

# Texas Success Initiative

## Sample Questions

# Mathematics

The Texas Success Initiative (TSI) Mathematics and Statistics test contains questions that measure proficiency in four content areas. The four content areas are as follows:

**Elementary Algebra and Functions** — Topics covered in this category include:

- Linear equations, inequalities and systems
- Algebraic expressions and equations
- Word problems and applications

**Intermediate Algebra and Functions** — Topics covered in this category include:

- Quadratic and other polynomial expressions, equations and functions
- Expressions, equations and functions involving powers, roots and radicals
- Rational and exponential expressions, equations and functions

**Geometry and Measurement** — Topics covered in this category include:

- Plane geometry
- Transformations and symmetry
- Linear, area and three-dimensional measurements

**Data Analysis, Statistics and Probability** — Topics covered in this category include:

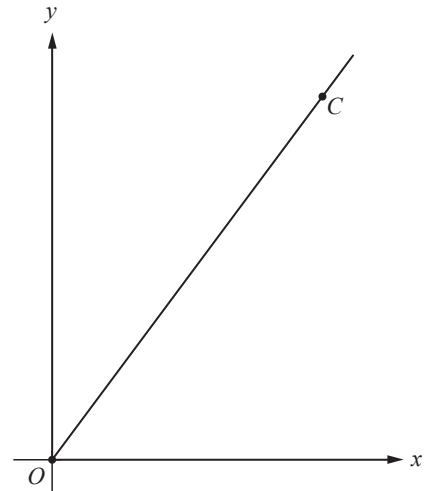
- Interpreting categorical and quantitative data
- Statistical measures
- Probabilistic reasoning

## Mathematics Sample Questions

### Directions for questions 1–15

For each of the questions below, choose the best answer from the four choices given. You may use the paper you received as scratch paper.

1. If  $3t - 7 = 5t$ , then  $6t =$ 
  - A. 21
  - B.  $-7$
  - C.  $-21$
  - D.  $-42$
2. The variables  $x$  and  $y$  are directly proportional, and  $y = 2$  when  $x = 3$ . What is the value of  $y$  when  $x = 9$ ?
  - A. 4
  - B. 6
  - C. 8
  - D. 12



3. In the  $xy$ -plane above, point  $C$  has coordinates  $(6, 9)$ . Which of the following is an equation of the line that contains points  $O$  and  $C$ ?
  - A.  $y = x - 3$
  - B.  $y = x + 3$
  - C.  $y = \frac{2}{3}x$
  - D.  $y = \frac{3}{2}x$

4. There are  $3x - 2$  trees planted in each row of a rectangular parcel of land. If there are a total of  $24x - 16$  trees planted in the parcel, how many rows of trees are there in the parcel?
- A.  $21x - 18$   
 B.  $21x - 14$   
 C.  $8x$   
 D. 8
5. A group of 18 people ordered soup and sandwiches for lunch. Each person in the group had either one soup or one sandwich. The sandwiches cost \$7.75 each and the soups cost \$4.50 each. If the total cost of all 18 lunches was \$113.50, how many sandwiches were ordered?
- A. 7  
 B. 8  
 C. 9  
 D. 10
6. Which of the following equations has both 1 and  $-3$  as solutions?
- A.  $x^2 - 2x - 3 = 0$   
 B.  $x^2 + 2x - 3 = 0$   
 C.  $x^2 - 4x + 3 = 0$   
 D.  $x^2 + 4x + 3 = 0$
7. In the  $xy$ -plane, what is the  $y$ -intercept of the graph of the equation  $y = 2(x + 3)(x - 4)$ ?
- A.  $-24$   
 B.  $-12$   
 C.  $-2$   
 D. 12
8.  $x^4 - 1 =$
- A.  $(x + 1)(x - 1)(x^2 + 1)$   
 B.  $(x + 1)^2(x - 1)^2$   
 C.  $(x + 1)^3(x - 1)^1$   
 D.  $(x - 1)^4$
9.  $(3x^2y^3)^3 =$
- A.  $3x^5y^6$   
 B.  $9x^6y^9$   
 C.  $27x^5y^6$   
 D.  $27x^6y^9$
10. If  $\sqrt{5 - x} = 4$ , then  $x =$
- A.  $-21$   
 B.  $-11$   
 C. 1  
 D. 11
11. If  $\frac{x - 1}{x} = 20$ , then  $x =$
- A.  $-21$   
 B.  $-19$   
 C.  $-\frac{1}{19}$   
 D.  $\frac{1}{21}$
12. A ball was kicked into the air from a balcony 20 feet above the ground, and the ball's height above the ground, in feet,  $t$  seconds after the ball was kicked was  $h(t) = 20 - 16t^2 + 32t$ . What was the maximum height, in feet, of the ball above the ground after it was kicked?
- A. 32  
 B. 34  
 C. 36  
 D. 40
13. The yard behind the Cindy's house is rectangular in shape and has a perimeter of 72 feet. If the length  $\ell$  of the yard is 18 feet longer than the width  $w$  of the yard, what is the area of the yard, in square feet?
- A. 36  
 B. 144  
 C. 243  
 D. 486

City	High Temperature
<i>A</i>	$t^{\circ}\text{F}$
<i>B</i>	$87^{\circ}\text{F}$
<i>C</i>	$81^{\circ}\text{F}$
<i>D</i>	$62^{\circ}\text{F}$
<i>E</i>	$93^{\circ}\text{F}$

14. The table above shows the high temperature last Thursday for five cities, *A* through *E*. If the median of the Thursday high temperatures for these cities was  $81^{\circ}\text{F}$ , which of the following could NOT have been the high temperature last Thursday for City *A* ?

- A.  $85^{\circ}\text{F}$
- B.  $75^{\circ}\text{F}$
- C.  $65^{\circ}\text{F}$
- D.  $55^{\circ}\text{F}$

15. There are 20 children in the cast of a class play, and 8 of the children are boys. Of the boys, 4 have a speaking part in the play, and of the girls, 8 do not have a speaking part in the play. If a child from the cast of the play is chosen at random, what is the probability that the child has a speaking part?

- A.  $\frac{2}{5}$
- B.  $\frac{1}{2}$
- C.  $\frac{3}{5}$
- D.  $\frac{3}{4}$

## Reading

The Texas Success Initiative (TSI) Reading test contains questions that measure proficiency in four content areas. The four content areas are as follows:

**Literary Analysis** — Topics covered in this category include:

- Identifying and analyzing ideas in and elements of literary texts

**Main Idea and Supporting Details** — Topics covered in this category include:

- Identifying the main idea of a passage
- Comprehending explicit textual information in a passage

**Inferences in a Text or Texts** — Topics covered in this category include:

- Synthesizing ideas by making a connection or comparison between two passages
- Making an appropriate inference about single passages

**Author’s Use of Language** — Topics covered in this category include:

- Identifying an author’s purpose, tone and organization or rhetorical strategies and use of evidence
- Determining the meaning of words in context

## Reading Sample Questions

### Directions for questions 1–9

Read the passage and then choose the best answer to the question. Answer the question on the basis of what is stated or implied in the passage.

1. When we think of volcanoes, eruptions, lava, and smoke-filled air come to mind—all occurring on land. Most people are surprised to learn about the prevalence of underwater volcanoes on our planet. Because the lava and smoke spilling out of an active, underwater volcano is contained by the ocean, people generally do not take note of these eruptions. However, the largest underwater volcanoes are capable of creating huge tidal waves, threatening coastal communities.

The main idea of the passage is that

- A. traditional volcanoes and underwater volcanoes are similar
  - B. the lava and smoke from an underwater volcano is contained by the sea
  - C. most tidal waves are caused by underwater volcanoes
  - D. underwater volcanoes receive little attention but can be dangerous
2. In 2010, talk show host Oprah Winfrey and novelist Jonathan Franzen kissed and made up after a nine-year feud. In 2001, Franzen was disinvited from appearing on Winfrey’s TV show to pitch his novel *The Corrections* after he made it clear that he was unhappy about the book’s being chosen for the Oprah Book Club. Describing his work as “in the high-art literary tradition,” Franzen said he didn’t want to be associated with the Club, which he accused of occasionally choosing “schmaltzy, one-dimensional” novels. But Winfrey is apparently able to forgive and forget: she chose Franzen’s next novel, *Freedom*, for her book club and said of it, “Now you haven’t heard me say this word often, but this book is a masterpiece.”

The passage implies that Franzen’s criticism of the Oprah Book Club was motivated primarily by

- A. pride
- B. anger
- C. insensitivity
- D. ignorance

3. The main authors of The Declaration of Independence and the Constitution are usually thought of as America’s “Founding Fathers.” Other, less known personages also deserve the title, however, and Noah Webster was one of these. Through his writings, which include the still-influential dictionary that bears his name, Webster sought to legitimize an “American English” that was independent of British spelling and pronunciation. For instance, Webster removed the “u” from “colour,” creating the distinct American version of the word.

What is the main purpose of this passage?

- A. To praise the Founding Fathers
  - B. To present information about an important American
  - C. To define and explain “American English”
  - D. To distinguish American dictionaries from British dictionaries
4. If you are committed to healthy, green living and want to reduce your environmental footprint, you might consider expanding your daily diet to include bugs. Supporters of the edible insect initiative rightfully argue that farming insects has a much lower environmental impact than does raising livestock since bugs are easier to harvest and require a fraction of the water and land space that cattle need. Indeed, the high-protein, low-fat health benefits of bug-eating have long been known. For hundreds of years, crickets, silkworms and even tarantulas have been served roasted, stewed and fried at the dinner tables of many cultures.

Which words best describe the author’s attitude toward the “edible insect initiative”?

- A. awe and amazement
  - B. interest and support
  - C. disgust and distaste
  - D. fear and apprehension
5. Long thought to be a case of mistaken identity, the discovery of the Bornean rainbow toad by European explorers in 1924 was recently verified by scientists. The explorers had made a black-and-white sketch of an unusual toad they had found in the jungles of Southeast Asia, christening it the Bornean rainbow toad. Skeptical but curious, scientists recently went to look for the toad—and ended up finding three specimens.

The passage implies which of the following about the Bornean rainbow toad?

- A. Some people doubted the existence of the toad.
- B. Scientists were confident that they would find the toad.
- C. The surviving toads have been relocated to Europe.
- D. No human being had seen the toad since 1924.

6. Television has been the primary source of information and entertainment for most Americans over the last 50 years. However, with Internet use on the rise year after year, some may wonder if surfing the net will soon surpass watching television as Americans’ primary leisure activity. Indeed, some recent surveys show that time spent on the Internet is now greater than time spent in front of the television. However, this statistic may not tell the whole story, as 59% of Americans say they multitask, using the Internet and watching TV simultaneously.

The main idea of the passage is that television

- A. is only one of many information sources
  - B. may have become less popular than the Internet
  - C. is watched by more people now than ever before
  - D. focuses more on entertainment than on news
7. Plywood, while not the most pleasing wood to look at, has become an incredibly important building material in house construction. It is flexible, inexpensive, and strong. Its strength is due to layers of thin wood glued on top of each other with the grain of each layer making a right angle with the grain of the layer below it. This way of layering the sheets of wood makes plywood difficult to break.

According to the passage, the arrangement of the layers of thin wood explains plywood’s

- A. strength
  - B. cost
  - C. attractiveness
  - D. flexibility
8. The 1922 German Expressionist film *Nosferatu*, directed by F. W. Murnau, is considered one of the most influential films in cinematic history—while also being a classic vampire movie. The film is closely based on Bram Stoker’s 1897 novel, *Dracula*; however, the villain in the film is called “Count Orlok” rather than “Count Dracula.” The reason is that the small studio that produced the film, Prana Film, was unable to secure the rights to Stoker’s novel. In fact, shortly after finishing *Nosferatu*, its one and only film, Prana went bankrupt in order to dodge copyright lawsuits from Stoker’s widow.

Why does the author say that the vampire in *Nosferatu* is named “Count Orlok” and not “Count Dracula”?

- A. To show that the makers of *Nosferatu* made minor changes to Stoker’s novel
- B. To suggest that the characters in *Nosferatu* were based on real people instead of literary characters
- C. To criticize *Nosferatu* for its differences from its source
- D. To praise the makers of *Nosferatu* for their imagination in recreating Stoker’s novel

9. Guillermo Gonzalez Camarena became a successful inventor at an early age. By the age of seven, he had constructed a variety of electronically-propelled toys to play with; he later designed and built his own amateur radio and a functioning telescope. In 1940, when he was only 23, Camarena obtained the world's first patent for color television. Camarena's early color television transmission system was the first one to be approved by the U.S. Federal Communications Commission. Other color-television technologies came after Camarena's patented invention, but his system is still used by a number of scientists today.

In sentence 2, the word "functioning" most nearly means

- A. performing
- B. running
- C. working
- D. moving

### Directions for questions 10–11

Read the 2 passages below and then choose the best answer to each question. Answer the questions on the basis of what is stated or implied in the passages.

#### Passage 1

I recently met a fifth-grade teacher who had asked her students what they did after school. Most said they stayed inside and watched TV or spent time on the computer. Some went to a recreation center for an afterschool program—where they played computer games. A handful of students played outside, but most of those were doing organized sports. It turned out that fewer than 10% of the children were enjoying unstructured time outside rather than concentrating on electronic devices. This is a tragedy! Now more than ever, kids need opportunities to learn and develop through outdoor activities—and not just on organized teams. Parents, limit computer use and encourage your kids to get outside and play every day!

#### Passage 2

There is almost no reliable data about the level of technological literacy among children in the United States. Our students perform relatively poorly on international tests in science and math, however, and many other Western countries teach more about technology than we do. It seems that American students are not as technologically literate as their international counterparts. This could put them at a disadvantage when it comes to their careers, because technology is everywhere, from medical facilities to farms. Obviously, it is imperative that teachers and parents make

the use of technology, including computers, a more central part of children's lives.

10. The author of Passage 2 probably would respond to the last sentence of Passage 1 ("Parents . . . every day!") by
- A. asserting that parents should help children find a balance of indoor and outdoor activities
  - B. claiming that young children often know more about computers than their parents do
  - C. pointing out that many children would rather use technology than play outside
  - D. arguing that children should be spending more time using computers
11. The author of Passage 1 would most likely criticize the author of Passage 2 for
- A. overemphasizing the strength of the data about students' technological literacy
  - B. overlooking the drawbacks of increasing the time children spend using technology
  - C. dismissing as unimportant the development that occurs during outdoor activities
  - D. exaggerating the proportion of careers that require knowledge of science and math

### Directions for questions 12–15

Read the passage below and then choose the best answer to each question. Answer the questions on the basis of what is stated or implied in the passage.

*The narrator of this passage from a short story describes the cabin where her father worked.*

I wasn't sure what this work involved, but it must have been exciting because the Lab itself was exciting. Anywhere we didn't go often was exciting.

We would get there in a heavy wooden rowboat, built in the five-house village half a mile away—our mother would row, she was quite good at it—or by following a twisty, winding footpath, over fallen trees and stumps and around boulders and across wet patches where a few slippery planks were laid across the sphagnum moss, breathing in the mildew smell of damp wood and slowly decaying leaves. It was too far for us to walk, our legs were too short, so mostly we went in the rowboat.

The Lab was made of logs; it seemed enormous, though in the two photographs of it that survive it looks like a shack. It did however have a screened porch, with log railings. Inside it there were things we weren't allowed to touch—bottles containing a dangerous liquid in which white grubs floated, their six tiny front legs clasped together like praying fingers, and corks that smelled like poison and were poison, and trays with dried insects pinned to them with long, thin pins,

each with a tiny, alluring black knob for a head. All of this was so forbidden it made us dizzy.

At the Lab we could hide in the ice house, a dim and mysterious place that was always bigger on the inside than it was on the outside, and where there was a hush, and a lot of sawdust to keep the blocks of ice cool. Sometimes there would be a tin of evaporated milk with holes punched in the top and wax paper stuck over them; sometimes there would be a carefully hoarded stub of butter or an end of bacon; sometimes there would be a fish or two, pickerel or lake trout, already filleted, laid out on a chipped enamel pie plate.

What did we do in there? There was nothing to actually do. We'd pretend we had vanished—that nobody knew where we were. This in itself was strangely energizing. Then we'd come out, away from the silence, back into the pine-needle scent and the sound of waves pocking against the shore, and our mother's voice calling us, because it was time to get back into the rowboat and row home.\*

12. In line 1, “this work” clearly refers to
- A. writing
  - B. food science
  - C. photography
  - D. insect research
13. Details in the passage suggest that the narrator is
- A. an adult remembering a recent incident
  - B. an elderly person remembering middle age
  - C. an adult recalling a location from childhood
  - D. a child describing a frightening place
14. The descriptions of the Lab and of the ice house are similar in that both descriptions
- A. emphasize cheerful and light-filled surroundings
  - B. contain images of hiding and concealment
  - C. highlight the narrator's misconception of size
  - D. contrast with descriptions of the narrator's home
15. When the narrator repeatedly uses the pronouns “we” and “us,” she is most likely speaking of herself and
- A. a sibling
  - B. her mother
  - C. her father
  - D. the reader

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\* Margaret Atwood, excerpt from “The Boys at the Lab” from *Moral Disorder: Stories*. Copyright © 2006 by O. W. Toad, Ltd. Used by permission of Nan A. Talese/Doubleday, a division of Random House, Inc. Any third party use of this material, outside of this publication, is prohibited. Interested parties must apply directly to Random House, Inc. for permission.



## Writing

The Texas Success Initiative (TSI) Writing test contains questions that measure proficiency in four content areas. The four content areas are as follows:

**Essay Revision** — Topics covered in this category include:

- Coherence, organization and word choice.
- Rhetorical effectiveness and use of evidence

**Agreement** — Topics covered in this category include:

- Subject-verb agreement
- Pronoun agreement
- Verb tense

**Sentence Structure** — Topics covered in this category include:

- Comma splices and run-on sentences
- Improper punctuation
- Fragments and parallelism
- Subordination and coordination

**Sentence Logic** — Topics covered in this category include:

- Correct placement of modifying phrase and clauses
- The use of logical transitions

## Writing Sample Questions

### Directions for questions 1–5

Read the following early draft of an essay and then choose the best answer to the question or the best completion of the statement.

(1) Seaweed-based fuel could one day power your car. (2) It is more than just an ingredient in a purifying face mask or a sushi roll. (3) According to new research, seaweed has the potential to become an advanced biofuel known as biobutanol.

(4) In the past, U.S. scientists have looked to the possibility of algae-based biofuels, but most of these explorations have shied away from kelp and seaweed. (5) One reason why seaweed may not have taken off as a potential fuel source is the fact that it's not a major part of American culture. (6) In contrast, in Asian countries such as Japan, there has been a long history of seaweed in the cuisine. (7) Japanese researchers are much more familiar with it and have spent decades studying its potential uses.

(8) A second reason for the U.S. avoidance of seaweed-based biofuel is the country's lack of experience with seaweed farming. (9) The U.S. is no stranger to seaweed harvesting. (10) However, for the biobutanol project to be environmentally sustainable, seaweed cannot be harvested; it must be farmed. (11) "One of the challenges of harvesting a natural seaweed bed is you can only [use] a certain percent of the bed if you don't want to have a negative environmental impact," Nikesh Parekh, CEO of Bio Architecture Lab, said.

(12) Farming enough seaweed to support mass production of a biofuel would be very expensive initially, but it could pay off handsomely. (13) They say that the seaweed-based fuel would work better in automobiles than ethanol and be easier to transport.

1. In context, which of the following is the best way to revise and combine sentences 1 and 2 (reproduced below)?

*Seaweed-based fuel could one day power your car. It is more than just an ingredient in a purifying face mask or a sushi roll.*

- A. Seaweed-based fuel could one day power your car, it is more than just an ingredient in a purifying face mask or a sushi roll.
- B. Seaweed-based fuel could one day power your car because it is more than just an ingredient in a purifying face mask or a sushi roll.
- C. Seaweed is more than just an ingredient in a purifying face mask or a sushi roll; seaweed-based fuel could one day power your car.
- D. Fuel from seaweed could one day power your car so it is more than just an ingredient in a purifying face mask or sushi roll.

2. In context, where would the following sentence best be placed?

*There are a number of possible reasons for this.*

- A. After sentence 2
  - B. After sentence 4
  - C. After sentence 6
  - D. After sentence 9
3. In context, which of the following is best to insert at the beginning of sentence 7 (reproduced below)?
- Japanese researchers are much more familiar with it and have spent decades studying its potential uses.*
- A. As a result,
  - B. Ironically,
  - C. However,
  - D. In addition,
4. In context, which of the following sentences would best be inserted between sentences 9 and 10?
- A. New research shows that seaweed may also possess the power to repair tissue damage in heart attack patients.
  - B. Planting a large-scale seaweed farm will likely meet with stiff opposition.
  - C. Maine Seaweed Co., for instance, harvests the seaweed naturally available along the U.S. coast.
  - D. Some say that seaweed-based fuel may one day be competitive with petroleum.
5. In context, which is the best revision to sentence 13 (reproduced below)?
- They say that the seaweed-based fuel would work better in automobiles than ethanol and be easier to transport.*
- A. Replace “They say” with “Advocates contend”.
  - B. Replace “would work” with “would be”.
  - C. Delete “and be easier to transport”.
  - D. Insert “their” before “automobiles”.

### Directions for questions 6–10

Select the best version of the underlined part of the sentence. If you think the original sentence is best, choose the first answer.

6. It is important to learn how to swim, even if one is afraid; the skill will invariably prove useful later in your life.
- A. one is
  - B. you are
  - C. everyone is
  - D. they are
7. In the Roman Empire, the first fish to be brought indoors was the sea barbel, it was kept under guest beds in small tanks made of marble.
- A. sea barbel, it
  - B. sea barbel, which
  - C. sea barbel, but
  - D. sea barbel and
8. The idea that lightning never strikes the same place twice is one of the oldest and most well-known weather-related myths; in fact, lightning strikes the Empire State Building in New York City about 100 times per year.
- A. in fact
  - B. therefore
  - C. moreover
  - D. in contrast
9. Horror films that keep viewers in a state of endless fright and which draw record-breaking crowds.
- A. that keep viewers in a state of endless fright and which draw
  - B. keep viewers in a state of endless fright and drawing
  - C. that keep viewers in a state of endless fright draw
  - D. that keep viewers in a state of endless fright and they draw
10. According to explorers, a "Lost Falls" resembling New York's Niagara Falls have been found in Tsangpo River Gorge in the Himalaya Mountains.
- A. have been found
  - B. has been found
  - C. having been found
  - D. being found

### Directions for questions 11–15

Think about how you would rewrite the following sentence according to the directions given, and then choose the best answer. Keep in mind that your revision should not change the meaning of the original sentence.

11. In some places, virtually all the topsoil has washed away, leaving the subsoils to sustain the crops.

Rewrite, beginning with

In some places, the subsoils must sustain the crops ...

The next word will be

- A. although
  - B. because
  - C. until
  - D. before
12. Hawaii, which consists of eight major islands and many smaller ones, and which used to be known as the Sandwich Islands, was admitted to the Union as the fiftieth state in 1959.

Rewrite, beginning with

Formerly known as the Sandwich Islands, and consisting of eight major and many smaller islands, ...

The next words will be

- A. Hawaii was
  - B. in 1959
  - C. the Union
  - D. Hawaii, which
13. Facing a 50% cut in funding for the library, the director was forced to lay off two librarians and sharply reduce hours of operation.

Rewrite, beginning with

Funding for the library was cut by 50%, ...

The next words will be

- A. the director was forced
- B. forcing the director
- C. this forced the director
- D. two librarians were

14. Carmen created a new piñata by constructing a papier-mâché figure and decorating it with brilliantly colored tissue paper.

Rewrite, beginning with

To create a new piñata, ...

The next words will be

- A. Carmen constructed a papier-mâché figure
  - B. Carmen, constructing a papier-mâché figure
  - C. a papier-mâché figure that Carmen had to construct
  - D. that Carmen would construct a papier-mâché figure for
15. If Antarctica's icebergs could be floated north before melting, many arid areas would experience relief from drought.

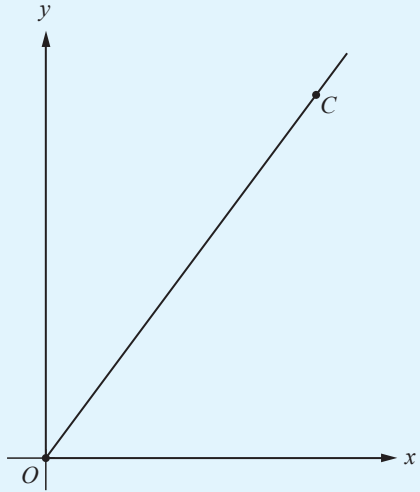
Rewrite, beginning with

If they could be floated north before melting, ...

The next words will be

- A. relief would be brought
- B. many arid areas would experience
- C. Antarctica's icebergs would bring
- D. drought relief would be experienced

# Answer Key

Mathematics and Statistics		
Question Number	Correct Answer	Rationale
1	C	Choice (C) is correct. If $3t - 7 = 5t$ , then $5t - 3t = -7$ , and $2t = -7$ . Therefore, $6t = (3)(2t) = (3)(-7) = -21$ .
2	B	Choice (B) is correct. Since the variables $x$ and $y$ are directly proportional, they are related by an equation $y = kx$ , where $k$ is a constant. It is given that $y = 2$ when $x = 3$ , and so $2 = k(3)$ , which gives $k = \frac{2}{3}$ . Therefore, $y = \frac{2}{3}x$ , and so when $x = 9$ , the value of $y$ is $y = \frac{2}{3}(9) = 6$ .
3	D	 <p>Choice (D) is correct. The coordinates of point <math>O</math> are <math>(0, 0)</math>, and the coordinates of point <math>C</math> are <math>(6, 9)</math>. It follows that the slope of the line that contains these two points is <math>\frac{9-0}{6-0} = \frac{3}{2}</math>.</p> <p>The <math>y</math>-intercept of any line through point <math>O</math> is 0. Therefore, an equation of the line that contains points <math>O</math> and <math>C</math> is <math>y = \frac{3}{2}x</math>.</p>
4	D	Choice (D) is correct. Since there are $3x - 2$ trees planted in each row of the parcel, and a total of $24x - 16$ trees planted in the parcel, it follows that the number of rows in the parcel is $\frac{24x-16}{3x-2}$ , which can be rewritten as $\frac{8(3x-2)}{3x-2} = 8$ .

5	D	<p>Choice (D) is correct. Let <math>n</math> be the number of sandwiches ordered. Then <math>18 - n</math> was the number of soups ordered. Since the sandwiches cost \$7.75 each, the soups cost \$4.50 each and the total cost of all 18 lunches was \$113.50, the equation <math>113.5 = 7.75n + 4.5(18 - n)</math> holds. Multiplying out this equation gives <math>113.5 = 7.75n + 81 - 4.5n</math>, which simplifies to <math>32.5 = 3.25n</math>, or <math>n = \frac{32.5}{3.25} = 10</math>. Therefore, 10 sandwiches were ordered.</p>
6	B	<p>Choice (B) is correct. A quadratic equation that has both 1 and <math>-3</math> as solutions is <math>(x - 1)(x + 3) = 0</math>. Multiplying this equation out gives the equation <math>x^2 + 2x - 3 = 0</math>.</p>
7	A	<p>Choice (A) is correct. The <math>y</math>-intercept of the graph of an equation is the <math>y</math>-coordinate of the point in the <math>xy</math>-plane where the graph intersects the <math>y</math>-axis. Thus the <math>y</math>-intercept can be found by setting <math>x = 0</math> and solving the equation <math>y = 2(x + 3)(x - 4)</math> for <math>y</math>. Therefore, <math>y = 2(0 + 3)(0 - 4) = -24</math> is the <math>y</math>-intercept of the graph of <math>y = 2(x + 3)(x - 4)</math>.</p>
8	A	<p>Choice (A) is correct. The expression <math>x^4 - 1</math> is the difference of the squares <math>x^4 = (x^2)^2</math> and <math>1 = 1^2</math>, and so it can be factored as <math>x^4 - 1 = (x^2 - 1)(x^2 + 1)</math>. The factor <math>x^2 - 1</math> is also a difference of squares, and so <math>x^4 - 1 = (x^2 - 1)(x^2 + 1) = (x + 1)(x - 1)(x^2 + 1)</math>.</p>
9	D	<p>Choice (D) is correct. By definition, <math>(3x^2y^3)^3</math> is equivalent to <math>(3x^2y^3)(3x^2y^3)(3x^2y^3)</math>. By the commutative law of multiplication, this expression is equivalent to <math>(3)(3)(3)(x^2x^2x^2)(y^3y^3y^3)</math>. Since <math>(3)(3)(3) = 27</math>, <math>x^2x^2x^2 = (x \cdot x) \cdot (x \cdot x) \cdot (x \cdot x) = x^6</math> and <math>y^3y^3y^3 = (y \cdot y \cdot y) \cdot (y \cdot y \cdot y) \cdot (y \cdot y \cdot y) = y^9</math>, it follows that <math>(3x^2y^3)^3 = 27x^6y^9</math>.</p>
10	B	<p>Choice (B) is correct. Squaring both sides of the equation <math>\sqrt{5 - x} = 4</math> gives <math>5 - x = 16</math>, and so <math>x = -11</math>. Substituting <math>-11</math> for <math>x</math> in the original equation, one can see that <math>-11</math> is a solution of the equation. Therefore, the value of <math>x</math> is <math>-11</math>.</p>
11	C	<p>Choice (C) is correct. If <math>\frac{x-1}{x} = 20</math>, then <math>x - 1 = 20x</math>. It follows that <math>-1 = 19x</math>, or <math>x = -\frac{1}{19}</math>.</p>
12	C	<p>Choice (C) is correct. The equation <math>h(t) = 20 - 16t^2 + 32t</math> is equivalent to <math>h(t) = 20 - 16t(t - 2)</math>. It follows that <math>h(t) = 20</math> when <math>t = 0</math> and <math>t = 2</math>. Thus the maximum value of this quadratic function occurs when <math>t</math> is halfway between <math>t = 0</math> and <math>t = 2</math>, which is when <math>t = \frac{2-0}{2} = 1</math>. Therefore, the maximum height, in feet, of the ball above the ground after it was kicked was <math>h(1) = 20 - 16(1)^2 + 32(1) = 36</math>.</p>

13	C	Choice (C) is correct. If the length $\ell$ of the yard is 18 feet longer than the width $w$ of the yard, then $w = \ell - 18$ , and so the perimeter $P$ , which is $P = 2(\ell + w)$ , can be rewritten as $2(\ell + \ell - 18) = 2(2\ell - 18)$ . Since the perimeter of the yard is 72 feet, it follows that $2\ell - 18 = 36$ , and so $\ell = 27$ and $w = 27 - 18 = 9$ . Therefore, the area of the yard is $(27)(9) = 243$ square feet.												
14	A	<table border="1" data-bbox="852 369 1149 709"> <thead> <tr> <th>City</th> <th>High Temperature</th> </tr> </thead> <tbody> <tr> <td><math>A</math></td> <td><math>t^\circ\text{F}</math></td> </tr> <tr> <td><math>B</math></td> <td><math>87^\circ\text{F}</math></td> </tr> <tr> <td><math>C</math></td> <td><math>81^\circ\text{F}</math></td> </tr> <tr> <td><math>D</math></td> <td><math>62^\circ\text{F}</math></td> </tr> <tr> <td><math>E</math></td> <td><math>93^\circ\text{F}</math></td> </tr> </tbody> </table> <p>Choice (A) is correct. If the median of the Thursday high temperatures for the five cities was <math>81^\circ\text{F}</math>, then when the five high temperatures are listed in order from greatest to least (or least to greatest), <math>81^\circ\text{F}</math> must be the third temperature in the list. Since the three greatest known high temperatures are <math>93^\circ\text{F}</math>, <math>87^\circ\text{F}</math> and <math>81^\circ\text{F}</math>, the unknown high temperature for City <math>A</math> must be less than or equal to <math>81^\circ\text{F}</math>. Of the given choices, only <math>85^\circ\text{F}</math> is NOT less than or equal to <math>81^\circ\text{F}</math>, and therefore only <math>85^\circ\text{F}</math> could NOT have been the high temperature last Thursday for City <math>A</math>.</p>	City	High Temperature	$A$	$t^\circ\text{F}$	$B$	$87^\circ\text{F}$	$C$	$81^\circ\text{F}$	$D$	$62^\circ\text{F}$	$E$	$93^\circ\text{F}$
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15	A	Choice (A) is correct. Of the 20 children, 8 are boys and so $20 - 8 = 12$ are girls. Of the boys, 4 have a speaking part in the play, and of the girls, 8 do <u>not</u> have a speaking part in the play, so $12 - 8 = 4$ girls do have a speaking part. Therefore, $4 + 4 = 8$ of the children have a speaking part. It follows that if a child from the cast of the play is chosen at random, the probability that the child has a speaking part is $\frac{8}{20} = \frac{2}{5}$ .												

Reading		
Question Number	Correct Answer	Rationale
1	D	Choice (D) is correct. The main idea of the passage is that underwater volcanoes receive little attention but can be dangerous. The author explains that while “people generally do not take note” of underwater eruptions because “the lava and smoke . . . is contained by the ocean,” such eruptions are dangerous because they are “capable of creating huge tidal waves, threatening coastal communities.” Choice (A) is incorrect because the passage highlights differences, not similarities, between traditional and underwater volcanoes. Choice (B) is incorrect because although the passage notes that the lava and smoke from underwater volcanoes is contained by the sea, that fact is not the main idea; it supports the larger point about what people notice. Choice (C) is incorrect because the passage does not indicate that <i>most</i> tidal waves are caused by underwater eruptions.

2	A	Choice (A) is correct. The author of the passage states that Franzen refers to his own work as belonging to a “high-art literary tradition” and to Oprah’s book club choices as being “schmaltzy,” or overly sentimental, and “one-dimensional.” These details suggest that Franzen felt that his own book is of higher quality than other books chosen for the book club. In other words, Franzen’s criticism of the Oprah Book Club was motivated by his pride, or his sense of self-importance. Choices (B) and (C) are incorrect because there is no indication in the passage that Franzen felt any anger or was trying to be insensitive. Choice (D) is incorrect because there is no indication that Franzen’s comments about Oprah’s choices were ignorant or uninformed.
3	B	Choice (B) is correct. The author discusses Noah Webster and the idea that he deserves the title of Founding Father. The author clearly considers Webster important, citing his “still-influential dictionary” and his attempt to “legitimize an ‘American English.’” Choice (A) is incorrect because although the author mentions that the Founding Fathers authored certain documents, he or she offers no specific praise of the Founding Fathers. Choices (C) and (D) are incorrect; although the author mentions Webster’s attempt “to legitimize an ‘American English’” and to create an American English dictionary, neither of these points is the main focus of the passage.
4	B	Choice (B) is correct. The author of the passage is interested in and supportive of the edible insect initiative. He or she addresses the reader directly, urging, “you might consider expanding your daily diet to include bugs.” The author also shows support for the edible insect movement by stating that advocates of the movement “rightfully” argue that “farming insects has a much lower environmental impact than does raising livestock.” Choice (A) is incorrect because although the author expresses support for the edible insect initiative, he or she does not speak with awe and amazement, or great wonder. Choices (C) and (D) are incorrect because the author is positive about the movement, showing interest and support rather than fear or disgust.
5	A	Choice (A) is correct. The author suggests that some people doubted the existence of the Bornean rainbow toad: they “thought [it] to be a case of mistaken identity” and were “skeptical.” In other words, some people thought the “European explorers” were documenting another, already known kind of toad, and had not discovered a new toad. This is supported by the fact that the discovery was not “verified” for many years. Choices (B), (C), and (D) are incorrect: the author suggests that scientists did <i>not</i> expect to find the Bornean rainbow toad, there is no indication that the recently-found toads were taken to Europe, and it is unlikely that <i>no</i> human being—including non-scientists—had seen any specimen of the toad since 1924.
6	B	Choice (B) is correct. The main idea of the passage is that television may have become less popular than the Internet. The author points out that “Internet use” is “on the rise,” and that some people wonder if using the Internet will soon become “Americans’ primary leisure activity.” The author points out that surfing the net <i>might</i> already be more popular than watching television, as “recent surveys show that time spent on the Internet is now greater than time spent in front of the television”—though some people use the Internet and watch TV at the same time. Choices (A), (C), and (D) are incorrect: it might be true that television is just one of many information sources, but the author does not address this, and he or she also does not indicate that television is watched by more people now than ever before, or that television programs tend to focus more on entertainment than on news.
7	A	Choice (A) is correct. The passage indicates that the arrangement of the layers of thin wood—“with the grain of each layer making a right angle with the grain of the layer below it”—is what “makes plywood difficult to break.” In other words, the arrangement of the layers explains plywood’s strength. Choices (B), (C), and (D) are incorrect: the author describes plywood as “inexpensive,” “not the most pleasing wood to look at,” and “flexible,” but he or she does not connect any of these facts to the layering of sheets of wood.

8	A	Choice (A) is correct. The author points out that the film <i>Nosferatu</i> is “closely based on”—but not exactly the same as—“Bram Stoker’s 1897 novel, <i>Dracula</i> .” He or she explains that the vampire in <i>Nosferatu</i> is “called ‘Count Orlok’ rather than ‘Count Dracula’” in order to show that the makers of <i>Nosferatu</i> made minor changes to Stoker’s novel as a result of being “unable to secure the rights” to <i>Dracula</i> . Choices (B), (C), and (D) are incorrect because the author does not indicate that the characters in <i>Nosferatu</i> were based on real people, and he or she neither criticizes <i>Nosferatu</i> for its differences from <i>Dracula</i> nor praises the makers of the film for their imagination in recreating Stoker’s novel.
9	C	Choice (C) is correct. The author speaks of Camarena’s successful inventions. In this context, “functioning” means “working”; the author is indicating that Camarena built a telescope that actually worked. He or she is not indicating that the telescope was performing, running, or moving.
10	D	Rationale: Choice (D) is correct. The author of Passage 2 believes that American students should be more technologically literate and suggests that “the use of technology, including computers,” should be “a more central part of children’s lives.” Therefore, he or she almost certainly would say that instead of limiting computer use, parents should encourage children to spend <i>more</i> time using computers. Choices (A), (B), and (C) are incorrect because the author of Passage 2 does not discuss outdoor activities, adults’ computer knowledge, or children’s recreational preferences.
11	B	Choice (B) is correct. The author of Passage 1 finds it very troubling that so many children spend their time on computers and other electronic devices instead of playing outside. The author of Passage 2, on the other hand, thinks technology should be an even bigger part of children’s lives than it already is. It is likely that the author of Passage 1 would criticize the author of Passage 2 for failing to think about the drawbacks of this increased time spent on technology—such as a decreased amount of time to spend “learn[ing] and develop[ing] through outdoor activities.” Choice (A) is incorrect because the author of Passage 2 states that there is very little “reliable data,” and choice (C) is incorrect because he or she does not discuss and dismiss development during outdoor activities. Choice (D) is incorrect because the author of Passage 1 makes no mention of careers, and there is no indication that the author of Passage 2 is exaggerating when speaking of careers.
12	D	Choice (D) is correct. In the first part of the passage, the narrator refers to “this work,” saying that “it must have been exciting because the Lab itself was exciting.” While she isn’t “sure what this work involved,” she describes the Lab very fully: the mysterious journey to get to it, its exterior, then its contents (“bottles containing a dangerous liquid in which white grubs floated . . . trays with dried insects”) and other aspects of her father’s work. The narrator never directly states what “this work” is, but these and other elements of the passage imply that it involves scientific research with such insects as the grubs. Choices (A), (B), and (C) are incorrect because there is no indication in the passage that the narrator’s father is involved in writing, food science, or photography.
13	C	Choice (C) is correct. The narrator uses the past tense throughout the passage, signaling to the reader that the events described occurred in the past. And the passage contains numerous hints that the narrator is describing her childhood self: “our mother would row” and “our legs were too short,” for example. It is reasonable to assume that the narrator is an adult recalling a location (and events) from childhood. Choices (A) and (B) are incorrect because the incidents described are clearly not recent, nor do the events recalled happen to a middle-aged person. And although the place has elements of scariness about it, the person describing it is clearly not a child; therefore, choice (D) is incorrect.



14	C	<p>Choice (C) is correct. When describing the Lab, the narrator states that “it seemed enormous, though in the two photographs of it that survive it looks like a shack.” When describing the ice house, she states that it “was always bigger on the inside than it was on the outside.” Both these descriptions emphasize misconceptions about the size of a place. The first misconception occurs because of a child’s natural perception that a place is larger than it is in reality, and is corrected by an adult viewing of photographs; the second plays on a child’s mistaken perception of the size of a place based on its exterior. Choices (A) and (D) are incorrect because there are no cheerful and light-filled surroundings in the passage, nor is there a description of the narrator’s home. And although the narrator does speak of hiding and concealing herself in the ice house, she does not speak of doing so in the Lab itself; therefore, choice (B) is incorrect.</p>
15	A	<p>Choice (A) is correct. In lines 3-4, when referring to the journey to the Lab, the narrator states, “our mother would row.” At the end of the passage—after she has described repeated adventures at the Lab while accompanied by at least one other person—she recalls hearing “our mother’s voice calling us, because it was time to get back into the rowboat and row home.” It is clear that the narrator’s companion shared a mother and a home with the narrator—in other words, the other person is the narrator’s sibling. Choices (B) and (D) are incorrect because the narrator’s mother is clearly differentiated from the companion in the passage and the reader does not participate in the events described in the passage. Although the narrator is describing the place where her father worked, there is no indication that her father was the other person accompanying her; indeed, it is unlikely that the narrator’s father’s legs would be “too short” for the walk, and he might not hide with a small child inside an ice house. Therefore, choice (C) is incorrect.</p>

## Writing

Question Number	Correct Answer	Rationale
1	C	Choice (C) is correct. The new sentence must be a logical and grammatical combination of the existing sentences, which indicate that “Seaweed-based fuel could one day power your car” and that “It” (presumably, seaweed) “is more than just an ingredient in a purifying face mask or a sushi roll.” Only (C) properly orders the two claims, first expressing that “Seaweed is more than just an ingredient . . .” and then, following a correct use of a semicolon to join two related independent clauses, narrowing the focus to “seaweed-based fuel.” The other choices introduce errors: choice (A) creates a comma splice (two independent clauses joined by only a comma), choice (B) provides an illogical cause-effect statement, and choice (D) contains a vague pronoun (“it”).
2	B	Choice (B) is correct. The new sentence, “There are a number of possible reasons for this,” needs to fit logically and grammatically between two existing sentences. Sentence 4 states that American scientists have “shied away from,” or ignored, kelp and seaweed as possible biofuels. Sentence 5 notes “One reason why seaweed may not have taken off as a fuel source.” Later in the passage, sentence 8 provides “A second reason for the U.S. avoidance of seaweed-based biofuel.” The new sentence fits logically and grammatically between sentences 4 and 5 because it introduces the reasons for “this” (American scientists’ neglect of kelp and seaweed as potential fuel sources)—reasons that are provided in the following sentences. On the contrary, if choices (A), (C), or (D) were chosen as the answer, “this” would refer to other things for which no reasons are given.
3	A	Choice (A) is correct. The inserted word or phrase must properly link sentence 7 with the sentences that come before it in the passage. Sentences 5 and 6 suggest that unlike the U.S., where seaweed has not been considered a potential fuel source because U.S. scientists are not familiar with it, Japan has “a long history of seaweed in the cuisine.” Sentence 7 states that “Japanese researchers are much more familiar with it and have spent decades studying its potential uses.” Only the phrase “As a result” properly links sentence 7 with what has come before: in the context of the passage, Japanese scientists’ familiarity with seaweed is clearly a result of its history as a food in their culture. Choices (B) and (C) suggest a contrast between sentences 6 and 7 that does not exist, and choice (D) suggests that sentence 7 simply adds more information to sentence 6 rather than showing the proper cause-effect relationship.
4	C	Choice (C) is correct. The new sentence needs to fit logically and grammatically between sentence 9 (“The U.S. is no stranger to seaweed harvesting”) and sentence 10 (“However, for the biobutanol project to be environmentally sustainable, seaweed cannot be harvested; it must be farmed”). The only sentence that provides a direct link back to sentence 9 and forward to sentence 10 is choice (C): “Maine Seaweed Co., for instance, harvests the seaweed naturally available along the U.S. coast.” This sentence provides the example of Maine Seaweed, a seaweed-harvesting company, to support the claim in sentence 9 that the U.S. is familiar with seaweed harvesting. And sentence 10 seems to refer back to the work of Maine Seaweed in stating that “However . . . seaweed cannot be harvested; it must be farmed.” Neither choice (A), choice (B), nor choice (D) offers the same explicit, logical link to sentences 9 and 10.

5	A	Choice (A) is correct. It is unclear to whom the pronoun “They” in sentence 13 refers. In fact, there are no plural nouns in the sentences that come before sentence 13 to which “They” could possibly refer. “They” must, therefore, be replaced with a plural noun describing the people who “say that the seaweed-based fuel would work better in automobiles than ethanol and be easier to transport.” These people clearly support the use of seaweed as a biofuel, so it would be appropriate to refer to them as “Advocates.” In addition, they are making an argumentative claim, so it would be more precise to state that they “contend” than that they “say” what follows. None of the other three potential revisions—choices (B), (C), and (D)—solves the problem presented by “They,” and each is unnecessary.
6	B	Choice (B) is correct. It avoids the pronoun agreement errors of the other options by providing the second-person pronoun “you” to be consistent with the second-person pronoun “your” that follows it (“in your life”). The third-person pronouns “one,” “everyone” and “they,” in choices (A), (C) and (D), respectively, are not consistent with the second-person pronoun “your.”
7	B	Choice (B) is correct. It avoids the comma-splice error of the original sentence by replacing the pronoun “it” with the relative pronoun “which,” thus making the second independent clause into a dependent clause. Two independent clauses (“the first fish to be brought indoors was the sea barbel” and “it was kept under guest beds in small tanks made of marble”) cannot be joined by only a comma. Choice (C) is incorrect, because there is no contrast between the idea that “the first fish to be brought indoors was the sea barbel” and the fact that the sea barbel “was kept under guest beds.” Choice (D) results in awkward phrasing: “. . . the first fish to be brought indoors was the sea barbel and was kept under guest beds . . .”
8	A	Choice (A) is correct. It avoids the illogical phrasing of the other options by providing the phrase “in fact,” which is used in this context to introduce evidence validating a previous statement. In this sentence, the information in the second clause (“lightning strikes the Empire State Building . . . about 100 times per year”) offers evidence confirming the truth of the statement made in the first clause (“The idea that lightning never strikes the same place twice” is a “well-known” yet false belief). Options (B), (C) and (D), while grammatically correct, result in illogical phrasing because they do not indicate the relationship specified by the information in the sentence.
9	C	Choice (C) is correct. It avoids the sentence-fragment error of the original sentence by providing the main verb “draw” to agree with the subject “horror films” and to carry out the action of the sentence. In addition, choice (C) appropriately provides the relative clause “that keep viewers in a state of endless fright” to modify the noun phrase that precedes it, “horror films.” None of the other options results in a complete sentence.
10	B	Choice (B) is correct. It avoids the subject-verb agreement error of the original sentence by providing the singular verb phrase “has been found” to carry out the action of the sentence. Choices (C) and (D) result in sentence fragments; they provide participial verb forms (“having been found,” “being found”), not main verbs.
11	B	Choice (B) is correct. The sentence should be rewritten “In some places, the subsoils must sustain the crops because virtually all the topsoil has washed away.” Choice (B) avoids the errors of the other options and appropriately provides the causal link needed to explain why the subsoils must sustain the crops. None of the other options can express the causal relationship between the two ideas (“virtually all the topsoil has washed away” and “the subsoils must sustain the crops”) in the sentence.

12	A	Choice (A) is correct. The sentence should be rewritten “Formerly known as the Sandwich Islands, and consisting of eight major and many smaller islands, <u>Hawaii</u> was admitted to the Union as the fiftieth state in 1959.” Choice (A) avoids the modification errors of choices (B) and (C) by placing the subject, “Hawaii,” directly after the phrases modifying it, “Formerly known as the Sandwich Islands” and “consisting of eight major and many smaller islands.” Choice (D) also avoids the modification errors but results in a sentence fragment; there is no main verb to carry out the action of the sentence, only the relative clause beginning “which.”
13	B	Choice (B) is correct. The sentence should be rewritten “Funding for the library was cut by 50%, <u>forcing the director</u> to lay off two librarians and sharply reduce hours of operation.” Each of the other choices results in a comma splice, with two independent clauses improperly joined by only a comma. Choice (B) avoids the comma-splice error by providing the participial phrase “forcing the director to lay off two librarians . . .” to join the independent clause “Funding for the library was cut by 50%.”
14	A	Choice (A) is correct. The sentence should be rewritten “To create a new piñata, <u>Carmen constructed a papier-mâché figure</u> and decorated it with brilliantly colored tissue paper.” Choice (A) avoids the errors of the other options by providing the past tense verb “constructed” to serve as one of the two main verbs in the sentence. Each of the other options results in a sentence fragment with no main verb to carry out the action of the sentence.
15	C	Choice (C) is correct. The sentence should be rewritten “If they could be floated north before melting, <u>Antarctica’s icebergs would bring</u> many arid areas relief from drought.” Choice (C) avoids the modification and pronoun errors of the other options by providing the appropriate subject, “Antarctica’s icebergs,” immediately after the dependent clause that modifies it, “If they could be floated north before melting.” Choices (A) and (D) do not clearly establish that “they” refers to “Antarctica’s icebergs,” and choice (B) illogically implies that “many arid areas” “could be floated north before melting.”