therefore inferred that, while protecting tortoises from humans had achieved significant results, additional
- B) Therefore, the researchers, inferring that protecting tortoises from humans had achieved significant results, inferred that additional
- C) The researchers therefore inferred that protecting tortoises from humans had achieved significant results, inferring, in addition, that
- D) The researchers' protection of tortoises from humans had achieved significant results, and it was additionally inferred that

11

The writer wants an effective concluding sentence that restates the main claim of the passage. Which choice best accomplishes this goal?

- A) NO CHANGE
- B) there are numerous grant-making organizations that researchers can appeal to for additional funds.
- C) the value of the data obtained by such comparative studies makes them well worth the cost.
- D) Aldabran giant tortoises are among the most important animals to study in their natural habitat.

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

### Hip-Hop Meets Native American Tradition

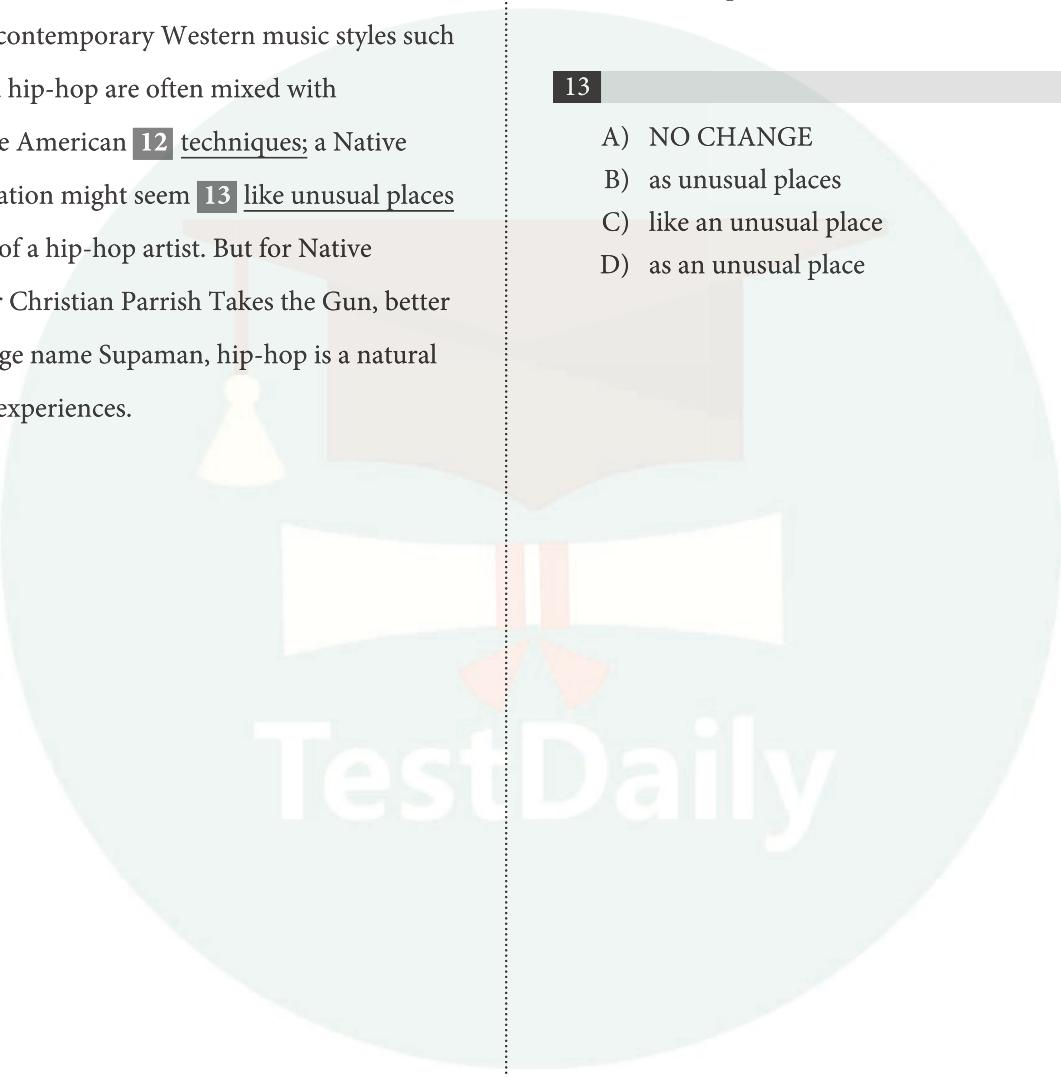
For those unfamiliar with Native American popular music, in which contemporary Western music styles such as pop, rock, and hip-hop are often mixed with traditional Native American **12** techniques; a Native American reservation might seem **13** like unusual places to find the roots of a hip-hop artist. But for Native American rapper Christian Parrish Takes the Gun, better known by his stage name Supaman, hip-hop is a natural language for his experiences.

12

- A) NO CHANGE
- B) techniques,
- C) techniques. But
- D) techniques—so

13

- A) NO CHANGE
- B) as unusual places
- C) like an unusual place
- D) as an unusual place

A large, semi-transparent circular watermark in the center of the page contains the words "TestDaily" in a bold, sans-serif font. Above the text, there is a stylized graphic element consisting of three vertical bars of increasing height followed by a downward-pointing arrow.

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2

2

Supaman, who is a member of the Crow, or Apsaalooke, Nation, developed his distinctive fusion of the genre with elements of his Crow upbringing partly by accident. Having written and performed hip-hop for several years, he **14** would have been invited to perform at a Native American heritage celebration at Montana State University. He recounted that he had been invited to the stage as a rapper, but to his surprise the organizers asked him first to demonstrate “fancy dance,” a contemporary, pan-tribal dance style with roots in traditional dances, in which participants perform in regalia decorated with feathers and beads. **15** Supaman agreed, assuming he would change into street clothes for his rap show. But as there was no time to do so, he chose to rap in the regalia he was wearing. It turned out that this spur-of-the-moment decision resonated for his Native American fans: they saw this juxtaposition of Native American and popular culture as reflective of their own experiences.

14

- A) NO CHANGE
- B) is being
- C) has been
- D) was

15

The writer is considering revising the underlined portion to the following.

- Supaman, who is a champion fancy dancer, Should the writer make this revision?
- A) Yes, because it defines a term used later in the passage.
  - B) Yes, because it helps explain some of the actions described in the paragraph.
  - C) No, because it merely repeats information that is provided elsewhere in the passage.
  - D) No, because this information belongs most logically in the first paragraph.

The performance **16** had a profound influence on

Supaman as he produced his own albums. For his 2014 music video for “Prayer Loop Song,” he noted, “I rapped in my traditional fancy dance outfit to showcase two different worlds coming together in a positive way.”

**17** Supaman maintains that the live performance of the song is similar to the performance shown in the music video. He composed “Prayer Loop Song” by using a looping machine—a device commonly used in hip-hop to play sound input on **18** repeat, to superimpose his rapping on a recording of traditional singing, drumming, and flute playing. The self-published single and other songs of his have won him several awards, such as the Aboriginal Peoples Choice Music Award and the Native American Music Award, as well as the attention of hundreds of thousands of listeners.

**16**

- A) NO CHANGE
- B) had a profound effect and influence on
- C) profoundly and deeply influenced
- D) profoundly influenced and affected

**17**

Which choice provides the best transition from the previous sentence to the one that follows in the paragraph?

- A) NO CHANGE
- B) Supaman has become a well-known performer of Native American popular music.
- C) The production style of the song also served to unite his diverse cultural influences.
- D) Social media and word of mouth helped Supaman promote the song.

**18**

- A) NO CHANGE
- B) repeat—
- C) repeat:
- D) repeat

2

2

Supaman's **19** work as an educator has complemented the intercultural dialogue of his music. Visiting reservation schools, holding workshops, and collaborating with nonprofit organizations, he has worked tirelessly to spread a message of cultural appreciation, **20** however. Through his **21** efforts, to connect the spirit of hip-hop with indigenous experience, Supaman has made a contribution that has **22** enriched both his community and his genre.

**19**

Which choice most effectively sets up the next sentence in the paragraph?

- A) NO CHANGE
- B) talent as a performer
- C) rise to fame
- D) acclaim among fellow musicians

**20**

- A) NO CHANGE
- B) at any rate.
- C) of course.
- D) DELETE the underlined portion, adjusting the punctuation as needed.

**21**

- A) NO CHANGE
- B) efforts to
- C) efforts to:
- D) efforts to,

**22**

Which choice best maintains the overall tone of the passage?

- A) NO CHANGE
- B) spruced up
- C) done a lot for
- D) been prodigiously impactful for

**Questions 23-33 are based on the following passage.****UNCLOS and the Arctic**

The United Nations Convention on the Law of the Sea treaty (UNCLOS), adopted in 1982, **23** which was the result of negotiations among 160 nations interested in stabilizing ocean sovereignty. Before UNCLOS, nations fishing or drilling for oil in coastal waters had found themselves competing for the same resources, leading to confusion and conflict. UNCLOS granted each coastal nation an exclusive economic zone (EEZ) extending 230 miles from its shore, within which only that nation could use any natural resources. In the Arctic, this placed most known resources within the **24** EEZ's of the Arctic Ocean's five coastal nations. Changing Arctic conditions have created interest in territory beyond the EEZs, however, testing the strength of UNCLOS.

Over the past 50 years, a warming trend in the far-north Arctic region has reduced the extent to which sea ice covers the Arctic Ocean in summer. Leaders in the Arctic coastal nations—Canada, Denmark (via Greenland), Norway, Russia, and the United States (via Alaska)—anticipate that navigation and oil drilling in the Arctic Ocean will therefore soon become easier. **25** In fact, two shipping routes became free of ice for the first time in 2007: the Northwest Passage in Canadian waters and the Northern Sea Route in Russian waters.

**23**

- A) NO CHANGE
- B) and
- C) so that it
- D) DELETE the underlined portion.

**24**

- A) NO CHANGE
- B) EEZs of the Arctic Ocean's
- C) EEZ's of the Arctic Oceans
- D) EEZs of the Arctic Oceans'

**25**

Which choice provides an example that supports the assumption made by the leaders mentioned in the previous sentence?

- A) NO CHANGE
- B) In reality, only about 20 percent of the Arctic Ocean is accessible by boat in winter.
- C) For example, shipping via the Arctic Ocean would cut thousands of miles from journeys that are now routed through the Suez or Panama Canals.
- D) One shipping route, the Northwest Passage, is infamously elusive; European explorers searched for it from the fifteenth to the nineteenth centuries.

2

2

Acting on these anticipated changes, **26** several preliminary claims have been filed by nations requesting more territory through an UNCLOS provision

**27** worrying continental shelves, relatively shallow areas of the seafloor adjacent to a shore. **28** Despite considerable danger and expense, Canada, Denmark, Norway, Russia, and the United States have undertaken Arctic seafloor mapping expeditions, searching for the drop-offs that mark the edges of their continental shelves. The resulting claims are sometimes conflicting. **29** For example, Russia, Denmark, and Canada each claim to have found evidence that the Lomonosov Ridge, a seafloor ridge beneath the North Pole, is part of that nation's continental shelf.

**26**

- A) NO CHANGE
- B) several nations have filed preliminary claims for
- C) preliminary claims filed by several nations request
- D) there has been the filing, by several nations, of preliminary claims for

**27**

- A) NO CHANGE
- B) engaged in
- C) belonging to
- D) concerning

**28**

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

By proving that its continental shelf extends beyond its EEZ, a nation can gain qualified rights to the seafloor of most of the remaining shelf.

Should the writer make this addition here?

- A) Yes, because it provides details about the relationship between a nation's continental shelf and its landmass.
- B) Yes, because it clarifies the application of the UNCLOS provision mentioned in the previous sentence.
- C) No, because it does not set up the example of seafloor mapping expeditions that follows.
- D) No, because it interrupts the paragraph's discussion of territorial claims submitted to the United Nations.

**29**

- A) NO CHANGE
- B) Ultimately,
- C) However,
- D) Despite this,

2

2

[1] These efforts to claim Arctic Ocean seafloor territory may not be productive. [2] Floating masses of ice **30** makes the new navigation routes hazardous. [3] Extreme conditions make Arctic offshore drilling almost prohibitively expensive. [4] For example, elevations like the Lomonosov Ridge can be seen as either freestanding **31** aspects or as continuations of a continental shelf. [5] Until UNCLOS is updated to reflect the complexity of this region, it will fail to attain **32** their original goal of securing stability on the seas. [6] The immediate impediment, though, is that the UNCLOS framework cannot classify the unique Arctic Ocean seafloor. **33**

30

- A) NO CHANGE
- B) make
- C) is making
- D) has made

31

- A) NO CHANGE
- B) highlights
- C) promotions
- D) features

32

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

33

- To make the paragraph most logical, sentence 6 should be placed
- A) where it is now.
  - B) after sentence 2.
  - C) after sentence 3.
  - D) after sentence 4.

2

2

Questions 34-44 are based on the following passage.

### A Clothes-Minded Career

Like many creative industries, clothing design resolves around a combination of specialized skills honed over many years and the ordinary demands

34 to run a business. Designers must shepherd their creations through a difficult process of conception, refinement, and production, after which clothes must be marketed to the fashion world and the customer.

34

- A) NO CHANGE
- B) of running
- C) in order to run
- D) for running

The initial idea behind a design depends on the

- 35** designer's skill and experience in creating a particular type of garment. When noted designer Jason Wu was **36** commissioned to create a dress for actor Lupita Nyong's to wear at the Tony Awards, for example, he aimed for a design that would capture the lively spirit of the biggest event in musical theater. From this broad concept, Wu proceeded to select the **37** colors, materials, and shapes to execute his vision, producing an off-the-shoulder dress with a multicolored sequined pattern. The intricate details required long hours of work in the studio to perfect: **38** the famous inaugural ball gown he designed for Michelle Obama was embellished with handmade organza flowers and crystals.

**35**

Which choice most effectively sets up the discussion that follows in the paragraph?

- A) NO CHANGE
- B) customer and the occasion for which the garment will be worn.
- C) painstaking handiwork necessary to turn a design into reality.
- D) fabrics and other materials available in the designer's studio.

**36**

Which choice most closely matches the style and tone of the passage?

- A) NO CHANGE
- B) called up
- C) given the green light
- D) bestowed the opportunity

**37**

- A) NO CHANGE
- B) colors, material; and shapes
- C) colors, materials and shapes;
- D) colors; materials, and shapes,

**38**

The writer wants to include information that illustrates the point made earlier in the sentence. Which choice best accomplishes this goal?

- A) NO CHANGE
- B) many of Wu's designs show the influence of classic photography.
- C) every sequin in Wu's dress had to be sewn on by hand.
- D) this artisanship is reflected in the high retail price of Wu's gowns.

While Wu often performs such painstaking work himself, he also **39** corroborates between a team of designers throughout the process, from developing ideas to the sewing and finishing of a garment. Clothing meant for the broader public is also designed and prototyped in the studio, but unlike a one-of-a-kind dress, it is produced in factories, removing it from the designer's immediate oversight. To prevent costly errors, Wu often travels to manufacturing facilities for his mass-market line of women's wear to examine the production process and ensure that the clothes meet his specifications.

When it comes to high-profile events like the Tony Awards, the payoff is not so much the sale of an individual garment as the **40** satisfaction of seeing the end result of a design. Since fashion is a highly concentrated **41** industry: most American designers work in New York or California), the ability to capture attention is **42** an essential and vital part of a marketing strategy. Wu developed an appreciation for branding and intellectual property while designing dolls for a high-end toy company earlier in his career. One of his first moves upon starting his fashion line was to register his name, something he had not learned in fashion school but which he calls "one of the finest things [he has] ever done." In an industry in which producers and consumers are very conscious of brand names, protecting and promoting one's brand are essential.

39

- A) NO CHANGE
- B) corroborates with
- C) collaborates between
- D) collaborates with

40

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

- A) NO CHANGE
- B) opportunity to attend these red-carpet events.
- C) prestige of having a celebrity clientele.
- D) visibility of the fashion line.

41

- A) NO CHANGE
- B) industry; most
- C) industry (most
- D) industry, most

42

- A) NO CHANGE
- B) an essentially vital
- C) an essential
- D) vitally and essentially a



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2

2

While designers typically begin **43** their careers with the desire to create beautiful clothing, turning that artistic aspiration into a career demands a broad skill set.

**44** Wu's noteworthy commitment to quality in both his mass-market and one-of-a-kind creations ensures that he will remain a sought-after designer for years to come.

43

- A) NO CHANGE
- B) your careers
- C) one's career
- D) his or her career

44

The writer wants a conclusion that summarizes the main point of the passage. Which choice best accomplishes this goal?

- A) NO CHANGE
- B) For designers like Wu, success in the field requires artistic and commercial consideration to blend seamlessly.
- C) While luck and skill may play important roles, Wu's career demonstrates that a strong work ethic is the best predictor of success in fashion design.
- D) Although only in his thirties, Wu has already demonstrated that he possesses the artistic genius necessary to thrive in the field of clothing design.

# STOP

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



# Math Test – No Calculator

**25 MINUTES, 20 QUESTIONS**

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

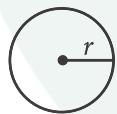
## DIRECTIONS

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

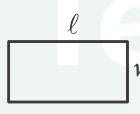
## NOTES

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

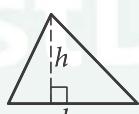
## REFERENCE



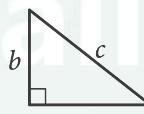
$$\begin{aligned} A &= \pi r^2 \\ C &= 2\pi r \end{aligned}$$



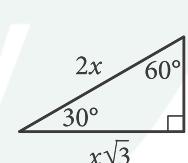
$$A = \ell w$$



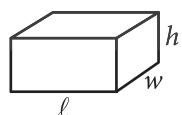
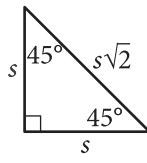
$$A = \frac{1}{2}bh$$



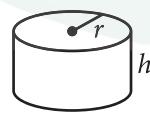
$$c^2 = a^2 + b^2$$



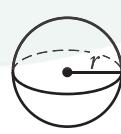
Special Right Triangles



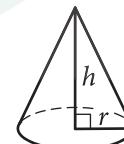
$$V = \ell wh$$



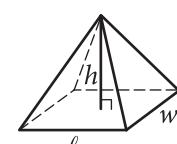
$$V = \pi r^2 h$$



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



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



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

The number of degrees of arc in a circle is 360.

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

The sum of the measures in degrees of the angles of a triangle is 180.



3

3

1

If  $3n + 7 = 2n - 1$ , what is the value of  $n$ ?

- A) -8
- B) -5
- C) 6
- D) 8

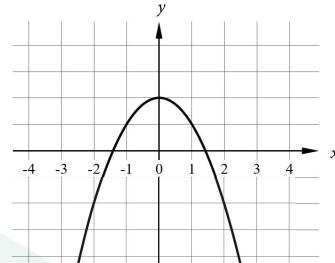
2

$$550x + 480y = 34,000$$

An office manager will use \$34,000 to purchase  $x$  laptop computers and  $y$  desktop computers. The relationship between how many laptop computers and desktop computers can be purchased by the office manager is represented by the given equation. Which of the following is the best interpretation of 550 in this context?

- A) The cost of each laptop computer
- B) The cost of each desktop computer
- C) The total number of laptop computers purchased
- D) The total number of desktop computers purchased

3



The graph of the function  $f$  is shown in the  $xy$ -plane where  $y = f(x)$ . Which of the following could define  $f$ ?

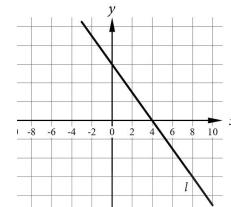
- A)  $f(x) = x^2 + 2$
- B)  $f(x) = x^2 - 2$
- C)  $f(x) = -x^2 + 2$
- D)  $f(x) = -x^2 - 2$

4

A high school offers an environmental science course and a world history course. The number of student taking environmental science is 6 more than the number of students taking world history. If 30 students are taking environmental science, for which of the following equations does  $n$  represent the number of students taking world history?

- A)  $\frac{1}{6n} = 30$
- B)  $n - 6 = 30$
- C)  $n + 6 = 30$
- D)  $6n = 30$

5



Line  $l$  is shown in the  $xy$ -plane above. If line  $k$  (shown) is parallel to line  $l$ , which of the following could be an equation of line  $k$ ?

- A)  $y = \frac{3}{2}x + 3$
- B)  $y = \frac{2}{3}x + 2$
- C)  $y = -\frac{2}{3}x - 2$
- D)  $y = -\frac{3}{2}x - 3$

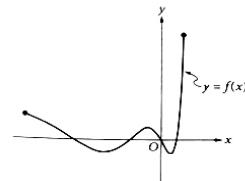


6

The function  $G(t) = 27.9(1.0096)^t$  models the expected weight, in pounds, of a certain male child from the age of 2 years to 10 years, where  $t$  is the amount of time, in months, that has passed since the child turned 2 years old. Which of the following is the best interpretation of 27.9 in this context?

- A) The weight of the child is expected to increase by 27.9% each year.
- B) The child is expected to weigh 27.9 pounds when he turned 2 years old.
- C) The weight of the child is expected to increase by 27.9 pounds each year.
- D) The child is expected to weigh 27.9 times more when he is 10 years old than when he was 2 years old.

7



The complete graph of the function  $f$  is shown in the  $xy$ -plane above. For how many values of  $x$  does  $f(x) = 0$ ?

- A) 1
- B) 2
- C) 3
- D) 4

8

$$(a - 2)x = 3x + 10$$

In the given equation,  $a$  is a constant. If the equation has no solution, what is the value of  $a$ ?

- A) 2
- B) 3
- C) 5
- D) 10

9

The surface area of a cube is 600 square centimeters. What is the volume, in cubic centimeters, of the cube? (The surface area  $A$  of a cube is given by  $A = 6s^2$ , where  $s$  is the length of an edge of the cube.)

- A) 600
- B) 1,000
- C) 1,200
- D) 1,500

10

$$\frac{3}{a+2} + \frac{7}{4a+8}$$

Which of the following is equivalent to the given expression?

- A)  $\frac{10}{a+2}$
- B)  $\frac{5}{2a+4}$
- C)  $\frac{19}{4a+8}$
- D)  $\frac{21}{5a+10}$

11

$$\sqrt{4b^2} + \sqrt{9b^2}$$

If  $b$  is a constant greater than 1, which of the following is equivalent to the given expression?

- A)  $5\sqrt{b}$
- B)  $13\sqrt{b}$
- C)  $\sqrt{13}b$
- D)  $5b$

12

$x$	$d(x)$
1	6
2	3
3	0

For the linear function  $d$ , the given table shows several values of  $x$  and the corresponding values of  $d(x)$ . If  $d(x) = mx + b$ , where  $m$  and  $b$  are constants, what is the value of  $b$ ?

- A) 3
- B) 6
- C) 9
- D) 12

3

3

13

What is the value of  $\cos(90^\circ)$ ?

- A) 0
- B)  $\frac{1}{2}$
- C)  $\frac{\sqrt{3}}{2}$
- D) 1

15

$$f(x) = 5(3)^{x+3}$$

For the given function  $f$ , which of the following equivalent forms shows the  $y$ -coordinate of the  $y$ -intercept of the graph of  $y = f(x)$  in the  $xy$ -plane as a constant or coefficient?

- A)  $f(x) = \frac{5}{3}(3)^{x+4}$
- B)  $f(x) = 15(3)^{x+2}$
- C)  $f(x) = 45(3)^{x+1}$
- D)  $f(x) = 135(3)^x$

14

$$4x\left(\frac{x}{2} + 6\right)^2$$

Which of the following is equivalent to the expression above?

- A)  $x^3 + 144x$
- B)  $x^3 + 12x^2 + 36x$
- C)  $x^3 + 12x^2 + 144x$
- D)  $x^3 + 24x^2 + 144x$



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**DIRECTIONS**

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

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

Write answer in boxes.

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

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

Grid in result.

← Fraction line

Answer: 2.5

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

← Decimal point

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

2	/	3
•	•	•
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8

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

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

Answer: 201 – either position is correct

2	0	1
•	•	•
0	0	0
1	1	1
2	2	2
3	3	3

2	0	1
•	•	•
0	0	0
1	1	1
2	2	2
3	3	3

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



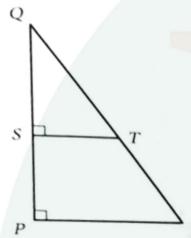
16

If  $\sqrt{x + 1} = \sqrt{5}$ , what is the value of  $x$ ?

18

The function  $h$  is defined by  $h(x) = ax + b$ , where  $a$  and  $b$  are constants. If  $h(2) = 19$  and  $h(5) = 25$ , what is the value of  $b$ ?

17



Note: Figure not drawn to scale.

In the figure shown,  $QP = 15$ ,  $PR = 5$ , and  $ST = 2$ . What is the length of  $\overline{SQ}$ ?

19

$$\begin{aligned}4x - 8y &= 1 \\12x + 4y &= 10\end{aligned}$$

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

20

What is the product of the two solutions to the quadratic equation  $8x(x - 1) = 3(2x - 1)$ ?

# STOP

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



# Math Test – Calculator

**55 MINUTES, 38 QUESTIONS**

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

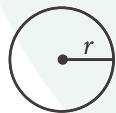
## DIRECTIONS

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

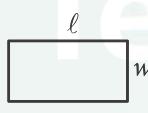
## NOTES

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

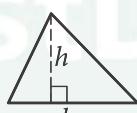
## REFERENCE



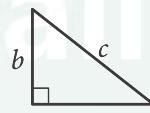
$$\begin{aligned}A &= \pi r^2 \\C &= 2\pi r\end{aligned}$$



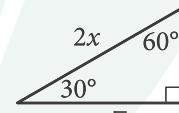
$$A = \ell w$$



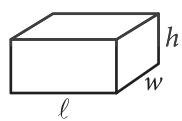
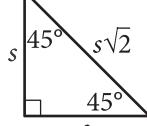
$$A = \frac{1}{2} bh$$



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



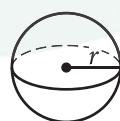
Special Right Triangles



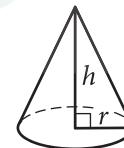
$$V = \ell wh$$



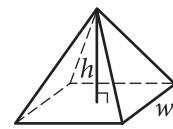
$$V = \pi r^2 h$$



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



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



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

The number of degrees of arc in a circle is 360.

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

The sum of the measures in degrees of the angles of a triangle is 180.



1

If  $5x = 25$ , what is the value of  $10x$ ?

- A) 10
- B) 50
- C) 100
- D) 250

2

Eli saves money each month to buy a new computer. The total amount he has saved,  $T$ , can be calculated by the equation  $T = 83 + 30m$ , where  $m$  is the number of months since he started saving. What does the number 83 represent in the equation?

- A) The amount of money Eli saves each month
- B) The total amount of money Eli wants to save
- C) The amount of money Eli started with
- D) The number of months Eli has been saving

3

Data set A: 10, 10, 10, 10, 10, 200

Data set B: 10, 10, 10, 10, 10

Which of the following statements correctly compares the mean of data set A and the mean of data set B?

- A) The mean of data set A is less than the mean of data set B.
- B) The mean of data set A is equal to the mean of data set B.
- C) The mean of dataset A is greater than the mean of data set B.
- D) The relationship between the two means cannot be determined from the given information.

4

2, 6, 10,  $x$ , 1, 9, 5?

The median of the seven given numbers is 6. Which of the following could be the value of  $x$ ?

- A) 3
- B) 4
- C) 5
- D) 6



5

In 1992 approximately 133 billion gallons of gasoline were consumed in the United States. From 1993 to 2004, the amount of gasoline consumed each year was about 3.4 billion gallons more than the consumption in the preceding year. Which of the following best approximates  $g(n)$ , the amount of gasoline, in billions of gallons, consumed  $n$  years after 1992, where  $n$  is an integer between 0 and 12?

- A)  $g(n) = 133n + 3.4$
- B)  $g(n) = 133 + n$
- C)  $g(n) = 133 + 3.4n$
- D)  $g(n) = 133 + 12n$

**Questions 6 and 7 refer to the following information.**

The given table summarizes the types of colleges in a certain state. Each college is classified as either public or private and either 2-year or 4-year.

Type	Public	Private	Total
2-year	22	10	32
4-year	15	31	46
Total	37	41	78

6

What is the ratio of 4-year public colleges to 2-year public colleges in this state?

- A) 15 to 22
- B) 15 to 37
- C) 31 to 10
- D) 31 to 41

7

If 6 new 4-year private colleges are opened in this state, what will be the closest percent increase in 4-year private colleges in this state?

- A) 16%
- B) 19%
- C) 32%
- D) 40%

8

## Distance Sound Travels at 20° Celsius

$s$	4	5	6	7	8
$d(s)$	1,372	1,715	2,058	2,401	2,744

The table above shows the distance  $d(s)$ , in meters, that sound travels in air at 20° Celsius in  $s$  seconds for selected values of  $s$ . Which of the following could define  $d$  as a function of  $s$ ?

- A)  $d(s) = 343s$
- B)  $d(s) = 235s + 432$
- C)  $d(s) = 300s + 172$
- D)  $d(s) = 400s - 228$

9

$$c = \frac{5}{9} (f - 32)$$

The equation shown can be used to find a temperature  $c$ , in degrees Celsius (°C), that is equivalent to a temperature  $f$ , in degrees Fahrenheit (°F). Which of the following is closest to a temperature of 160°F?

- A) 57°C
- B) 71°C
- C) 107°C
- D) 320°C

10

$x$	-5.0	-3.0	-2.0	1.0	4.0
$f(x)$	6.5	5.5	5.0	3.5	2.0

The table above shows some values of the variable  $x$  and the corresponding values of the function  $f(x)$ . Which of the following equations could represent the relationship between  $x$  and  $f(x)$ ?

- A)  $f(x) = -\frac{x}{2} + 4$
- B)  $f(x) = -x + \frac{3}{2}$
- C)  $f(x) = -\frac{x}{4} + 2$
- D)  $f(x) = -\frac{x}{2} + 2$



11

An air filtration system in a science lab removes 80% of the microscopic particles in the air every 10 minutes. If the lab is sealed so that no new particles can enter the air, which of the following function types best models the number of microscopic particles in the air as a function of time?

- A) Decreasing exponential
- B) Increasing exponential
- C) Decreasing linear
- D) Increasing linear

12

$$(3x + 4)(2x - 3) = 0$$

Which of the following is a solution to the equation above?

- A)  $-\frac{2}{3}$
- B)  $-\frac{3}{4}$
- C)  $-\frac{4}{3}$
- D)  $-\frac{3}{2}$

13

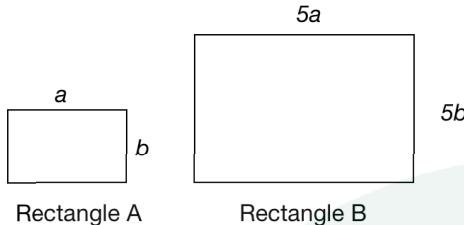
$$y = \frac{2}{3} x$$

The equation above shows a relationship between the variables  $x$  and  $y$ . Which of the following is equivalent to  $2y$ ?

- A)  $\frac{1}{3} x$
- B)  $\frac{3}{4} x$
- C)  $\frac{4}{3} x$
- D)  $3x$



14



Note: Figures not drawn to scale.

Two rectangles and their dimensions, in units, are shown. If the area of rectangle A is  $c$  square units, what is the area, in square units, of rectangle B in terms of  $c$ ?

- A)  $c + 5$
- B)  $c + 25$
- C)  $5c$
- D)  $25c$

15

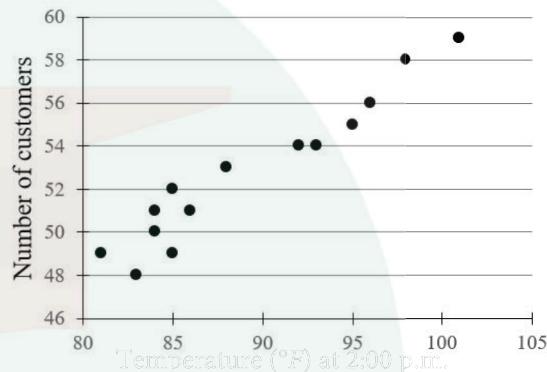
One source recommends that an active person should consume one gram of protein per day for every 2 to 3 pounds of body weight. Based on this source, which of the following inequalities gives the possible values of the number of grams of protein,  $p$ , that an active person weighing 190 pounds should consume per day?

- A)  $60 \leq p \leq 90$
- B)  $360 \leq p \leq 540$
- C)  $p \leq 60$  or  $p \geq 90$
- D)  $p \leq 360$  or  $p \geq 540$

16

For two weeks, an ice cream store collected data on the number of customers who visited the store each day and the temperature, in degrees Fahrenheit ( $^{\circ}\text{F}$ ), at 2:00 p.m. on that day. The data are shown in the scatterplot.

Number of Customers by Temperature



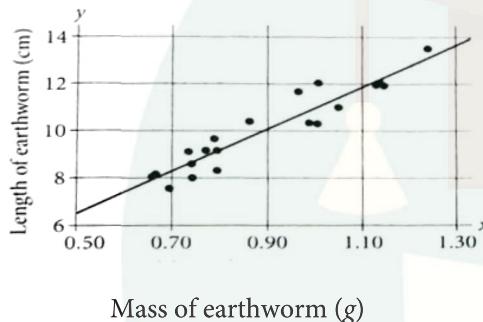
Which of the following is closest to the slope of a line of best fit for the data?

- A) 0.20
- B) 0.50
- C) 1.30
- D) 1.70



**Questions 17 and 18 refer to the following information.**

A gardener randomly selected a sample of 20 earthworms from a compost bin that contained 1.6 cubic meters of compost and measured the mass, in grams ( $g$ ), and the length, in centimeters ( $cm$ ), for each earthworm. The scatterplot shows the lengths and masses for the sample of earthworms as well as a line of best fit. The equation of the line of best fit is  $y = 2.1 + 8.9x$ .



17

Which of the following is the best interpretation of the slope of the line of best fit, 8.9, in this context?

- A) The length of an earthworm is predicted to increase 8.9 cm for every 1g increase in its mass.
- B) The mass of an earthworm is predicted to increase by 8.9g for every 1cm increase in its length.
- C) The length of an earthworm is predicted to decrease 8.9 cm for every 1g increase in its mass.
- D) The mass of an earthworm is predicted to decrease by 8.9g for every 1cm increase in its length.

18

Which of the following statements best describes the difference between the actual length of the earthworm from the sample that has a mass of 0.86g and the length predicted by the line of best fit?

- A) The actual length of the earthworm is approximately 0.6cm longer than the length predicted by the line of best fit.
- B) The actual length of the earthworm is approximately 0.6cm shorter than the length predicted by the line of best fit.
- C) The actual length of the earthworm is approximately 6cm longer than the length predicted by the line of best fit.
- D) The actual length of the earthworm is approximately 6cm shorter than the length predicted by the line of best fit.

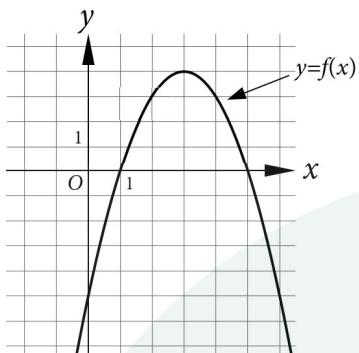
19

An alloy is made by melting and combining two or more metals. A metalsmith has two alloys, each containing different amounts of silver, that will be melted and combined to form another alloy. Every 10 grams of alloy A contains 2 grams of silver, and every 10 grams of alloy B contains 7 grams of silver. To obtain 100 grams of an alloy that contains 50 grams of silver, how many grams of alloy A should be combined with alloy B?

- A) 35
- B) 40
- C) 60
- D) 65



20

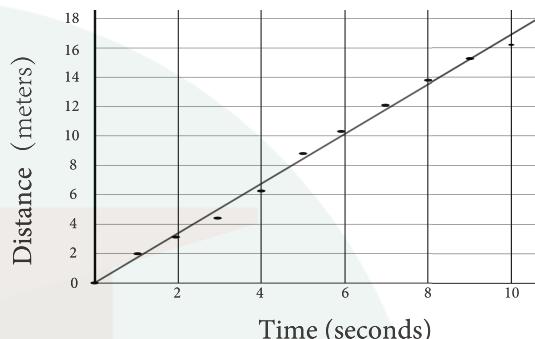


The figure above shows the graph of the quadratic function  $f$  in the  $xy$ -plane. The function  $g$  is defined by the equation  $g(x) = -x^2 + 5$ . The maximum value of  $g(x)$  is how many units greater than the maximum value of  $f(x)$ ?

- A) 1
- B) 3
- C) 4
- D) 5

21

In a physics class experiment, Juanita rolled a marble on a track and measured the distance it traveled at various points in time. The scatterplot shows Juanita's measurements and a line of best fit for the data.



Which of the following is an equation of the line of best fit shown for the data, where  $d$  is the distance, in meters, the marble traveled  $t$  seconds after the experiment began?

- A)  $d = -1.71 - 0.04t$
- B)  $d = -0.04 + 1.71t$
- C)  $d = 0.04 - 1.71t$
- D)  $d = 1.71 + 0.04t$

22

Occupied	Seat location			
	Window	Middle	Aisle	Total
Yes	48	26	52	126
No	6	18	2	26
Total	54	44	54	152

The table summarizes the seat location and whether the seat is occupied by a passenger on a certain flight. If a seat is selected at random, what is the probability it is a middle seat that is occupied?

- A)  $\frac{26}{44}$
- B)  $\frac{26}{126}$
- C)  $\frac{44}{126}$
- D)  $\frac{26}{152}$

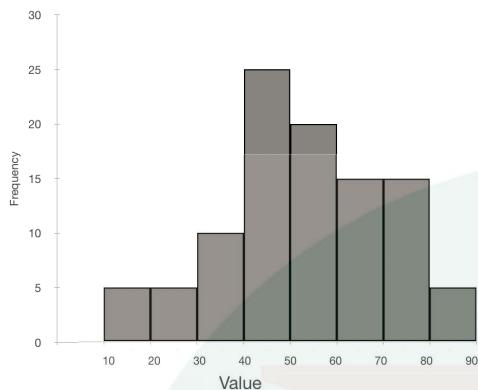
23

The Trans-Siberian Railway is the second longest railway in the world, with a total length of 5,772 miles. The length of the longest railway in the world, the China-Europe Block Train, is 1.4 times the length of the Trans-Siberian Railway. The length of the China-Europe Block Train railway is what percent greater than the length of the Trans-Siberian Railway?

- A) 4%
- B) 14%
- C) 40%
- D) 140%



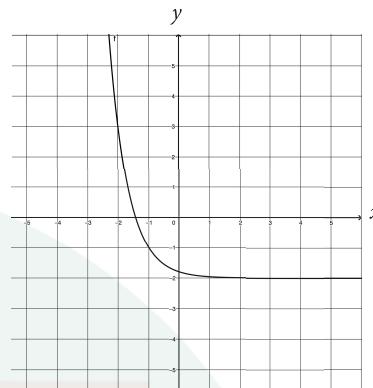
24



The data set summarized by the histogram above contains 100 values. The first bar includes values of more than 10 and at most 20, the second bar include values of more than 20 and at most 30, and so on. Which range of values contains the median value of the data set?

- A) More than 30 and at most 40
- B) More than 40 and at most 50
- C) More than 50 and at most 60
- D) More than 60 and at most 70

25



The function  $f$  is graphed in the  $xy$ - plane shown, where  $y = f(x)$ . Which of the following represents the graph of the function  $f$  translated 2 units to the right?

- A)  $y = \left(\frac{1}{5}\right)^x$
- B)  $y = \left(\frac{1}{5}\right)^{x-2}$
- C)  $y = \left(\frac{1}{5}\right)^{x-1}$
- D)  $y = \left(\frac{1}{5}\right)^{x-1} - 2$



26

$$6x - 7y = -24$$

$$2x + 5y = 14$$

The ordered pair  $(x, y)$  is a solution to the system of equations above. What is the value of  $\frac{y}{x}$ ?

- A) -6
- B)  $-\frac{7}{2}$
- C)  $-\frac{1}{2}$
- D) 3

27

A line in the  $xy$ -plane contains the points  $(a, 8)$  and  $(-a, 2)$ , where  $a$  is a positive constant. If this line is defined by the equation  $y = mx + b$ , where  $m$  and  $b$  are constants, what is the value of  $b$ ?

- A) 6
- B) 5
- C) 3
- D) -6

28

Which of the following is equivalent to

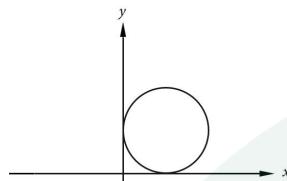
$$\frac{1}{x^2+x} - \frac{1}{x+1}, \text{ where } x > 0?$$

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

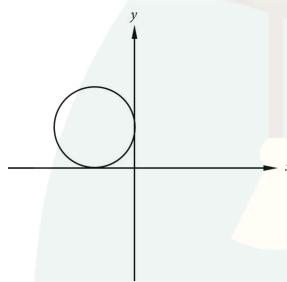
29

In the equation  $(x - a)^2 + (y + a)^2 = 1$ ,  $a$  is a positive constant. Which of the following could be the graph of the equation in the  $xy$ -plane?

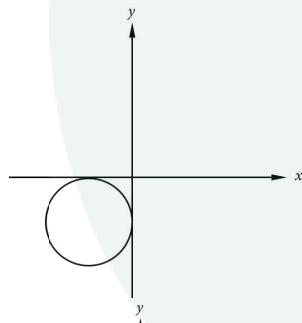
A)



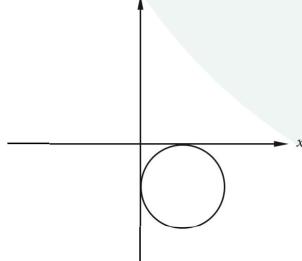
B)



C)



D)



30

If  $f$  is an exponential function and the value of  $f(x)$  doubles each time  $x$  is increased by 5, which of the following could define  $f$ ?

A)  $f(x) = 2^{x+5}$

B)  $f(x) = 2^{x+5}$

C)  $f(x) = 2^{\frac{x}{5}}$

D)  $f(x) = 2^{5x}$

**DIRECTIONS**

In questions 1/ q16\* solve the problem and enter your answer in the grid, as described below, on the answer sheet.

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

Write answer in boxes.

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

Grid in result.

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

Fraction line

Answer: 2.5

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

Decimal point

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

2	/	3
●	/	●
0	0	0
1	1	1
2	●	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8

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

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

Answer: 201 – either position is correct

2	0	1
●	/	/
0	0	0
1	1	1
2	●	2
3	3	3

2	0	1
●	/	/
0	0	0
1	1	1
2	●	2
3	3	3

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



31

A researcher interviewed 60 participants. After the interview, each participant was asked to recall the color of the researcher's shirt, and 50% correctly recalled the color. How many participants correctly recalled the shirt color?

32

How many meters are equivalent to a length of 0.51 kilometers? (1000 meters = 1 kilometer)

33

$$\begin{aligned}2x + 4y &= 8 \\cx + 20y &= 40\end{aligned}$$

In the given system of equations,  $c$  is a constant. If the system has infinitely many solutions, what is the value of  $c$ ?

34

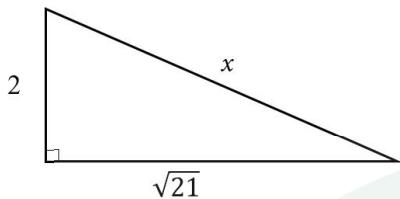
The table shows the daily high temperatures, in degrees Fahrenheit, for the same week in Salt Lake City, Utah, and Nashville, Tennessee.

Salt Lake City, UT	93	91	94	93	84	88	80
Nashville, TN	86	83	82	88	95	98	91

Based on these data, if the median daily high temperature in Salt Lake City is  $x$  degrees Fahrenheit and the median daily high temperature in Nashville is  $y$  degrees Fahrenheit, what is the value of  $x - y$ ?



35



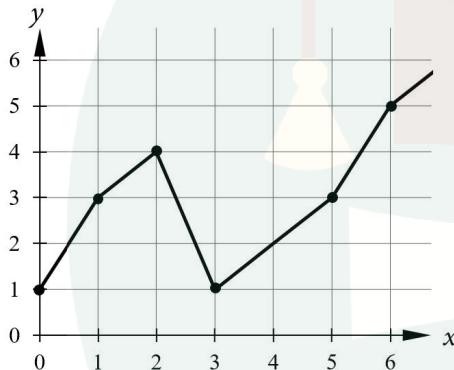
What is the value of  $x$  in the right triangle shown?

37

$$x^2 + bx + c = 0$$

In the equation above,  $b$  and  $c$  are constants,  $-b + \sqrt{b^2 - 4c} = 8$ , and  $-b - \sqrt{b^2 - 4c} = 2$ . If  $x$  is a solution of the equation, what is one possible value of  $x$ ?

36



The graph in the  $xy$ -plane shown consists of five segments. According to the graph, if the value of  $y$  is twice the value of  $x$ , what is the value of  $x$ ?

38

Twice the length of a rectangle is equal to three times its width. If the area of the rectangle is 216 square millimeters, what is its length, in millimeters?



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# STOP

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