

REMINDER

To convert from degrees to radians, multiply the number of degrees by $\frac{2\pi}{360}$ degrees. To convert from radians to degrees, multiply the number of radians by $\frac{360^\circ}{2\pi \text{ radians}}$.

standard position. As segment OB , also called the *terminal side* of $\angle AOB$, rotates counterclockwise about the circle, while OA is anchored along the x -axis, the *radian* measure of $\angle AOB$ is defined to be the length s of the arc that $\angle AOB$ intercepts on the unit circle. In other words, the measure of $\angle AOB$ is s radians.

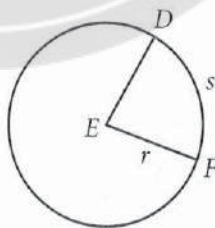
When an acute $\angle AOB$ is in standard position within the unit circle, the x -coordinate of point B is $\cos \angle AOB$, and the y -coordinate of point B is $\sin \angle AOB$. When $\angle AOB$ is greater than 90 degrees (or $\frac{\pi}{2}$ radians), and point B extends beyond the boundaries of the positive x -axis and positive y -axis, the values of $\cos \angle AOB$ and $\sin \angle AOB$ may be negative depending on the coordinates of point B . For any $\angle AOB$, place $\angle AOB$ in standard position within the circle of radius 1 centered at the origin, with side OA along the positive x -axis and terminal side OB intersecting the circle at point B . Then the cosine of $\angle AOB$ is the x -coordinate of B , and the sine of $\angle AOB$ is the y -coordinate of B . The tangent of $\angle AOB$ is the sine of $\angle AOB$ divided by the cosine of $\angle AOB$.

An angle with a full rotation about point O has measure 360° . This angle intercepts the full circumference of the circle, which has length 2π . Thus, $\frac{\text{measure of an angle in radians}}{\text{measure of an angle in degrees}} = \frac{2\pi}{360^\circ}$. It follows that

the measure of an angle in radians is $\frac{2\pi}{360^\circ} \times$ the measure of the angle in degrees and that the measure of an angle in degrees is $\frac{360^\circ}{2\pi} \times$ the measure of the angle in radians.

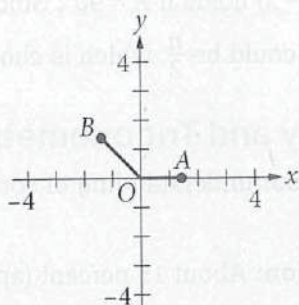
Also note that since a rotation of 2π about point O brings you back to the same point on the unit circle, $\sin(s + 2\pi) = \sin s$, $\cos(s + 2\pi) = \cos s$, and $\tan(s + 2\pi) = \tan s$, for any radian measure s .

Let angle DEF be a central angle in a circle of radius r , as shown in the following figure.



A circle of radius r is similar to a circle of radius 1, with constant of proportionality equal to r . Thus, the length s of the arc intercepted by angle DEF is r times the length of the arc that would be intercepted by an angle of the same measure in a circle of radius 1. Therefore, in the figure above, $s = r \times (\text{radian measure of angle } DEF)$, or radian measure of angle $DEF = \frac{s}{r}$.

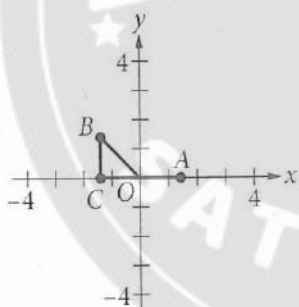
Geometry and Trigonometry Sample Question 10



In the figure shown, the coordinates of point B are $(-\sqrt{2}, \sqrt{2})$. What is the measure, in radians, of angle AOB ?

- A) $\frac{\pi}{4}$
- B) $\frac{\pi}{2}$
- C) $\frac{3\pi}{4}$
- D) $\frac{5\pi}{4}$

Let C be the point $(-\sqrt{2}, 0)$. Then triangle BOC , shown in the figure below, is a right triangle with both legs of length $\sqrt{2}$.

**STRATEGY**

Always be on the lookout for special right triangles. Here, noticing that segment OB is the hypotenuse of a 45° - 45° - 90° triangle makes this question easier to solve.

Hence, triangle BOC is a 45° - 45° - 90° triangle. Thus, angle COB has measure 45° , and angle AOB has measure $180^\circ - 45^\circ = 135^\circ$. Therefore, the measure of angle AOB in radians is $135^\circ \times \frac{2\pi}{360^\circ} = \frac{3\pi}{4}$, which is choice C.

Geometry and Trigonometry Sample Question 11

$$\sin x = \cos (K - x)$$

In the given equation, the angle measures are in radians and K is a constant. Which of the following could be the value of K ?

- A) 0
- B) $\frac{\pi}{4}$
- C) $\frac{\pi}{2}$
- D) π

The complementary angle relationship for sine and cosine implies that the equation $\sin x = \cos (K - x)$ holds if $K = 90^\circ$. Since $90^\circ = \frac{2\pi}{360^\circ} \times 90^\circ$, or $\frac{\pi}{2}$ radians, the value of K could be $\frac{\pi}{2}$, which is choice C.

Summary: Geometry and Trigonometry Questions

Main purpose: To assess your understanding of concepts central to geometry and trigonometry

Proportion of the test section: About 15 percent (approximately five to seven questions)

Question types

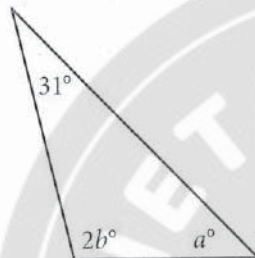
- Area and volume
- Lines, angles, and triangles
- Right triangles and trigonometry
- Circles



CHAPTER 28

Math: Questions— Geometry and Trigonometry Drills

1



In the triangle shown, $a = 45$. What is the value of b ?

- A) 52
- B) 59
- C) 76
- D) 104

2

A cube has a surface area of 54 square meters. What is the volume, in cubic meters, of the cube?

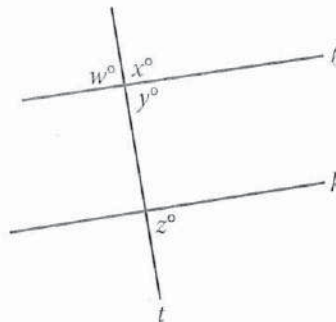
- A) 18
- B) 27
- C) 36
- D) 81

3

In the xy -plane, a circle with radius 5 has center $(-8, 6)$. Which of the following is an equation of the circle?

- A) $(x - 8)^2 + (y + 6)^2 = 25$
- B) $(x + 8)^2 + (y - 6)^2 = 25$
- C) $(x - 8)^2 + (y + 6)^2 = 5$
- D) $(x + 8)^2 + (y - 6)^2 = 5$

4



Note: Figure not drawn to scale.

In the figure shown, line t intersects lines ℓ and k . Which of the following statements, if true, would imply that lines ℓ and k are parallel?

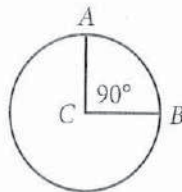
- A) $w = y$
- B) $w = z$
- C) $x = z$
- D) $x + y = 180$

5

In a right triangle, the tangent of one of the two acute angles is $\frac{\sqrt{3}}{3}$. What is the tangent of the other acute angle?

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

6



Point C is the center of the circle shown. What is the measure of angle ACB , in radians?

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

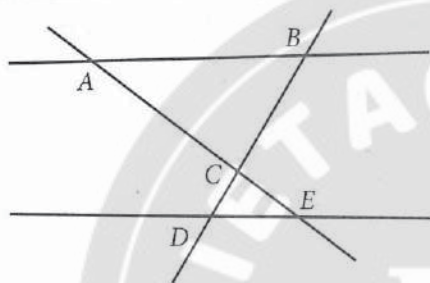
7

The length of one side of square M is 5 times the length of one side of square N. The area of square N is 361 square centimeters. What is the area, in square centimeters, of square M?

8

Triangle KLM is similar to triangle QRS , where angle K corresponds to angle Q and where angles L and R are right angles. If $\sin K = \frac{105}{233}$ and $\sin M = \frac{208}{233}$, what is the value of $\tan S$?

9

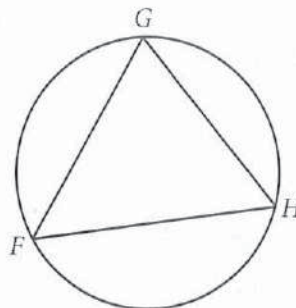


Note: Figure not drawn to scale.

In the figure shown, $\triangle ABC$ is similar to $\triangle EDC$, with $\angle BAC$ corresponding to $\angle CED$ and $\angle ABC$ corresponding to $\angle CDE$. Which of the following must be true?

- A) $\overline{AE} \parallel \overline{BD}$
- B) $\overline{AE} \perp \overline{BD}$
- C) $\overline{AB} \parallel \overline{DE}$
- D) $\overline{AB} \perp \overline{DE}$

10



Note: Figure not drawn to scale.

Triangle FGH is inscribed in the circle shown. If arc FG is congruent to arc GH and the measure of $\angle G$ is 30° , what is the measure of $\angle H$?

- A) 30°
- B) 60°
- C) 75°
- D) 120°

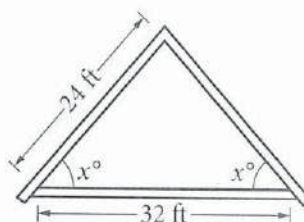
11



Triangle ABC shown is a right triangle, and $\sin B = \frac{5}{13}$. What is the length of side $\overline{BC}$?

12

An architect drew the sketch shown while designing a house roof. The dimensions shown are for the interior of the triangle.



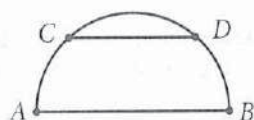
Note: Figure not drawn to scale.

What is the value of $\cos x$?

13

Line ℓ is parallel to line m . Points A and B lie on line ℓ , and points P and Q lie on line m . If $\angle ABP$ and $\angle QAB$ each have measure 21° and $\angle AQB$ has measure 76° , what is the measure, in degrees, of $\angle PAQ$?

14



The semicircle shown has a radius of r inches, and chord $\overline{CD}$ is parallel to the diameter $\overline{AB}$. If the length of $\overline{CD}$ is $\frac{2}{3}$ of the length of $\overline{AB}$, what is the distance between the chord and the diameter in terms of r ?

A) $\frac{1}{3}\pi r$

B) $\frac{2}{3}\pi r$

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

D) $\frac{\sqrt{5}}{3}r$

Answer Explanations

QUESTION 1

Choice A is correct. The sum of the measures of the three interior angles of a triangle is 180° . Therefore, $31 + 2b + a = 180$. Since it's given that $a = 45$, it follows that $31 + 2b + 45 = 180$, or $2b = 104$. Dividing both sides of this equation by 2 yields $b = 52$.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect. This is the value of $a + 31$. **Choice D** is incorrect. This is the value of $2b$.

QUESTION 2

Choice B is correct. The surface area of a cube with side length s is equal to $6s^2$. Since the surface area is given as 54 square meters, the equation $54 = 6s^2$ can be used to solve for s . Dividing both sides of this equation by 6 yields $9 = s^2$. Taking the square root of both sides of this equation yields $3 = s$ and $-3 = s$. Since the side length of a cube must be a positive value, it follows that $s = 3$. The volume of a cube with side length s is equal to s^3 . Therefore, the volume of this cube, in cubic meters, is 3^3 , or 27.

Choices A, C, and D are incorrect and may result from conceptual or calculation errors.

QUESTION 3

Choice B is correct. An equation of a circle in the xy -plane is $(x - h)^2 + (y - k)^2 = r^2$, where the center of the circle is (h, k) and the radius is r . It's given that the center of this circle is $(-8, 6)$ and the radius is 5. Substituting these values into the equation $(x - h)^2 + (y - k)^2 = r^2$ gives $(x - (-8))^2 + (y - 6)^2 = 5^2$, or $(x + 8)^2 + (y - 6)^2 = 25$.

Choice A is incorrect. This is an equation of a circle that has center $(8, -6)$.

Choice C is incorrect. This is an equation of a circle that has center $(8, -6)$ and radius $\sqrt{5}$. **Choice D** is incorrect. This is an equation of a circle that has radius $\sqrt{5}$.

QUESTION 4

Choice B is correct. Two lines are parallel if the alternate exterior angles are congruent. The angles with measures of w° and z° are alternate exterior angles. If $w = z$, then these alternate exterior angles would be congruent, which would imply that the lines ℓ and k are parallel.

Choice A is incorrect. Although it's true that $w = y$, since vertical angles are congruent, this doesn't provide enough information to imply that lines ℓ and k are parallel. **Choice C** is incorrect. The angles with measures x° and z° must be supplementary, instead of congruent, to imply that lines ℓ and k are parallel.

Choice D is incorrect. Although it's true that $x + y = 180$, since the sum of the measures of a linear pair of angles is 180° , this doesn't provide enough information to imply that lines ℓ and k are parallel.

QUESTION 5

Choice D is correct. The tangent of a non-right angle in a right triangle is defined as the ratio of the length of the leg opposite the angle to the length of the leg adjacent to the angle. Using this definition for tangent, in a right triangle with legs that have lengths a and b , the tangent of one acute angle is $\frac{a}{b}$ and the

tangent for the other acute angle is $\frac{b}{a}$. It follows that the tangents of the acute angles in a right triangle are reciprocals of each other. Therefore, the tangent of the other acute angle in the given triangle is the reciprocal of $\frac{\sqrt{3}}{3}$, or $\frac{3}{\sqrt{3}}$.

Choices A, B, and C are incorrect and may result from conceptual or calculation errors.

QUESTION 6

Choice C is correct. It's given that the measure of angle ACB is 90° . Since 180° is equivalent to π radians and angle ACB is the equivalent of $\frac{180^\circ}{2}$, it follows that the measure of angle ACB , in radians, is $\frac{\pi}{2}$.

Choices A, B, and D are incorrect and may result from conceptual or calculation errors.

QUESTION 7

The correct answer is 9,025. It's given that the length of one side of square M is 5 times the length of one side of square N. Let m and n represent the lengths, in centimeters, of each side of square M and square N, respectively. It follows that $m = 5n$ and the areas, in square centimeters, of squares M and N are m^2 and n^2 , respectively. Squaring both sides of the equation $m = 5n$ yields $m^2 = (5n)^2$, which is equivalent to $m^2 = 25n^2$. It's given that the area of square N is 361 square centimeters. Substituting 361 for n^2 in the equation $m^2 = 25n^2$ yields $m^2 = 25(361)$, or $m^2 = 9,025$. Therefore, the area, in square centimeters, of square M is 9,025.

QUESTION 8

The correct answer is 1.981. It's given that triangle KLM is similar to triangle QRS , where angle K corresponds to angle Q and where angles L and R are right angles. Since corresponding angles in similar triangles have equal measures, the sines, cosines, and tangents, respectively, of corresponding angles are equivalent. Therefore, $\tan S = \tan M$. In a right triangle, the sine of an acute angle is the ratio of the length of the leg opposite the angle to the length

of the hypotenuse. It follows that in triangle KLM , $\sin K = \frac{LM}{MK}$ and $\sin M = \frac{KL}{MK}$.

If $\sin K = \frac{105}{233}$ and $\sin M = \frac{208}{233}$, then $\frac{LM}{MK} = \frac{105}{233}$ and $\frac{KL}{MK} = \frac{208}{233}$. It follows from these ratios that for some constant d , $LM = 105d$, $MK = 233d$, and $KL = 208d$.

The tangent of an acute angle in a right triangle is the ratio of the length of the leg opposite the angle to the length of the leg adjacent to the angle. It follows

that in triangle KLM , $\tan M = \frac{KL}{LM}$. Thus, $\tan M = \frac{208d}{105d}$, or $\tan M = \frac{208}{105}$. Since $\tan S = \tan M$, the value of $\tan S$ is $\frac{208}{105}$, or approximately 1.981. Note that 1.981 and 1.98 are examples of ways to enter a correct answer.

QUESTION 9

Choice C is correct. It's given that $\triangle ABC$ is similar to $\triangle EDC$ and that $\angle BAC$ corresponds to $\angle CED$. Since the two triangles are similar, corresponding angles are congruent. Therefore, $\angle BAC$ is congruent to $\angle CED$. The alternate interior angle theorem states that when two parallel lines are cut by a transversal, alternate interior angles are congruent. The converse of this theorem is also true, which implies that $\overline{AB}$ is parallel to $\overline{DE}$.

Choice A is incorrect. The figure shows that $\overline{AE}$ and $\overline{BD}$ intersect; therefore, they can't be parallel. Choice B is incorrect. While $\overline{AE}$ and $\overline{BD}$ appear to form a 90° angle, there isn't sufficient information to prove that $\overline{AE}$ is perpendicular to $\overline{BD}$. Choice D is incorrect. $\overline{AB}$ is parallel, not perpendicular, to $\overline{DE}$.

QUESTION 10

Choice C is correct. The measure of an inscribed angle is equal to half the measure of the arc the angle intercepts. Therefore, the measure of $\angle H$ is equal to half the measure of arc FG and the measure of $\angle F$ is equal to half the measure of arc GH . If arcs FG and GH are congruent, it follows that the measures of angles H and F must be equal. Let the measure of $\angle H$ be x° . Therefore, the measure of $\angle F$ is also x° . Since the sum of the three interior angles of a triangle is 180° , it follows that the sum of the measures of angles F , G , and H is 180° . Therefore, $x + x + 30 = 180$. Adding like terms on the left-hand side and subtracting 30 from both sides of this equation gives $2x = 150$. Dividing both sides of this equation by 2 yields $x = 75$. Therefore, the measure of $\angle H$ is 75° .

Choice A is incorrect. This is the measure of $\angle G$, which isn't congruent to $\angle H$. Choice B is incorrect. This is twice the measure of $\angle G$, not the measure of $\angle H$. Choice D is incorrect and may result from a conceptual or calculation error.

QUESTION 11

The correct answer is 24. The sine of an acute angle in a right triangle is equal to the ratio of the length of the side opposite the angle to the length of the hypotenuse. In the triangle shown, the sine of angle B , or $\sin B$, is equal to the ratio of the length of side AC to the length of side AB . It's given that the length of side AB is 26 and that $\sin(B) = \frac{5}{13}$. Therefore, $\frac{5}{13} = \frac{AC}{26}$. Multiplying both sides of this equation by 26 yields $AC = 10$. Using the Pythagorean theorem, it follows that $AB^2 = AC^2 + BC^2$. Substituting 26 for AB and 10 for AC in this equation gives $26^2 = 10^2 + BC^2$, or $676 = 100 + BC^2$. Subtracting 100 from both sides of $676 = 100 + BC^2$ yields $576 = BC^2$. Taking the square root of both sides of $576 = BC^2$ yields $\pm 24 = BC$ or $24 = BC$. Since the side length of a triangle must be a positive value, the length of side BC is 24.

QUESTION 12

The correct answer is $\frac{2}{3}$. The given sketch of the house roof shows that the two base angles of the triangle are congruent, which means the triangle is isosceles. Constructing a perpendicular line from the vertex of the isosceles triangle to the opposite side will bisect the base of the triangle and create two smaller right triangles. In a right triangle, the cosine of an acute angle is equal to the ratio of the length of the side adjacent to the angle to the length of the hypotenuse. This gives $\cos x = \frac{16}{24}$, which can be rewritten as $\cos x = \frac{2}{3}$. Note that $\frac{2}{3}$, $\frac{16}{24}$, .6666, .6667, 0.666, and 0.667 are examples of ways to enter a correct answer.

QUESTION 13

The correct answer is 62. It's given that line ℓ is parallel to line m , where points A and B lie on line ℓ and points P and Q lie on line m . If a line segment is drawn from point B to point P and a line segment is drawn from point A to point Q , then angles ABP and QAB are formed. It's given that each of these angles has a measure of 21° . Let the intersection of $\overline{BP}$ and $\overline{AQ}$ be point T , which lies between lines ℓ and m . Since the sum of the interior angles of a triangle is 180° , it follows that in triangle ABT , the measure of angle ATB is equal to $180^\circ - 2(21^\circ)$, or 138° . Angles ATB and ATP are adjacent angles that form a straight line segment, $\overline{BP}$. Since a line segment is a straight angle that measures 180° , by the angle addition postulate, it follows that the measure of angle ATP is $180^\circ - 138^\circ$, or 42° . Angles ATP and BTQ are vertical angles and are therefore congruent. Therefore, the measure of angle BTQ is also 42° . Angles ABP and BPQ are alternate interior angles. Since lines ℓ and m are parallel, angles ABP and BPQ are congruent. Therefore, the measure of angle BPQ is also 21° . Similarly, angles QAB and AQP are congruent alternate interior angles. Therefore, angle AQP also measures 21° . It follows that triangle ABT is an isosceles triangle, where $AT = BT$, and triangle PQT is an isosceles triangle, where $PT = QT$. If a line segment is drawn from point A to point P and a line segment is drawn from point B to point Q , then triangles ATP and BTQ are formed. Since $AT = BT$, $PT = QT$, and the measure of angle ATP is equal to the measure of angle BTQ , by the side-angle-side theorem, triangle ATP is congruent to triangle BTQ . In triangles ATP and BTQ , angle ATP corresponds to angle BTQ , angle TPA corresponds to angle TQB , and angle PAT corresponds to angle QBT . It's given that the measure of angle AQB is 76° . Since angle AQB and angle TQB are the same angle, the measure of angle TQB is 76° . Therefore, in triangle BTQ , by the triangle angle sum theorem, it follows that the measure of angle QBT is $180^\circ - 42^\circ - 76^\circ$, or 62° . In congruent triangles, corresponding angles have equal measure. Therefore, the measure of angle PAT is 62° . Since angle PAT and angle PAQ are the same angle, the measure, in degrees, of angle PAQ is 62.

QUESTION 14

Choice D is correct. Let the semicircle have center O . The diameter $\overline{AB}$ has length $2r$. If chord $\overline{CD}$ is $\frac{2}{3}$ of the length of the diameter, then $CD = \frac{2}{3}(2r)$, or $CD = \frac{4}{3}r$. It follows that $\frac{1}{2}CD = \frac{1}{2}\left(\frac{4}{3}r\right)$, or $\frac{1}{2}CD = \frac{2}{3}r$. The distance, x , between $\overline{AB}$ and $\overline{CD}$ can be found by drawing a right triangle connecting center O , the midpoint of chord $\overline{CD}$, and point C . Using the Pythagorean theorem, it follows that $r^2 = x^2 + \left(\frac{2}{3}r\right)^2$, or $r^2 = x^2 + \frac{4}{9}r^2$. Subtracting $\frac{4}{9}r^2$ from both sides of this equation yields $\frac{5}{9}r^2 = x^2$. Finally, taking the square root of both sides of this equation gives $x = \frac{\sqrt{5}}{3}r$ or $x = -\frac{\sqrt{5}}{3}r$. Since the distance between the chord and the diameter must be positive, this distance in terms of r is $\frac{\sqrt{5}}{3}r$.

Choices A, B, and C are incorrect and may result from conceptual or calculation errors.

CHAPTER 29

Math: Student-Produced Response (SPR) Questions

In earlier chapters, we presented numerous examples of Math section questions in the student-produced response, or SPR, format. In this brief chapter, we go over the directions for entering answers to these sorts of questions.

REMINDER

About 25 percent of questions in the Math section are in the student-produced response (SPR) format.

SPRs IN PRACTICE AND ACTUAL TESTS

The following describes how to enter SPR answers into Bluebook, the digital testing app. This guidance applies to taking a practice test digitally in Bluebook or an actual SAT digitally.

If you're using the paper-based practice test forms at the end of this book to prepare, write your answer to a given SPR question next to or under the question in this book. Once you've written your answer, circle it.

SPR Directions

You'll have ready access to the SPR directions while you take the digital SAT, so there's no need to memorize them in every detail prior to test day. However, as we discussed in chapter 5, being familiar with the directions in advance of testing is beneficial to you because it will both save you time—you can devote more time to answering questions—and make it less likely that you'll make a careless mistake when entering your answers.

Figure 1 displays the official directions for how to enter responses to SPR questions.

Figure 1. Math Section: Student-Produced Response (SPR) Entry Directions.

For student-produced response questions, solve each problem and enter your answer as described below.

- If you find **more than one correct answer**, enter only one answer.
- You can enter up to 5 characters for a **positive** answer and up to 6 characters (including the negative sign) for a **negative** answer.
- If your answer is a **fraction** that doesn't fit in the provided space, enter the decimal equivalent.
- If your answer is a **decimal** that doesn't fit in the provided space, enter it by truncating or rounding at the fourth digit.
- If your answer is a **mixed number** (such as $3\frac{1}{2}$), enter it as an improper fraction ($7/2$) or its decimal equivalent (3.5).
- Don't enter **symbols** such as a percent sign, comma, or dollar sign.

Examples

Answer	Acceptable ways to enter answer	Unacceptable: will NOT receive credit
3.5	3.5 3.50 7/2	3 1/2 3 1/2
$\frac{2}{3}$	2/3 .6666 .6667 0.666 0.667	0.66 .66 0.67 .67
$-\frac{1}{3}$	-1/3 -.3333 -0.333	-.33 -0.33

Unacceptable and Acceptable Answers

The directions themselves are clear on what can and can't be entered into an SPR answer field, but let's go over what disqualifies the "unacceptable" answers (as well as a few other examples) to clarify what makes them impermissible and to help you avoid making these (and similar) entry mistakes.

Table 1. Math Section: Examples of Unacceptable and Acceptable SPR Answers.

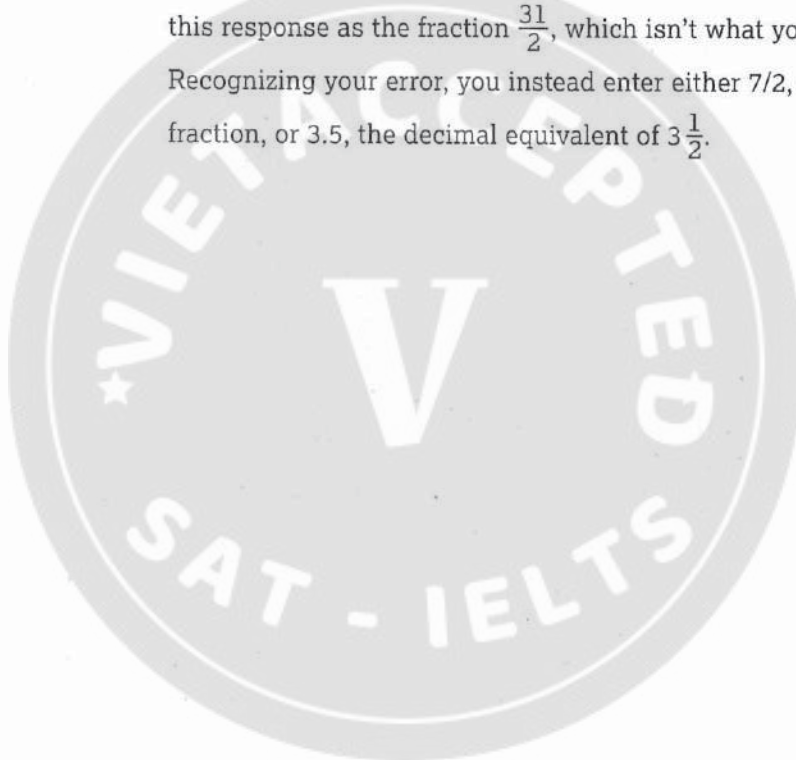
Intended answer	Unacceptable answer(s)	Reason	Acceptable answer(s)
3.5	$31/2$ $3\ 1/2$	Mixed numbers should be entered as improper fractions or as decimal equivalents.	$7/2$ (improper fraction that fits the space) 3.5 (decimal equivalent)
$\frac{2}{3}$	0.66 .66 0.67 .67	Decimals that don't fit the provided space should be truncated or rounded at the fourth digit.	$2/3$ (fraction that fits the space) .6666 (decimal truncated at the fourth digit) .6667 (decimal rounded at the fourth digit) 0.666 (decimal truncated at the fourth digit, includes leading zero) 0.667 (decimal rounded at the fourth digit, includes leading zero)
$-\frac{1}{3}$	-0.33	Decimals that don't fit the provided space should be truncated or rounded at the fourth digit.	$-1/3$ (fraction that fits the space) -.3333 (decimal rounded or truncated at the fourth digit) -0.333 (decimal rounded or truncated at the fourth digit, includes leading zero)
\$2.53	\$2.53	Answers may not include symbols such as a dollar sign.	2.53
68,132	68,132	Answers may not include symbols such as a comma.	68132
45%	45%	Answers may not include symbols such as a percent sign.	0.45

Confirming Your Answers

The Bluebook test application includes a feature called Answer Preview for each SPR question. Answer Preview shows you how the test interprets the response you entered to a given question so that you can confirm that your intended answer is properly reflected. If it's not, you'll have a chance to change it should time permit.

For example, to continue from the cases presented in the preceding table, let's assume that you had intended your answer to a given SPR question to be $3\frac{1}{2}$ and that, contrary to the guidelines above, you decided to enter this as $31/2$, with the goal of representing your answer as a mixed number. Answer Preview would inform you that it interprets this response as the fraction $\frac{31}{2}$, which isn't what you intended.

Recognizing your error, you instead enter either $7/2$, an improper fraction, or 3.5 , the decimal equivalent of $3\frac{1}{2}$.



CHAPTER 30

Calculator Options

The use of a calculator is permitted throughout the Math section (but not the Reading and Writing section) of the digital SAT. You have two options in terms of tools on test day: (1) you may bring your own approved calculator or (2) you may use the Desmos Graphing Calculator built into Bluebook, the digital testing app. The choice you make should be based primarily on which tool you're more comfortable with. We recommend that you try out both options during your practice.

Bringing Your Own Calculator

College Board allows digital SAT test takers to use their own approved calculator on test day. To ensure that you have up-to-date information on which calculators are and aren't permitted, please visit satsuite.collegeboard.org/digital/what-to-bring-do/calculator-policy.

Using the Built-In Desmos Graphing Calculator

The embedded calculator available for test takers in Bluebook is the Desmos Graphing Calculator, a fully digital, accessible graphing calculator used for computational, graphing, statistical, and other mathematical purposes. You may already be familiar with the Desmos calculator from your classes, as it's an application commonly used in education as well as in other fields.

The Testing Calculator

The Desmos Graphing Calculator embedded in Bluebook mimics the experience users see at desmos.com/calculator, except that images, folders, and notes (usually available via the plus mark button—i.e., the “Add Icon” button atop the expression list) are removed in the testing calculator.

Figure 1. Desmos Graphing Calculator—Standard View in Bluebook with Keypad Open.

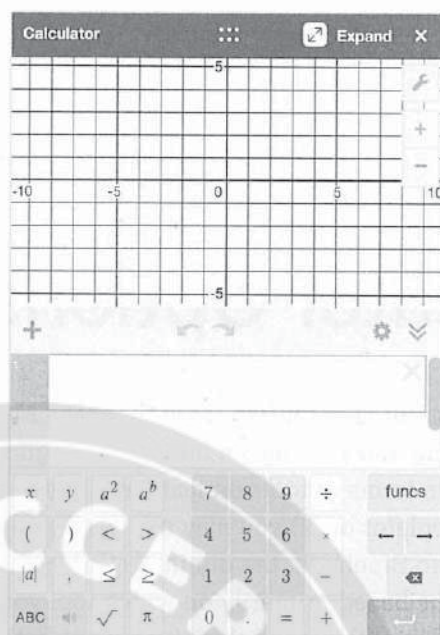
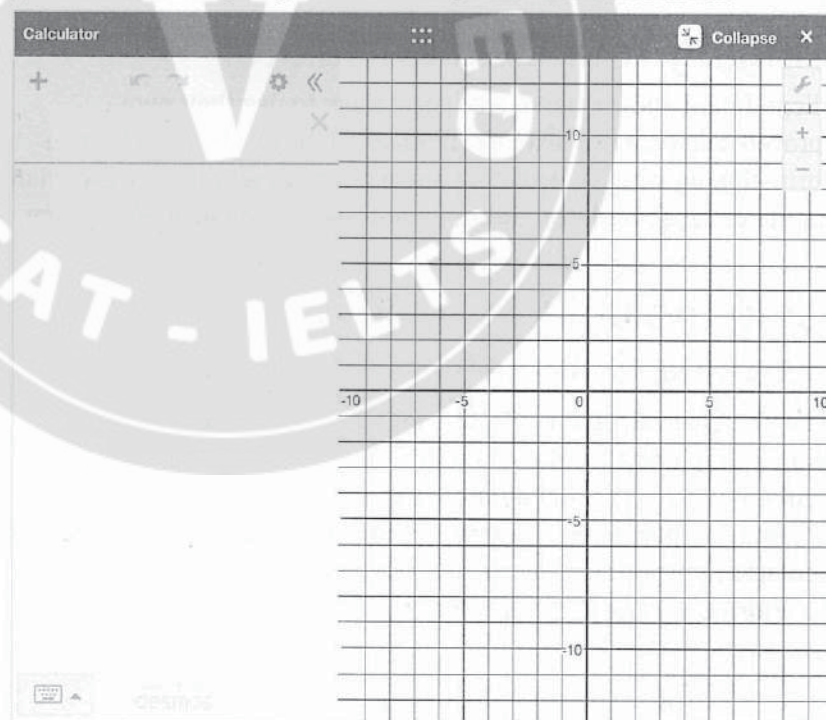


Figure 2. Desmos Graphing Calculator—Expanded View in Bluebook.



A PDF document explaining the slight differences between the online Desmos Graphing Calculator and the one embedded in Bluebook, along with a practice calculator that mimics the exact version available in Bluebook, can be found at desmos.com/testing. The version of the Desmos Graphing Calculator for the digital SAT is also available at desmos.com/practice and on the Desmos Test Mode app available for Chromebooks (Chrome Web Store) and for iPads and iPhones (Apple's App Store).

Notable Features

For students and users new to the Desmos Graphing Calculator, please reference the frequently asked questions (FAQ) document (help.desmos.com/hc/en-us/articles/4406360401677) available at the Desmos Help Center to get started with basic functionality around plotting points, graphing lines and curves, adjusting display settings, and more.

Accessibility Settings

The Desmos Graphing Calculator was designed with all learners in mind. Accessibility features available to digital SAT test takers in the Desmos Graphing Calculator include

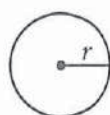
- Text-to-Speech and Audio Trace capabilities:
desmos.com/accessibility#setup
- Enlarge Display, Reverse Contrast, and additional options:
help.desmos.com/hc/en-us/articles/5685797932813
- Braille Mode: desmos.com/braille-examples



CHAPTER 31

Math: Reference Sheet

You'll have access to the following common formulas at any time as you take the digital SAT.



$$A = \pi r^2$$

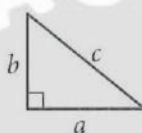
$$C = 2\pi r$$



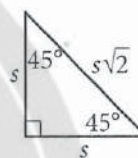
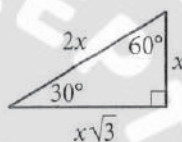
$$A = \ell w$$



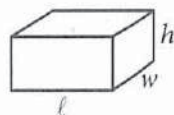
$$A = \frac{1}{2}bh$$



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



Special Right Triangles



$$V = \ell wh$$



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



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



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



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

PART 4

Practice Tests



Introduction to the Practice Tests

Part 4 of this book consists of four official full-length SAT practice tests accompanied by answer explanations and scoring guidelines. These practice tests were assembled using the same processes and standards College Board employs to construct actual SAT tests, so you can prepare for test day confident in the knowledge that your practice will be as authentic as possible.

We strongly recommend that you take at least one full-length practice test, under timed conditions, prior to test day to get a clear sense of how the test is put together and how to pace yourself.

About These Practice Tests

The four practice tests included in this book may be used as part of your preparation for test day. For the best and most realistic practice experience, however, **we strongly recommend that you take these tests digitally in the Bluebook test application** unless you know that you'll be taking the actual test on paper owing to a testing accommodation. Practicing in Bluebook gives you valuable exposure to the app's interface and tools in a low-stakes environment, allows you to experience how adaptive testing works, and yields section and total scores that you don't have to calculate yourself.

If you do use the practice tests printed in this book, please be aware that they aren't adaptive like the corresponding versions in Bluebook. While each test form begins with a medium-difficulty first-stage module, **Practice Tests 1 and 3 include (only) a lower-difficulty second-stage module, whereas Practice Tests 2 and 4 include (only) a higher-difficulty second-stage module.** To simulate (as best as possible on paper) the full test experience, we recommend taking *both* Practice Tests 1 and 2 or Practice Tests 3 and 4 in this guide so that you get a better sense of the full range of question difficulty found on the digital SAT administered in Bluebook. For more information on how adaptive testing in the digital SAT works, see chapter 2.

Important

College Board includes a small number of unscored questions in test forms—including these practice test forms—for research purposes. Your answers to these questions don't affect your score in any way.

In the scoring guides that follow each practice test in this book, the rows in the "SAT Practice Test Worksheet: Answer Key" corresponding to unscored questions are grayed out. You should **not** consider these questions when calculating your raw scores for the Reading and Writing and Math sections. (A reminder of this appears in each scoring guide.)

Note also that the placement of unscored questions within digital SAT test forms isn't fixed. This means that the locations of the unscored questions in the practice tests in this book are only examples and that such questions may appear in different locations in actual digital SAT test forms. You should give your best effort to answering each and every question on the test.



The SAT[®]

Practice Test #1

Make time to take the practice test.
It is one of the best ways to get ready
for the SAT.

After you have taken the practice test, score it right away
using materials provided in *The Official Digital SAT Study Guide*.

This version of the SAT Practice Test is for students using
this guide. As a reminder, most students taking the
digital SAT will do so using Bluebook[™], the digital testing
application. To best prepare for test day, download Bluebook
at bluebook.app.collegeboard.org to take the practice test in
the digital format.



SAT[®]



Test begins on the next page.

Reading and Writing

27 QUESTIONS

DIRECTIONS

The questions in this section address a number of important reading and writing skills. Each question includes one or more passages, which may include a table or graph. Read each passage and question carefully, and then choose the best answer to the question based on the passage(s).

All questions in this section are multiple-choice with four answer choices. Each question has a single best answer.

1

Researchers and conservationists stress that biodiversity loss due to invasive species is _____. For example, people can take simple steps such as washing their footwear after travel to avoid introducing potentially invasive organisms into new environments.

Which choice completes the text with the most logical and precise word or phrase?

- A) preventable
- B) undeniable
- C) common
- D) concerning

2

It is by no means _____ to recognize the influence of Dutch painter Hieronymus Bosch on Ali Banisadr's paintings; indeed, Banisadr himself cites Bosch as an inspiration. However, some scholars have suggested that the ancient Mesopotamian poem *Epic of Gilgamesh* may have had a far greater impact on Banisadr's work.

Which choice completes the text with the most logical and precise word or phrase?

- A) substantial
- B) satisfying
- C) unimportant
- D) appropriate

3

Astronomers are confident that the star Betelgeuse will eventually consume all the helium in its core and explode in a supernova. They are much less confident, however, about when this will happen, since that depends on internal characteristics of Betelgeuse that are largely unknown. Astrophysicist Sarafina El-Badry Nance and colleagues recently investigated whether acoustic waves in the star could be used to determine internal stellar states but concluded that this method could not sufficiently reveal Betelgeuse's internal characteristics to allow its evolutionary state to be firmly fixed.

Which choice best describes the function of the second sentence in the overall structure of the text?

- A) It explains how the work of Nance and colleagues was received by others in the field.
- B) It presents the central finding reported by Nance and colleagues.
- C) It identifies the problem that Nance and colleagues attempted to solve but did not.
- D) It describes a serious limitation of the method used by Nance and colleagues.

4

The mimosa tree evolved in East Asia, where the beetle *Bruchidius terrenus* preys on its seeds. In 1785, mimosa trees were introduced to North America, far from any *B. terrenus*. But evolutionary links between predators and their prey can persist across centuries and continents. Around 2001, *B. terrenus* was introduced in southeastern North America near where botanist Shu-Mei Chang and colleagues had been monitoring mimosa trees. Within a year, 93 percent of the trees had been attacked by the beetles.

Which choice best describes the function of the third sentence in the overall structure of the text?

- A) It states the hypothesis that Chang and colleagues had set out to investigate using mimosa trees and *B. terrenus*.
- B) It presents a generalization that is exemplified by the discussion of the mimosa trees and *B. terrenus*.
- C) It offers an alternative explanation for the findings of Chang and colleagues.
- D) It provides context that clarifies why the species mentioned spread to new locations.

5

Text 1

When companies in the same industry propose merging with one another, they often claim that the merger will benefit consumers by increasing efficiency and therefore lowering prices. Economist Ying Fan investigated this notion in the context of the United States newspaper market. She modeled a hypothetical merger of Minneapolis-area newspapers and found that subscription prices would rise following a merger.

Text 2

Economist Dario Focarelli and Fabio Panetta have argued that research on the effect of mergers on prices has focused excessively on short-term effects, which tend to be adverse for consumers. Using the case of consumer banking in Italy, they show that over the long term (several years, in their study), the efficiency gains realized by merged companies do result in economic benefits for consumers.

Based on the texts, how would Focarelli and Panetta (Text 2) most likely respond to Fan's findings (Text 1)?

- A) They would argue that over the long term the expenses incurred by the merged newspaper company will also increase.
- B) They would recommend that Fan compare the near-term effect of a merger on subscription prices in the Minneapolis area with the effect of a merger in another newspaper market.
- C) They would encourage Fan to investigate whether the projected effect on subscription prices persists over an extended period.
- D) They would claim that mergers have a different effect on consumer prices in the newspaper industry than in most other industries.

6

The following text is from Jane Austen's 1811 novel *Sense and Sensibility*. Elinor lives with her younger sisters and her mother, Mrs. Dashwood.

Elinor, this eldest daughter, whose advice was so effectual, possessed a strength of understanding, and coolness of judgment, which qualified her, though only nineteen, to be the counsellor of her mother, and enabled her frequently to counteract, to the advantage of them all, that eagerness of mind in Mrs. Dashwood which must generally have led to imprudence. She had an excellent heart;—her disposition was affectionate, and her feelings were strong; but she knew how to govern them: it was a knowledge which her mother had yet to learn; and which one of her sisters had resolved never to be taught.

According to the text, what is true about Elinor?

- A) Elinor often argues with her mother but fails to change her mind.
- B) Elinor can be overly sensitive with regard to family matters.
- C) Elinor thinks her mother is a bad role model.
- D) Elinor is remarkably mature for her age.

7

The following text is adapted from Charles W. Chesnutt's 1901 novel *The Marrow of Tradition*.

Mrs. Ochiltree was a woman of strong individuality, whose comments upon her acquaintance[s], present or absent, were marked by a frankness at times no less than startling. This characteristic caused her to be more or less avoided. Mrs. Ochiltree was aware of this sentiment on the part of her acquaintance[s], and rather exulted in it.

Based on the text, what is true about Mrs. Ochiltree's acquaintances?

- A) They try to refrain from discussing topics that would upset Mrs. Ochiltree.
- B) They are unable to spend as much time with Mrs. Ochiltree as she would like.
- C) They are too preoccupied with their own concerns to speak with Mrs. Ochiltree.
- D) They are likely offended by what Mrs. Ochiltree has said about them.

8

The following text is adapted from William Shakespeare's 1609 poem "Sonnet 27." The poem is addressed to a close friend as if he were physically present.

Weary with toil, I [hurry] to my bed,
The dear repose for limbs with travel tired;
But then begins a journey in my head
To work my mind, when body's work's expired:
For then my thoughts—from far where I abide—
[Begin] a zealous pilgrimage to thee,
And keep my drooping eyelids open wide,

What is the main idea of the text?

- A) The speaker is asleep and dreaming about traveling to see the friend.
- B) The speaker is planning an upcoming trip to the friend's house.
- C) The speaker is too fatigued to continue a discussion with the friend.
- D) The speaker is thinking about the friend instead of immediately falling asleep.

9

Black beans (*Phaseolus vulgaris*) are a nutritionally dense food, but they are difficult to digest in part because of their high levels of soluble fiber and compounds like raffinose. They also contain antinutrients like tannins and trypsin inhibitors, which interfere with the body's ability to extract nutrients from foods. In a research article, Marisela Granito and Glenda Álvarez from Simón Bolívar University in Venezuela claim that inducing fermentation of black beans using lactic acid bacteria improves the digestibility of the beans and makes them more nutritious.

Which finding from Granito and Álvarez's research, if true, would most directly support their claim?

- A) When cooked, fermented beans contained significantly more trypsin inhibitors and tannins but significantly less soluble fiber and raffinose than nonfermented beans.
- B) Fermented beans contained significantly less soluble fiber and raffinose than nonfermented beans, and when cooked, the fermented beans also displayed a significant reduction in trypsin inhibitors and tannins.
- C) When the fermented beans were analyzed, they were found to contain two microorganisms, *Lactobacillus casei* and *Lactobacillus plantarum*, that are theorized to increase the amount of nitrogen absorbed by the gut after eating beans.
- D) Both fermented and nonfermented black beans contained significantly fewer trypsin inhibitors and tannins after being cooked at high pressure.

10

Ablation Rates for Three Elements in Cosmic Dust, by Dust Source

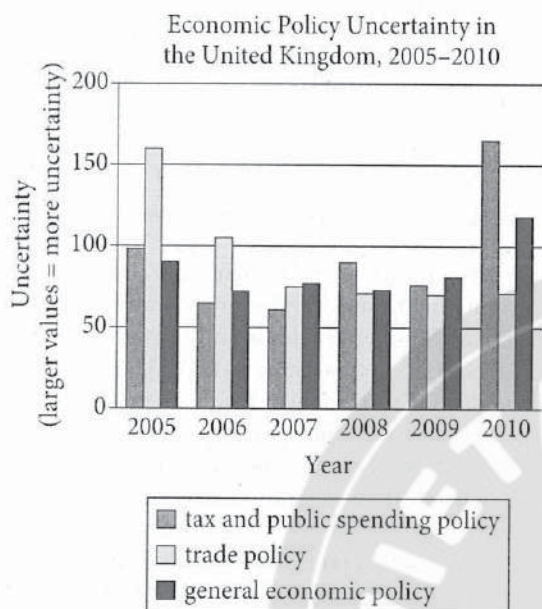
Element	SPC	AST	HTC	OCC
iron	20%	28%	90%	98%
potassium	44%	74%	97%	100%
sodium	45%	75%	99%	100%

Earth's atmosphere is bombarded by cosmic dust originating from several sources: short-period comets (SPCs), particles from the asteroid belt (ASTs), Halley-type comets (HTCs), and Oort cloud comets (OCCs). Some of the dust's material vaporizes in the atmosphere in a process called ablation, and the faster the particles move, the higher the rate of ablation. Astrophysicist Juan Diego Carrillo-Sánchez led a team that calculated average ablation rates for elements in the dust (such as iron and potassium) and showed that material in slower-moving SPC or AST dust has a lower rate than the same material in faster-moving HTC or OCC dust. For example, whereas the average ablation rate for iron from AST dust is 28%, the average rate for _____

Which choice most effectively uses data from the table to complete the example?

- A) iron from SPC dust is 20%.
- B) sodium from OCC dust is 100%.
- C) iron from HTC dust is 90%.
- D) sodium from AST dust is 75%.

11



High levels of public uncertainty about which economic policies a country will adopt can make planning difficult for businesses, but measures of such uncertainty have not tended to be very detailed. Recently, however, economist Sandile Hlatshwayo analyzed trends in news reports to derive measures not only for general economic policy uncertainty but also for uncertainty related to specific areas of economic policy, like tax or trade policy. One revelation of her work is that a general measure may not fully reflect uncertainty about specific areas of policy, as in the case of the United Kingdom, where general economic policy uncertainty _____

Which choice most effectively uses data from the graph to illustrate the claim?

- A) aligned closely with uncertainty about tax and public spending policy in 2005 but differed from uncertainty about tax and public spending policy by a large amount in 2009.
- B) was substantially lower than uncertainty about tax and public spending policy each year from 2005 to 2010.
- C) reached its highest level between 2005 and 2010 in the same year that uncertainty about trade policy and tax and public spending policy reached their lowest levels.
- D) was substantially lower than uncertainty about trade policy in 2005 and substantially higher than uncertainty about trade policy in 2010.

12

Average Number and Duration of Torpor Bouts and Arousal Episodes for Alaska Marmots and Arctic Ground Squirrels, 2008–2011

Feature	Alaska marmots	Arctic ground squirrels
torpor bouts	12	10.5
duration per bout	13.81 days	16.77 days
arousal episodes	11	9.5
duration per episode	21.2 hours	14.2 hours

When hibernating, Alaska marmots and Arctic ground squirrels enter a state called torpor, which minimizes the energy their bodies need to function. Often a hibernating animal will temporarily come out of torpor (called an arousal episode) and its metabolic rate will rise, burning more of the precious energy the animal needs to survive the winter. Alaska marmots hibernate in groups and therefore burn less energy keeping warm during these episodes than they would if they were alone. A researcher hypothesized that because Arctic ground squirrels hibernate alone, they would likely exhibit longer bouts of torpor and shorter arousal episodes than Alaska marmots.

Which choice best describes data from the table that support the researcher's hypothesis?

- A) The Alaska marmots' arousal episodes lasted for days, while the Arctic ground squirrels' arousal episodes lasted less than a day.
- B) The Alaska marmots and the Arctic ground squirrels both maintained torpor for several consecutive days per bout, on average.
- C) The Alaska marmots had shorter torpor bouts and longer arousal episodes than the Arctic ground squirrels did.
- D) The Alaska marmots had more torpor bouts than arousal episodes, but their arousal episodes were much shorter than their torpor bouts.

13

Employment by Sector in France and the United States, 1800–2012
(% of total employment)

Year	Agriculture in France	Manufacturing in France	Services in France	Agriculture in US	Manufacturing in US	Services in US
1800	64	22	14	68	18	13
1900	43	29	28	41	28	31
1950	32	33	35	14	33	53
2012	3	21	76	2	18	80

Rows in table may not add up to 100 due to rounding.

Over the past two hundred years, the percentage of the population employed in the agricultural sector has declined in both France and the United States, while employment in the service sector (which includes jobs in retail, consulting, real estate, etc.) has risen. However, this transition happened at very different rates in the two countries. This can be seen most clearly by comparing the employment by sector in both countries in _____

Which choice most effectively uses data from the table to complete the statement?

- A) 1900 with the employment by sector in 1950.
- B) 1800 with the employment by sector in 2012.
- C) 1900 with the employment by sector in 2012.
- D) 1800 with the employment by sector in 1900.

14

Euphorbia esula (leafy spurge) is a Eurasian plant that has become invasive in North America, where it displaces native vegetation and sickens cattle.

E. esula can be controlled with chemical herbicides, but that approach can also kill harmless plants nearby. Recent research on introducing engineered DNA into plant species to inhibit their reproduction may offer a path toward exclusively targeting *E. esula*, consequently _____

Which choice most logically completes the text?

- A) making individual *E. esula* plants more susceptible to existing chemical herbicides.
- B) enhancing the ecological benefits of *E. esula* in North America.
- C) enabling cattle to consume *E. esula* without becoming sick.
- D) reducing invasive *E. esula* numbers without harming other organisms.

15

Both Sona Charaipotra, an Indian American, and Dhonielle Clayton, an African American, grew up frustrated by the lack of diverse characters in books for young people. In 2011, these two writers joined forces to found CAKE Literary, a book packaging _____ specializes in the creation and promotion of stories told from diverse perspectives for children and young adults.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) company,
- B) company that
- C) company
- D) company, that

16

In 1930, Japanese American artist Chiura Obata depicted the natural beauty of Yosemite National Park in two memorable woodcuts: *Evening at Carl Inn* and *Lake Basin in the High Sierra*. In 2019, _____ exhibited alongside 150 of Obata's other works in a single-artist show at the Smithsonian American Art Museum.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) it was
- B) they were
- C) this was
- D) some were

17

American writer Edwidge Danticat, who emigrated from Haiti in 1981, has won acclaim for her powerful short stories, novels, and _____ her lyrical yet unflinching depictions of her native country's turbulent history, writer Robert Antoni has compared Danticat to Nobel Prize-winning novelist Toni Morrison.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) essays, praising
- B) essays and praising
- C) essays praising
- D) essays. Praising

18

In 1966, Emmett Ashford became the first African American to umpire a Major League Baseball game. His energetic gestures announcing when a player had struck out and his habit of barreling after a hit ball to see if it would land out of _____ transform the traditionally solemn umpire role into a dynamic one.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) bounds helped
- B) bounds, helping
- C) bounds that helped
- D) bounds to help

19

In crafting her fantasy fiction, Nigerian-born British author Helen Oyeyemi has drawn inspiration from the classic nineteenth-century fairy tales of the Brothers Grimm. Her 2014 novel *Boy, Snow, Bird*, for instance, is a complex retelling of the story of Snow White, while her 2019 novel _____ offers a delicious twist on the classic tale of Hansel and Gretel.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) *Gingerbread*—
- B) *Gingerbread*,
- C) *Gingerbread*
- D) *Gingerbread*:

20

The violins handmade in the seventeenth century by Italian craftsman Antonio Stradivari have been celebrated as some of the finest in the world. In close collaboration with musicians, Stradivari introduced changes to the shape of a traditional violin, flattening some of the instrument's curves and making _____ lighter overall.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) those
- B) one
- C) them
- D) it

21

During the English neoclassical period (1660–1789), many writers imitated the epic poetry and satires of ancient Greece and Rome. They were not the first in England to adopt the literary modes of classical _____ some of the most prominent figures of the earlier Renaissance period were also influenced by ancient Greek and Roman literature.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) antiquity, however
- B) antiquity, however,
- C) antiquity, however;
- D) antiquity; however,

22

One poll taken after the first 1960 presidential debate suggested that John Kennedy lost badly: only 21 percent of those who listened on the radio rated him the winner. _____ the debate was ultimately considered a victory for the telegenic young senator, who rated higher than his opponent, Vice President Richard Nixon, among those watching on the new medium of television.

Which choice completes the text with the most logical transition?

- A) In other words,
- B) Therefore,
- C) Likewise,
- D) Nevertheless,

23

In November 1934, Amrita Sher-Gil was living in what must have seemed like the ideal city for a young artist: Paris. She was studying firsthand the color-saturated style of France's modernist masters and beginning to make a name for herself as a painter. _____ Sher-Gil longed to return to her childhood home of India; only there, she believed, could her art truly flourish.

Which choice completes the text with the most logical transition?

- A) Still,
- B) Therefore,
- C) Indeed,
- D) Furthermore,

24

In his 1925 book *The Morphology of Landscape*, US geographer Carl Sauer challenged prevailing views about how natural landscapes influence human cultures. _____ Sauer argued that instead of being shaped entirely by their natural surroundings, cultures play an active role in their own development by virtue of their interactions with the environment.

Which choice completes the text with the most logical transition?

- A) Similarly,
- B) Finally,
- C) Therefore,
- D) Specifically,

25

Although those who migrated to California in 1849 dreamed of finding gold nuggets in streambeds, the state's richest deposits were buried deeply in rock, beyond the reach of individual prospectors.

_____ by 1852, many had given up their fortune-hunting dreams and gone to work for one of the large companies capable of managing California's complex mining operations.

Which choice completes the text with the most logical transition?

- A) Furthermore,
- B) Still,
- C) Consequently,
- D) Next,

26

While researching a topic, a student has taken the following notes:

- In 2013, archaeologists studied cat bone fragments they had found in the ruins of Quanhucun, a Chinese farming village.
- The fragments were estimated to be 5,300 years old.
- A chemical analysis of the fragments revealed that the cats had consumed large amounts of grain.
- The grain consumption is evidence that the Quanhucun cats may have been domesticated.

The student wants to present the Quanhucun study and its conclusions. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) As part of a 2013 study of cat domestication, a chemical analysis was conducted on cat bone fragments found in Quanhucun, China.
- B) A 2013 analysis of cat bone fragments found in Quanhucun, China, suggests that cats there may have been domesticated 5,300 years ago.
- C) In 2013, archaeologists studied what cats in Quanhucun, China, had eaten more than 5,000 years ago.
- D) Cat bone fragments estimated to be 5,300 years old were found in Quanhucun, China, in 2013.

27

While researching a topic, a student has taken the following notes:

- Started in 1925, the Scripps National Spelling Bee is a US-based spelling competition.
- The words used in the competition have diverse linguistic origins.
- In 2008, Sameer Mishra won by correctly spelling the word “guerdon.”
- “Guerdon” derives from the Anglo-French word “guerdun.”
- In 2009, Kavya Shivashankar won by correctly spelling the word “Laodicean.”
- “Laodicean” derives from the ancient Greek word “Laodikeia.”

The student wants to emphasize a difference in the origins of the two words. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) “Guerdon,” the final word of the 2008 Scripps National Spelling Bee, is of Anglo-French origin, while the following year’s final word, “Laodicean,” derives from ancient Greek.
- B) In 2008, Sameer Mishra won the Scripps National Spelling Bee by correctly spelling the word “guerdon”; however, the following year, Kavya Shivashankar won based on spelling the word “Laodicean.”
- C) Kavya Shivashankar won the 2009 Scripps National Spelling Bee by correctly spelling “Laodicean,” which derives from the ancient Greek word “Laodikeia.”
- D) The Scripps National Spelling Bee uses words from diverse linguistic origins, such as “guerdon” and “Laodicean.”

STOP

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

Reading and Writing

27 QUESTIONS

DIRECTIONS

The questions in this section address a number of important reading and writing skills. Each question includes one or more passages, which may include a table or graph. Read each passage and question carefully, and then choose the best answer to the question based on the passage(s).

All questions in this section are multiple-choice with four answer choices. Each question has a single best answer.

1

Due to their often strange images, highly experimental syntax, and opaque subject matter, many of John Ashbery's poems can be quite difficult to _____ and thus are the object of heated debate among scholars.

Which choice completes the text with the most logical and precise word or phrase?

- A) delegate
- B) compose
- C) interpret
- D) renounce

2

Mônica Lopes-Ferreira and others at Brazil's Butantan Institute are studying the freshwater stingray species *Potamotrygon rex* to determine whether biological characteristics such as the rays' age and sex have _____ effect on the toxicity of their venom—that is, to see if differences in these traits are associated with considerable variations in venom potency.

Which choice completes the text with the most logical and precise word or phrase?

- A) a disconcerting
- B) an acceptable
- C) an imperceptible
- D) a substantial

3

Former astronaut Ellen Ochoa says that although she doesn't have a definite idea of when it might happen, she _____ that humans will someday need to be able to live in other environments than those found on Earth. This conjecture informs her interest in future research missions to the moon.

Which choice completes the text with the most logical and precise word or phrase?

- A) demands
- B) speculates
- C) doubts
- D) establishes

4

Following the principles of community-based participatory research, tribal nations and research institutions are equal partners in health studies conducted on reservations. A collaboration between the Crow Tribe and Montana State University _____ this model: tribal citizens worked alongside scientists to design the methodology and continue to assist in data collection.

Which choice completes the text with the most logical and precise word or phrase?

- A) circumvents
- B) eclipses
- C) fabricates
- D) exemplifies

5

Researchers have struggled to pinpoint specific causes for hiccups, which happen when a person's diaphragm contracts _____. However, neuroscientist Kimberley Whitehead has found that these uncontrollable contractions may play an important role in helping infants regulate their breathing.

Which choice completes the text with the most logical and precise word or phrase?

- A) involuntarily
- B) beneficially
- C) strenuously
- D) smoothly

6

The parasitic dodder plant increases its reproductive success by flowering at the same time as the host plant it has latched onto. In 2020, Jianqiang Wu and his colleagues determined that the tiny dodder achieves this _____ with its host by absorbing and utilizing a protein the host produces when it is about to flower.

Which choice completes the text with the most logical and precise word or phrase?

- A) synchronization
- B) hibernation
- C) prediction
- D) moderation

7

Ofelia Zepeda's contributions to the field of linguistics are _____. her many accomplishments include working as a linguistics professor and bilingual poet, authoring the first Tohono O'odham grammar book, and co-founding the American Indian Language Development Institute.

Which choice completes the text with the most logical and precise word or phrase?

- A) pragmatic
- B) controversial
- C) extensive
- D) universal

8

In the Indigenous intercropping system known as the Three Sisters, maize, squash, and beans form an _____ web of relations: maize provides the structure on which the bean vines grow; the squash vines cover the soil, discouraging competition from weeds; and the beans aid their two "sisters" by enriching the soil with essential nitrogen.

Which choice completes the text with the most logical and precise word or phrase?

- A) indecipherable
- B) ornamental
- C) obscure
- D) intricate

9

The following text is adapted from Oscar Wilde's 1891 novel *The Picture of Dorian Gray*. Dorian Gray is taking his first look at a portrait that Hallward has painted of him.

Dorian passed listlessly in front of his picture and turned towards it. When he saw it he drew back, and his cheeks flushed for a moment with pleasure. A look of joy came into his eyes, as if he had recognized himself for the first time. He stood there motionless and in wonder, dimly conscious that Hallward was speaking to him, but not catching the meaning of his words. The sense of his own beauty came on him like a revelation. He had never felt it before.

According to the text, what is true about Dorian?

- A) He wants to know Hallward's opinion of the portrait.
- B) He is delighted by what he sees in the portrait.
- C) He prefers portraits to other types of paintings.
- D) He is uncertain of Hallward's talent as an artist.

10

"Often Rebuked, Yet Always Back Returning" is an 1846 poem by Emily Brontë. The poem conveys the speaker's determination to experience the countryside around her: _____

Which quotation from the poem most effectively illustrates the claim?

- A) "Often rebuked, yet always back returning / To those first feelings that were born with me, / And leaving busy chase of wealth and learning / For idle dreams of things which cannot be."
- B) "I'll walk, but not in old heroic traces, / And not in paths of high morality, / And not among the half-distinguished faces, / The clouded forms of long-past history."
- C) "I'll walk where my own nature would be leading: / It vexes me to choose another guide: / Where the grey flocks in ferny glens are feeding; / Where the wild wind blows on the mountain side."
- D) "To-day, I will seek not the shadowy region; / Its unsustaining vastness waxes drear; / And visions rising, legion after legion, / Bring the unreal world too strangely near."

11

"Mrs. Spring Fragrance" is a 1912 short story by Sui Sin Far. In the story, Mrs. Spring Fragrance, a Chinese immigrant living in Seattle, is traveling in California. In letters to her husband and friend, she demonstrates her concern for what's happening at her home in Seattle while she is away: _____

Which quotation from Mrs. Spring Fragrance's letters most effectively illustrates the claim?

- A) "My honorable cousin is preparing for the Fifth Moon Festival, and wishes me to compound for the occasion some American 'fudge,' for which delectable sweet, made by my clumsy hands, you have sometimes shown a slight prejudice."
- B) "Next week I accompany Ah Oi to the beautiful town of San José. There will we be met by the son of the Illustrious Teacher."
- C) "Forget not to care for the cat, the birds, and the flowers. Do not eat too quickly nor fan too vigorously now that the weather is warming."
- D) "I am enjoying a most agreeable visit, and American friends, as also our own, strive benevolently for the accomplishment of my pleasure."

12

Hedda Gabler is an 1890 play by Henrik Ibsen. As a woman in the Victorian era, Hedda, the play's central character, is unable to freely determine her own future. Instead, she seeks to influence another person's fate, as is evident when she says to another character, _____

Which quotation from a translation of *Hedda Gabler* most effectively illustrates the claim?

- A) "Then what in heaven's name would you have me do with myself?"
- B) "I want for once in my life to have power to mould a human destiny."
- C) "Then I, poor creature, have no sort of power over you?"
- D) "Faithful to your principles, now and for ever! Ah, that is how a man should be!"

13

If some artifacts recovered from excavations of the settlement of Kuulo Kataa, in modern Ghana, date from the thirteenth century CE, that may lend credence to claims that the settlement was founded before or around that time. There is other evidence, however, strongly supporting a fourteenth century CE founding date for Kuulo Kataa. If both the artifact dates and the fourteenth century CE founding date are correct, that would imply that _____

Which choice most logically completes the text?

- A) artifacts from the fourteenth century CE are more commonly recovered than are artifacts from the thirteenth century CE.
- B) the artifacts originated elsewhere and eventually reached Kuulo Kataa through trade or migration.
- C) Kuulo Kataa was founded by people from a different region than had previously been assumed.
- D) excavations at Kuulo Kataa may have inadvertently damaged some artifacts dating to the fourteenth century CE.

14

One theory behind human bipedalism speculates that it originated in a mostly ground-based ancestor that practiced four-legged “knuckle-walking,” like chimpanzees and gorillas do today, and eventually evolved into moving upright on two legs. But recently, researchers observed orangutans, another relative of humans, standing on two legs on tree branches and using their arms for balance while they reached for fruits. These observations may suggest that _____

Which choice most logically completes the text?

- A) bipedalism evolved because it was advantageous to a tree-dwelling ancestor of humans.
- B) bipedalism must have evolved simultaneously with knuckle-walking and tree-climbing.
- C) moving between the ground and the trees would have been difficult without bipedalism.
- D) a knuckle-walking human ancestor could have easily moved bipedally in trees.

15

In a study of the cognitive abilities of white-faced capuchin monkeys (*Cebus imitator*), researchers neglected to control for the physical difficulty of the tasks they used to evaluate the monkeys. The cognitive abilities of monkeys given problems requiring little dexterity, such as sliding a panel to retrieve food, were judged by the same criteria as were those of monkeys given physically demanding problems, such as unscrewing a bottle and inserting a straw. The results of the study, therefore, _____

Which choice most logically completes the text?

- A) could suggest that there are differences in cognitive ability among the monkeys even though such differences may not actually exist.
- B) are useful for identifying tasks that the monkeys lack the cognitive capacity to perform but not for identifying tasks that the monkeys can perform.
- C) should not be taken as indicative of the cognitive abilities of any monkey species other than *C. imitator*.
- D) reveal more about the monkeys’ cognitive abilities when solving artificial problems than when solving problems encountered in the wild.

16

The increased integration of digital technologies throughout the process of book creation in the late 20th and early 21st centuries lowered the costs of book production, but those decreased costs have been most significant in the manufacturing and distribution process, which occurs after the authoring, editing, and design of the book are complete. This suggests that in the late 20th and early 21st centuries, _____

Which choice most logically completes the text?

- A) digital technologies made it easier than it had been previously for authors to write very long works and get them published.
- B) customers generally expected the cost of books to decline relative to the cost of other consumer goods.
- C) publishers increased the variety of their offerings by printing more unique titles but also printed fewer copies of each title.
- D) the costs of writing, editing, and designing a book were less affected by the technologies used than were the costs of manufacturing and distributing a book.

17

Public-awareness campaigns about the need to reduce single-use plastics can be successful, says researcher Kim Borg of Monash University in Australia, when these campaigns give consumers a choice: for example, Japan achieved a 40 percent reduction in plastic-bag use after cashiers were instructed to ask customers whether _____ wanted a bag.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) they
- B) one
- C) you
- D) it

18

A member of the Cherokee Nation, Mary Golda Ross is renowned for her contributions to NASA's Planetary Flight Handbook, which _____ detailed mathematical guidance for missions to Mars and Venus.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) provided
- B) having provided
- C) to provide
- D) providing

19

Typically, underlines, scribbles, and notes left in the margins by a former owner lower a book's _____ when the former owner is a famous poet like Walt Whitman, such markings, known as marginalia, can be a gold mine to literary scholars.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) value, but
- B) value
- C) value,
- D) value but

20

British scientists James Watson and Francis Crick won the Nobel Prize in part for their 1953 paper announcing the double helix structure of DNA, but it is misleading to say that Watson and Crick discovered the double helix. _____ findings were based on a famous X-ray image of DNA fibers, "Photo 51," developed by X-ray crystallographer Rosalind Franklin and her graduate student Raymond Gosling.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) They're
- B) It's
- C) Their
- D) Its

21

In order to prevent nonnative fish species from moving freely between the Mediterranean and Red Seas, marine biologist Bella Galil has proposed that a saline lock system be installed along the Suez Canal in Egypt's Great Bitter Lakes. The lock would increase the salinity of the lakes and _____ a natural barrier of water most marine creatures would be unable to cross.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) creates
- B) create
- C) creating
- D) created

22

Lucía Michel of the University of Chile observed that alkaline soils contain an insoluble form of iron that blueberry plants cannot absorb, thus inhibiting blueberry growth. If these plants were grown in alkaline soil alongside grasses that aid in iron solubilization, _____ Michel was determined to find out.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) could the blueberries thrive.
- B) the blueberries could thrive.
- C) the blueberries could thrive?
- D) could the blueberries thrive?

23

The classic children's board game Chutes and Ladders is a version of an ancient Nepalese game, Paramapada Sopanapata. In both games, players encounter "good" or "bad" spaces while traveling along a path; landing on one of the good spaces _____ a player to skip ahead and arrive closer to the end goal.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) allows
- B) are allowing
- C) have allowed
- D) allow

24

In 1968, US Congressman John Conyers introduced a bill to establish a national holiday in honor of Dr. Martin Luther King Jr. The bill didn't make it to a vote, but Conyers was determined. He teamed up with Shirley Chisholm, the first Black woman to be elected to Congress, and they resubmitted the bill every session for the next fifteen years. _____ in 1983, the bill passed.

Which choice completes the text with the most logical transition?

- A) Instead,
- B) Likewise,
- C) Finally,
- D) Additionally,

25

Most conifers (trees belonging to the phylum Coniferophyta) are evergreen. That is, they keep their green leaves or needles year-round. However, not all conifer species are evergreen. Larch trees, _____ lose their needles every fall.

Which choice completes the text with the most logical transition?

- A) for instance,
- B) nevertheless,
- C) meanwhile,
- D) in addition,

26

Samuel Coleridge-Taylor was a prominent classical music composer from England who toured the US three times in the early 1900s. The child of a West African father and an English mother, Coleridge-Taylor emphasized his mixed-race ancestry. For example, he referred to himself as Anglo-African. _____ he incorporated the sounds of traditional African music into his classical music compositions.

Which choice completes the text with the most logical transition?

- A) In addition,
- B) Actually,
- C) However,
- D) Regardless,

27

While researching a topic, a student has taken the following notes:

- British musicians John Lennon and Paul McCartney shared writing credit for numerous Beatles songs.
- Many Lennon-McCartney songs were actually written by either Lennon or McCartney, not by both.
- The exact authorship of specific parts of many Beatles songs, such as the verse for "In My Life," is disputed.
- Mark Glickman, Jason Brown, and Ryan Song used statistical methods to analyze the musical content of Beatles songs.
- They concluded that there is 18.9% probability that McCartney wrote the verse for "In My Life," stating that the verse is "consistent with Lennon's songwriting style."

The student wants to make a generalization about the kind of study conducted by Glickman, Brown, and Song. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) Based on statistical analysis, Glickman, Brown, and Song claim that John Lennon wrote the verse of "In My Life."
- B) There is only an 18.9% probability that Paul McCartney wrote the verse for "In My Life"; John Lennon is the more likely author.
- C) It is likely that John Lennon, not Paul McCartney, wrote the verse for "In My Life."
- D) Researchers have used statistical methods to address questions of authorship within the field of music.

STOP

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



Test begins on the next page.

Math

22 QUESTIONS

DIRECTIONS

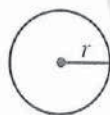
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE



$$A = \pi r^2$$

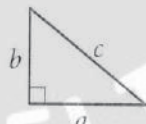
$$C = 2\pi r$$



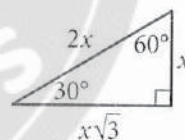
$$A = \ell w$$



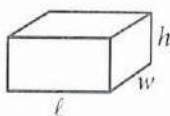
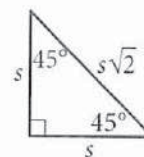
$$A = \frac{1}{2}bh$$



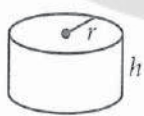
$$c^2 = a^2 + b^2$$



Special Right Triangles



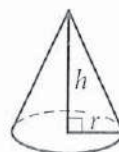
$$V = \ell wh$$



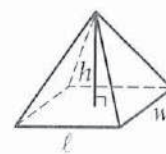
$$V = \pi r^2 h$$



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



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



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

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

The number of radians of arc in a circle is 2π .

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

For multiple-choice questions, solve each problem, choose the correct answer from the choices provided, and then circle your answer in this book. Circle only one answer for each question. If you change your mind, completely erase the circle. You will not get credit for questions with more than one answer circled, or for questions with no answers circled.

For student-produced response questions, solve each problem and write your answer next to or under the question in the test book as described below.

- Once you've written your answer, circle it clearly. You will not receive credit for anything written outside the circle, or for any questions with more than one circled answer.
- If you find **more than one correct answer**, write and circle only one answer.
- Your answer can be up to 5 characters for a **positive** answer and up to 6 characters (including the negative sign) for a **negative** answer, but no more.
- If your answer is a **fraction** that is too long (over 5 characters for positive, 6 characters for negative), write the decimal equivalent.
- If your answer is a **decimal** that is too long (over 5 characters for positive, 6 characters for negative), truncate it or round at the fourth digit.
- If your answer is a **mixed number** (such as $3\frac{1}{2}$), write it as an improper fraction ($\frac{7}{2}$) or its decimal equivalent (3.5).
- Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

1

4, 4, 4, 4, 8, 8, 13, 13

Which frequency table correctly represents the data listed?

A)

Number	Frequency
4	4
8	3
13	2

B)

Number	Frequency
4	4
3	8
2	13

C)

Number	Frequency
4	16
8	24
13	26

D)

Number	Frequency
16	4
24	8
26	13

2

Which expression is equivalent to $x^2 + 3x - 40$?

- A) $(x - 4)(x + 10)$
B) $(x - 5)(x + 8)$
C) $(x - 8)(x + 5)$
D) $(x - 10)(x + 4)$

3

Jay walks at a speed of 3 miles per hour and runs at a speed of 5 miles per hour. He walks for w hours and runs for r hours for a combined total of 14 miles. Which equation represents this situation?

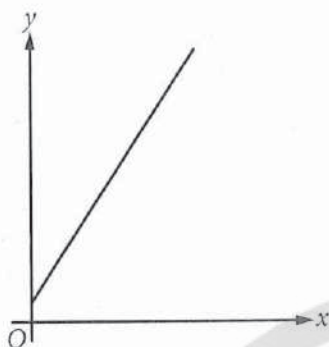
- A) $3w + 5r = 14$
B) $\frac{1}{3}w + \frac{1}{5}r = 14$
C) $\frac{1}{3}w + \frac{1}{5}r = 112$
D) $3w + 5r = 112$

4

In triangle ABC , the measure of angle B is 52° and the measure of angle C is 17° . What is the measure of angle A ?

- A) 21°
B) 35°
C) 69°
D) 111°

5



The graph represents the total charge, in dollars, by an electrician for x hours of work. The electrician charges a onetime fee plus an hourly rate. What is the best interpretation of the slope of the graph?

- A) The electrician's hourly rate
- B) The electrician's onetime fee
- C) The maximum amount that the electrician charges
- D) The total amount that the electrician charges

6

The table summarizes the distribution of color and shape for 100 tiles of equal area.

	Red	Blue	Yellow	Total
Square	10	20	25	55
Pentagon	20	10	15	45
Total	30	30	40	100

If one of these tiles is selected at random, what is the probability of selecting a red tile? (Express your answer as a decimal or fraction, not as a percent.)

7

From a population of 50,000 people, 1,000 were chosen at random and surveyed about a proposed piece of legislation. Based on the survey, it is estimated that 35% of people in the population support the legislation, with an associated margin of error of 3%. Based on these results, which of the following is a plausible value for the total number of people in the population who support the proposed legislation?

- A) 350
- B) 650
- C) 16,750
- D) 31,750

8

$$\frac{55}{x+6} = x$$

What is the positive solution to the given equation?

9

An airplane descends from an altitude of 9,500 feet to 5,000 feet at a constant rate of 400 feet per minute. What type of function best models the relationship between the descending airplane's altitude and time?

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

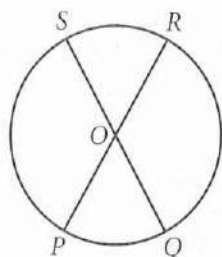
10

$$g(x) = 11\left(\frac{1}{12}\right)^x$$

If the given function g is graphed in the xy -plane, where $y = g(x)$, what is the y -intercept of the graph?

- A) (0, 11)
- B) (0, 132)
- C) (0, 1)
- D) (0, 12)

11



Note: Figure not drawn to scale.

The circle shown has center O , circumference 144π , and diameters PR and QS . The length of arc PS is twice the length of arc PQ . What is the length of arc QR ?

- A) 24π
- B) 48π
- C) 72π
- D) 96π

13

Time (years)	Total amount (dollars)
0	604.00
1	606.42
2	608.84

Rosa opened a savings account at a bank. The table shows the exponential relationship between the time t , in years, since Rosa opened the account and the total amount n , in dollars, in the account. If Rosa made no additional deposits or withdrawals, which of the following equations best represents the relationship between t and n ?

- A) $n = (1 + 604)^t$
- B) $n = (1 + 0.004)^t$
- C) $n = 604(1 + 0.004)^t$
- D) $n = 0.004(1 + 604)^t$

14

At how many points do the graphs of the equations $y = x + 20$ and $y = 8x$ intersect in the xy -plane?

- A) 0
- B) 1
- C) 2
- D) 8

15

$$5G + 45R = 380$$

At a school fair, students can win colored tokens that are worth a different number of points depending on the color. One student won G green tokens and R red tokens worth a total of 380 points. The given equation represents this situation. How many more points is a red token worth than a green token?

16

The number of bacteria in a liquid medium doubles every day. There are 44,000 bacteria in the liquid medium at the start of an observation. Which represents the number of bacteria, y , in the liquid medium t days after the start of the observation?

- A) $y = \frac{1}{2}(44,000)^t$
- B) $y = 2(44,000)^t$
- C) $y = 44,000\left(\frac{1}{2}\right)^t$
- D) $y = 44,000(2)^t$

17

A cylinder has a diameter of 8 inches and a height of 12 inches. What is the volume, in cubic inches, of the cylinder?

- A) 16π
- B) 96π
- C) 192π
- D) 768π

18

$$\begin{aligned} 6x + 7y &= 28 \\ 2x + 2y &= 10 \end{aligned}$$

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

- A) -2
- B) 7
- C) 14
- D) 18

19

In triangle JKL , $\cos(K) = \frac{24}{51}$ and angle J is a right angle. What is the value of $\cos(L)$?

20

$$f(x) = 4x^2 - 50x + 126$$

The given equation defines the function f . For what value of x does $f(x)$ reach its minimum?

21

In the xy -plane, line ℓ passes through the point $(0, 0)$ and is parallel to the line represented by the equation $y = 8x + 2$. If line ℓ also passes through the point $(3, d)$, what is the value of d ?

22

In the xy -plane, a line with equation $2y = c$ for some constant c intersects a parabola at exactly one point. If the parabola has equation $y = -2x^2 + 9x$, what is the value of c ?

STOP

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

Math

22 QUESTIONS

DIRECTIONS

The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE



$$A = \pi r^2$$

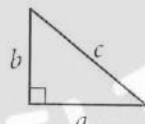
$$C = 2\pi r$$



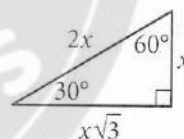
$$A = \ell w$$



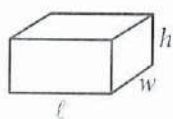
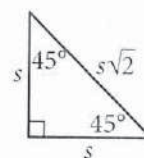
$$A = \frac{1}{2}bh$$



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



Special Right Triangles



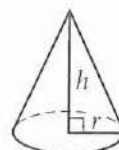
$$V = \ell wh$$



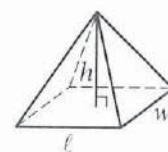
$$V = \pi r^2 h$$



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



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



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

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

The number of radians of arc in a circle is 2π .

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

For multiple-choice questions, solve each problem, choose the correct answer from the choices provided, and then circle your answer in this book. Circle only one answer for each question. If you change your mind, completely erase the circle. You will not get credit for questions with more than one answer circled, or for questions with no answers circled.

For student-produced response questions, solve each problem and write your answer next to or under the question in the test book as described below.

- Once you've written your answer, circle it clearly. You will not receive credit for anything written outside the circle, or for any questions with more than one circled answer.
- If you find **more than one correct answer**, write and circle only one answer.
- Your answer can be up to 5 characters for a **positive** answer and up to 6 characters (including the negative sign) for a **negative** answer, but no more.
- If your answer is a **fraction** that is too long (over 5 characters for positive, 6 characters for negative), write the decimal equivalent.
- If your answer is a **decimal** that is too long (over 5 characters for positive, 6 characters for negative), truncate it or round at the fourth digit.
- If your answer is a **mixed number** (such as $3\frac{1}{2}$), write it as an improper fraction ($\frac{7}{2}$) or its decimal equivalent (3.5).
- Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

1

71, 72, 73, 76, 77, 79, 83, 87, 93

What is the median of the data shown?

- A) 71
- B) 77
- C) 78
- D) 79

2

$$x + 40 = 95$$

What value of x is the solution to the given equation?

3

What is the area of a rectangle with a length of 17 centimeters (cm) and a width of 7 cm?

- A) 24 cm^2
- B) 48 cm^2
- C) 119 cm^2
- D) 576 cm^2

4

Which expression is equivalent to $20w - (4w + 3w)$?

- A) $10w$
- B) $13w$
- C) $19w$
- D) $21w$

5

The number y is 84 less than the number x . Which equation represents the relationship between x and y ?

- A) $y = x + 84$
- B) $y = \frac{1}{84}x$
- C) $y = 84x$
- D) $y = x - 84$

6

The expression $\frac{24}{6x + 42}$ is equivalent to $\frac{4}{x + b}$, where b is a constant and $x > 0$. What is the value of b ?

- A) 7
- B) 10
- C) 24
- D) 252

7

Out of 300 seeds that were planted, 80% sprouted. How many of these seeds sprouted?

8

Ty set a goal to walk at least 24 kilometers every day to prepare for a multiday hike. On a certain day, Ty plans to walk at an average speed of 4 kilometers per hour. What is the minimum number of hours Ty must walk on that day to fulfill the daily goal?

- A) 4
- B) 6
- C) 20
- D) 24

9

If $6 + x = 9$, what is the value of $18 + 3x$?

10

The function f is defined by $f(x) = x^3 + 9$. What is the value of $f(2)$?

- A) 14
- B) 15
- C) 17
- D) 18

11

The total cost $f(x)$, in dollars, to lease a car for 36 months from a particular car dealership is given by $f(x) = 36x + 1,000$, where x is the monthly payment, in dollars. What is the total cost to lease a car when the monthly payment is \$400?

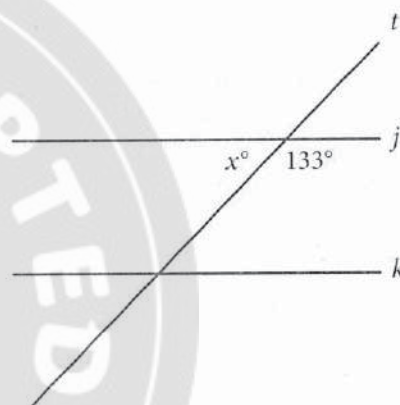
- A) \$13,400
- B) \$13,000
- C) \$15,400
- D) \$37,400

12

The function g is defined by $g(x) = 10x + 8$. What is the value of $g(x)$ when $x = 8$?

- A) 0
- B) 8
- C) 10
- D) 88

13



Note: Figure not drawn to scale.

In the figure, line j is parallel to line k . What is the value of x ?

14

The graph of $7x + 2y = -31$ in the xy -plane has an x -intercept at $(a, 0)$ and a y -intercept at $(0, b)$, where a and b are constants. What is the value of $\frac{b}{a}$?

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

15

An object travels at a constant speed of 12 centimeters per second. At this speed, what is the time, in seconds, that it would take for the object to travel 108 centimeters?

- A) 9
- B) 96
- C) 120
- D) 972

16

John paid a total of \$165 for a microscope by making a down payment of \$37 plus p monthly payments of \$16 each. Which of the following equations represents this situation?

- A) $16p - 37 = 165$
- B) $37p - 16 = 165$
- C) $16p + 37 = 165$
- D) $37p + 16 = 165$

17

x	y
0	18
1	13
2	8

The table shows three values of x and their corresponding values of y . There is a linear relationship between x and y . Which of the following equations represents this relationship?

- A) $y = 18x + 13$
- B) $y = 18x + 18$
- C) $y = -5x + 13$
- D) $y = -5x + 18$

18

An object is kicked from a platform. The equation $h = -4.9t^2 + 7t + 9$ represents this situation, where h is the height of the object above the ground, in meters, t seconds after it is kicked. Which number represents the height, in meters, from which the object was kicked?

- A) 0
- B) 4.9
- C) 7
- D) 9

19

$$h(x) = x^2 - 3$$

Which table gives three values of x and their corresponding values of $h(x)$ for the given function h ?

- A)

x	1	2	3
$h(x)$	4	5	6
- B)

x	1	2	3
$h(x)$	-2	1	6
- C)

x	1	2	3
$h(x)$	-1	1	3
- D)

x	1	2	3
$h(x)$	-2	1	3

20

In the linear function f , $f(0) = 8$ and $f(1) = 12$. Which equation defines f ?

- A) $f(x) = 12x + 8$
- B) $f(x) = 4x$
- C) $f(x) = 4x + 12$
- D) $f(x) = 4x + 8$

21

$$14j + 5k = m$$

The given equation relates the numbers j , k , and m . Which equation correctly expresses k in terms of j and m ?

- A) $k = \frac{m - 14j}{5}$
- B) $k = \frac{1}{5}m - 14j$
- C) $k = \frac{14j - m}{5}$
- D) $k = 5m - 14j$

22

$$RS = 440$$

$$ST = 384$$

$$TR = 584$$

The side lengths of right triangle RST are given. Triangle RST is similar to triangle UVW , where S corresponds to V and T corresponds to W . What is the value of $\tan W$?

- A) $\frac{48}{73}$
- B) $\frac{55}{73}$
- C) $\frac{48}{55}$
- D) $\frac{55}{48}$

STOP

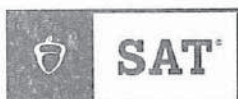
If you finish before time is called, you may check your work on this module only.
Do not turn to any other module in the test.

The SAT[®]

Practice Test #1

ANSWER EXPLANATIONS

These answer explanations are for students using
The Official Digital SAT Study Guide.



Reading and Writing

Module 1

(27 questions)

QUESTION 1

Choice A is the best answer because it most logically completes the text's discussion of how biodiversity loss due to invasive species can be avoided. As used in this context, "preventable" means able to be stopped or kept from happening. The text indicates that "people can take simple steps" to avoid bringing possible invasive species into new environments. It presents these steps as an example of how biodiversity loss due to invasive species is preventable.

Choice B is incorrect because it wouldn't make sense to say that a simple step like washing your shoes after traveling is an example of biodiversity loss due to invasive species being "undeniable," or something that can't be proved to be wrong. Although the text may suggest that biodiversity loss due to invasive species is something that really happens, the word that completes the text must make the first sentence into an assertion that is illustrated by the second sentence, and the second sentence illustrates the idea that biodiversity loss due to invasive species is preventable, not undeniable. **Choice C** is incorrect because it wouldn't make sense to say that a simple step like washing your shoes after traveling is an example of biodiversity loss due to invasive species being "common," or something that happens regularly. Additionally, the text doesn't provide any information about how frequently invasive species cause biodiversity loss. **Choice D** is incorrect because it wouldn't make sense to say that a simple step like washing your shoes after traveling is an example of biodiversity loss due to invasive species being "concerning," or something that is troubling or causes worry. Although the text implies that the phenomenon of biodiversity loss due to invasive species is itself a concerning phenomenon, the word that completes the text must make the first sentence into an assertion that is illustrated by the second sentence, and the second sentence illustrates the idea that biodiversity loss due to invasive species is preventable, not concerning.

QUESTION 2

Choice C is the best answer because it most logically completes the text's discussion of the influences on Banisadr's work. As used in this context, "unimportant" means trivial or lacking value. "It is by no means" establishes that the word that goes in the blank is contradicted by other information; the material that follows "indeed" later in that sentence provides the contradicting information—namely, that Banisadr himself cites Bosch as an inspiration. In other words, the sentence indicates that Bosch's influence on Banisadr is significant, and thus recognizing that influence is by no means unimportant.

Choice A is incorrect because it wouldn't make sense to say that recognizing Bosch's influence on Banisadr isn't "substantial," or meaningful. The text states that Banisadr himself cites Bosch as an influence. *Choice B* is incorrect because it wouldn't make sense to say that it isn't "satisfying," or pleasing, to recognize Bosch's influence on Banisadr. The text states that Banisadr himself cites Bosch as an influence. *Choice D* is incorrect because it wouldn't make sense to say that recognizing Bosch's influence on Banisadr isn't "appropriate," or suitable. The text indicates that Banisadr himself notes that Bosch's work has had an effect on him.

QUESTION 3

Choice C is the best answer because it best describes how the second sentence functions in the text as a whole. The first sentence establishes something astronomers believe with some certainty: that Betelgeuse will explode in a supernova. The second sentence then introduces a problem: astronomers aren't certain *when* Betelgeuse will explode because they don't have enough information about the star's internal characteristics. Finally, the third sentence indicates that researcher Sarafina El-Badry Nance and colleagues investigated a possible method of obtaining the necessary information about Betelgeuse's internal characteristics, though they found that the method wouldn't be sufficient. Thus, the function of the second sentence is to identify the problem that Nance and colleagues attempted to solve but didn't.

Choice A is incorrect because the second sentence doesn't indicate how other astronomers or astrophysicists responded to the work done by Nance and colleagues; the text doesn't address this information at all. *Choice B* is incorrect because the second sentence introduces the general problem Nance and colleagues hoped to solve, not the central finding they ultimately reported. It is the third sentence that presents Nance and colleagues' conclusion that a potential method for determining internal stellar states would be insufficient. *Choice D* is incorrect because the second sentence introduces the general problem Nance and colleagues hoped to solve, not a serious limitation of how Nance and colleagues tried to solve it. It is the third sentence that introduces Nance and colleagues, but no serious limitation of their approach to studying a method of determining internal stellar states is described.

QUESTION 4

Choice B is the best answer because it most accurately describes the function of the third sentence within the overall structure of the text. The third sentence makes a generalization, asserting that evolutionary links between predators and prey can persist across great expanses of time and distance. This generalization is exemplified by the text's discussion of the relationship between mimosa trees and *B. terrenus* beetles. When mimosa trees were introduced to North America in 1785, no *B. terrenus* beetles were present, so the relationship between the trees and the beetles that exists in their native East Asia was disrupted. When the beetles were introduced to North America more than 200 years later, however, they quickly attacked mimosa trees, illustrating the generalization that links between predators and prey "can persist across centuries and continents."

Choice A is incorrect because the third sentence doesn't indicate that Chang and colleagues were investigating any particular hypothesis. According to the text, Chang and colleagues were simply monitoring mimosa trees when the beetles happened to be introduced to the area. *Choice C* is incorrect because the third sentence offers a generalization about the relationship between predators and prey, not an explanation for the findings of Chang and colleagues.

that differs from an explanation presented elsewhere in the text. *Choice D* is incorrect because the third sentence doesn't discuss any particular species (either the species mentioned elsewhere in the text or any other) and doesn't help explain why species spread to new locations.

QUESTION 5

Choice C is the best answer because, based on the information presented in the texts, it represents how Focarelli and Panetta would most likely respond to Fan's findings. Text 1 indicates that Fan found that a newspaper merger would result in a rise in subscription prices. This rise wouldn't benefit customers, who would have to pay more for news after a merger. Text 2 presents Focarelli and Panetta's argument that merger research tends to focus too much on what happens immediately after the merger. Text 2 goes on to describe their finding that mergers can be economically beneficial for consumers over the long term. This suggests that Focarelli and Panetta would encourage Fan to investigate the long-term effect of the hypothetical newspaper merger on subscription prices.

Choice A is incorrect because Text 2 indicates that Focarelli and Panetta found that merged companies experience "efficiency gains" over the long term, meaning that their expenses go down relative to their output, not that their expenses increase. *Choice B* is incorrect because Text 2 doesn't indicate that Focarelli and Panetta connect the effects of mergers to specific locations. Instead, Focarelli and Panetta focus on the length of time over which the effects of mergers should be evaluated. *Choice D* is incorrect because there's no indication in Text 2 that Focarelli and Panetta believe that the newspaper industry is different from any other industry when it comes to the effects of mergers. Although their own research was about consumer banking, Text 2 suggests that they view their conclusions as applicable to mergers in general.

QUESTION 6

Choice D is the best answer because it provides a detail about Elinor that is established in the text. The text indicates that although Elinor is "only nineteen," she gives good advice and exhibits such a high level of understanding and judgment that she serves as "the counsellor of her mother." Thus, Elinor is mature beyond her years.

Choice A is incorrect because it isn't supported by the text: although the text says that Elinor advises her mother and often counteracts her mother's impulses, there's no mention of Elinor arguing with her mother or failing to change her mother's mind. *Choice B* is incorrect because it isn't supported by the text: although the text mentions that Elinor has strong feelings, it doesn't indicate that she's excessively sensitive when it comes to family issues. *Choice C* is incorrect because it isn't supported by the text: there's no mention of what Elinor thinks about her mother and no suggestion that she thinks her mother is a bad role model. Because she's described as having "an excellent heart," Elinor likely doesn't think ill of her mother.

QUESTION 7

Choice D is the best answer because it presents a statement about Mrs. Ochiltree's acquaintances that is supported by the text. The text indicates that Mrs. Ochiltree makes comments about her acquaintances that are frank, or direct and blunt, and sometimes startling. It also states that because of this behavior, the acquaintances tend to avoid Mrs. Ochiltree.

Together, these details suggest that the acquaintances choose not to be around Mrs. Ochiltree because they are offended by the things she has said about them.

Choice A is incorrect because the text doesn't suggest that Mrs. Ochiltree's acquaintances avoid discussing topics that would upset Mrs. Ochiltree; instead, it states that they avoid being around Mrs. Ochiltree. *Choice B* is incorrect because the text indicates that Mrs. Ochiltree knows her acquaintances often avoid her and is pleased about it (she "rather exulted in it"), not that she wants to spend more time with them. *Choice C* is incorrect because the text doesn't suggest that Mrs. Ochiltree's acquaintances avoid speaking with Mrs. Ochiltree because they are too focused on their own concerns, but rather because they don't like the frank comments she makes.

QUESTION 8

Choice D is the best answer because it most accurately states the main idea of the text. The speaker describes the experience of being "weary" and "tired" and going to bed to seek "dear repose" (that is, sleep), but instead of sleeping, the speaker is kept awake ("keep my drooping eyelids open wide") by thoughts of a friend ("my thoughts...[Begin] a zealous pilgrimage to thee").

Choice A is incorrect because the text makes it clear that the speaker isn't asleep; thoughts about the friend are keeping the speaker awake ("keep my drooping eyelids open wide"). *Choice B* is incorrect because the speaker isn't talking about taking a literal trip when referring to "a zealous pilgrimage." Rather, the speaker is referring to the experience of thinking about the friend, of taking "a journey in my head." *Choice C* is incorrect because the text indicates that the speaker and the friend aren't in the same place and having a conversation. Rather, the speaker is at home and thinking of the friend, who is somewhere else ("from far where I abide").

QUESTION 9

Choice B is the best answer because it presents a finding that would best support Granito and Álvarez's claim that fermenting black beans makes them easier to digest and more nutritious. The text indicates that high levels of soluble fiber and raffinose in black beans make the beans hard to digest and that tannins and trypsin inhibitors make it harder for the body to extract nutrients from the beans. If it were found that fermenting the beans significantly reduces their levels of soluble fiber, raffinose, trypsin inhibitors, and tannins when cooked, this would directly support the claim that fermentation improves the digestibility of the beans and makes them more nutritious.

Choice A is incorrect because the text indicates that trypsin inhibitors and tannins interfere with the body's ability to extract nutrients from black beans; if fermentation and cooking were found to increase these antinutrients, fermented beans would likely be less nutritious than unfermented ones, not more nutritious (as Granito and Álvarez claim). *Choice C* is incorrect because the text doesn't address the idea that greater nitrogen absorption in the gut has an effect on a food's digestibility or level of nutrition, so the discovery of the presence of microorganisms that may increase nitrogen absorption wouldn't provide relevant support for the claim that fermentation makes black beans easier to digest and more nutritious. *Choice D* is incorrect because Granito and Álvarez's claim focuses on the effect of fermenting black beans, but the finding that nonfermented black beans also have fewer trypsin inhibitors and tannins when cooked at high pressure would suggest that the role of the cooking method could be significant when it comes to nutrition; further, the finding wouldn't address the beans' digestibility.

QUESTION 10

Choice C is the best answer because it most effectively completes the example regarding the ablation rate of iron. The table shows the ablation rates for three elements—iron, potassium, and sodium—found in cosmic dust that comes from one of four sources. The text says that the ablation rate for a given element in slower-moving SPC or AST dust was lower than the ablation rate for that same element in faster-moving HTC or OCC dust. The text then presents the first part of an example of this pattern, describing an ablation rate of 28% for iron in AST dust. The information that iron from HTC dust had an ablation rate of 90% is therefore the most effective way to complete this example—the comparison of a relatively low ablation rate for iron in slower-moving AST dust with a relatively high ablation rate for iron in faster-moving HTC dust illustrates the tendency of ablation rates for a given element to be lower in slower-moving dust than in faster-moving dust.

Choice A is incorrect because the text indicates that SPC dust, like AST dust, moves relatively slowly; a comparison of the ablation rates of iron from two slower-moving dust sources could not be an example of the difference between ablation rates in slower-moving dust and faster-moving dust, which is the pattern that the example is supposed to illustrate. **Choice B** is incorrect because the example in the text is supposed to illustrate the difference in the ablation rates of the same element from slower-moving dust and faster-moving dust, and the first part of the example provides data about the ablation rate of iron, which means the second part of the example must also be about the ablation rate of iron, not the ablation rate of sodium. **Choice D** is incorrect because the example in the text is supposed to illustrate the difference in the ablation rates of the same element from slower-moving dust and faster-moving dust, and the first part of the example provides data about the ablation rate of iron, which means the second part of the example must also be about the ablation rate of iron, not the ablation rate of sodium. Additionally, any ablation rate from AST dust would be ineffective in this example since AST dust is referenced in the first part of the example and thus additional data focused on AST dust would not illustrate a variation across dust types.

QUESTION 11

Choice D is the best answer because it uses data from the graph to effectively illustrate the text's claim about general economic policy uncertainty in the United Kingdom. The graph presents values for economic policy uncertainty in tax and public spending policy, trade policy, and general economic policy in the UK from 2005 to 2010. The graph shows that in 2005, the value for general economic policy uncertainty (approximately 90) was substantially lower than the value for uncertainty about trade policy specifically (approximately 160). It also shows that in 2010, the value for general economic policy uncertainty (approximately 120) was substantially higher than the value for uncertainty about trade policy (approximately 70). The substantial differences between these values in 2005 and 2010 support the claim that a general measure may not fully reflect uncertainty about specific areas of policy.

Choice A is incorrect because the graph shows that the level of general economic policy uncertainty was similar to the level of uncertainty about tax and public spending policy in both 2005 (with values of approximately 90 and 100, respectively) and 2009 (with values of approximately 80 and 75, respectively). **Choice B** is incorrect because the graph shows that general economic policy uncertainty was higher than uncertainty about tax and public spending policy in 2006, 2007, and 2009, not that it was lower each year from 2005 to 2010. **Choice C** is incorrect because the graph shows that general

economic policy uncertainty reached its highest level in 2010, which was when uncertainty about tax and public spending policy also reached its highest level, not its lowest level.

QUESTION 12

Choice C is the best answer because it describes data from the table that support the researcher's hypothesis. According to the text, the researcher hypothesized that Arctic ground squirrels would exhibit longer torpor bouts and shorter arousal episodes than Alaska marmots do—or, put the other way, that the marmots would show shorter torpor bouts and longer arousal episodes than the ground squirrels do. The table shows data about torpor bouts and arousal episodes for the two species from 2008 to 2011. According to the table, the average duration of torpor bouts was 13.81 days for Alaska marmots, shorter than the average of 16.77 days for Arctic ground squirrels, and the average duration of arousal episodes was 21.2 hours for Alaska marmots, longer than the average of 14.2 hours for Arctic ground squirrels. Thus, the table supports the researcher's hypothesis by showing that Alaska marmots had shorter bouts of torpor and longer arousal episodes than Arctic ground squirrels did.

Choice A is incorrect because it inaccurately describes data from the table and doesn't support the researcher's hypothesis. The table shows that the average duration of arousal episodes was less than a day for both Alaska marmots (21.2 hours) and Arctic ground squirrels (14.2 hours). Additionally, information about arousal episodes for Alaska marmots and Arctic ground squirrels isn't sufficient to support a hypothesis involving comparisons of both arousal episodes and torpor bouts for those animals. **Choice B** is incorrect because it doesn't support the researcher's hypothesis, which involves comparisons of arousal episodes as well as torpor bouts for Alaska marmots and Arctic ground squirrels. Noting that both animals had torpor bouts lasting several days, on average, doesn't address arousal episodes at all, nor does it reveal how the animals' torpor bouts compared. **Choice D** is incorrect because it doesn't support the researcher's hypothesis. Although the table does show that Alaska marmots had more torpor bouts (12) than arousal episodes (11) and that their arousal episodes were much shorter than their torpor bouts (21.2 hours and 13.81 days, respectively), comparing data across only Alaska marmot behaviors isn't sufficient to support a hypothesis about torpor and arousal behaviors of both Alaska marmots and Arctic ground squirrels.

QUESTION 13

Choice A is the best answer because it presents data from the table that most effectively complete the statement about the rates at which employment shifted in France and the United States. The text states that over the last two hundred years employment in the agricultural sector has declined while employment in the service sector has risen in both France and the US, and the data from the table reflect these trends. The text asserts, however, that the transition from agriculture to services "happened at very different rates in the two countries." This assertion is best supported by a comparison of data from 1900 and 1950: the table shows that in those years, employment in agriculture went from 43% to 32% in France (a decline of 11 percentage points) and from 41% to 14% in the US (a decline of 27 percentage points), and that employment in services went from 28% to 35% in France (an increase of 7 percentage points) and from 31% to 53% in the US (an increase of 22 percentage points). In other words, the rate of change was greater in the US than in France for both sectors.

Choice B is incorrect because comparing the data for 1800 and 2012 would suggest a similar rate of change in the two countries, not very different rates: employment in agriculture went from 64% in 1800 to 3% in 2012 in France, which is close to the change from 68% in 1800 to 2% in 2012 in the US, while employment in services went from 14% in 1800 to 76% in 2012 in France, which is close to the change from 13% in 1800 to 80% in 2012 in the US. *Choice C* is incorrect because comparing the data for 1900 and 2012 would suggest a similar rate of change in the two countries rather than very different rates: employment in agriculture went from 43% in 1900 to 3% in 2012 in France, which is close to the change from 41% in 1900 to 2% in 2012 in the US, while employment in services went from 28% in 1900 to 76% in 2012 in France, which is close to the change from 31% in 1900 to 80% in 2012 in the US. *Choice D* is incorrect because comparing the data for 1800 and 1900 would suggest a similar rate of change in the two countries, not very different rates: employment in agriculture went from 64% in 1800 to 43% in 1900 in France, which is fairly close to the change from 68% in 1800 to 41% in 1900 in the US, while employment in services went from 14% in 1800 to 28% in 1900 in France, which is close to the change from 13% in 1800 to 31% in 1900 in the US.

QUESTION 14

Choice D is the best answer because it presents the conclusion that most logically follows from the text's discussion of leafy spurge and engineered DNA. The text establishes that using chemical herbicides to control leafy spurge in North America can also harm other plants nearby. The text then indicates that it might be possible to use engineered DNA to prevent plants from reproducing, which would be useful for "exclusively targeting" leafy spurge. If it's possible to exclusively target leafy spurge with engineered DNA—meaning that only leafy spurge is affected by the engineered DNA—and prevent the plant from reproducing, then leafy spurge numbers could be reduced "without harming other organisms."

Choice A is incorrect because the text raises the possibility of using engineered DNA to prevent leafy spurge from reproducing, not to make individual leafy spurge plants more vulnerable to chemical herbicides that already exist. *Choice B* is incorrect because the text doesn't describe any ecological benefits of leafy spurge in North America; instead, the text is focused on using engineered DNA to prevent leafy spurge from reproducing and thereby reduce its numbers. The only ecological effects of leafy spurge in North America that are described in the text are harmful. *Choice C* is incorrect because the text describes the possibility of using engineered DNA to prevent leafy spurge from reproducing; it doesn't offer a way to enable cattle to eat leafy spurge without becoming sick.

QUESTION 15

Choice B is the best answer. The convention being tested is the use and punctuation of an integrated relative clause. This choice correctly uses the relative pronoun "that" and no punctuation to create an integrated relative clause that provides essential information about the noun phrase ("a book packaging company") that it modifies.

Choice A is incorrect because it doesn't use a relative pronoun to link the verb phrase beginning with "specializes" to the noun phrase that it modifies ("a book packaging company"). *Choice C* is incorrect because it doesn't use a relative pronoun to link the verb phrase beginning with "specializes" to the noun phrase that it modifies ("a book packaging company"). *Choice D* is incorrect because no punctuation is needed between the integrated relative clause beginning with "that specializes" and the noun phrase that it modifies ("a book packaging company").

QUESTION 16

Choice B is the best answer. The convention being tested is pronoun-antecedent agreement. The plural pronoun "they" agrees in number with the plural antecedent "woodcuts" and clearly identifies what was exhibited at the Smithsonian American Art Museum.

Choice A is incorrect because the singular pronoun "it" doesn't agree in number with the plural antecedent "woodcuts." **Choice C** is incorrect because the singular pronoun "this" doesn't agree in number with the plural antecedent "woodcuts." **Choice D** is incorrect because the plural pronoun "some" is illogical in this context (referring to "some" of only two woodcuts).

QUESTION 17

Choice D is the best answer. The convention being tested is punctuation use between sentences. In this choice, the period after "essays" is used correctly to mark the boundary between one sentence ("American...essays") and another ("Praising...Morrison"). The participial phrase beginning with "praising" modifies the subject of the second sentence, "writer Robert Antoni."

Choice A is incorrect because it results in a comma splice. A comma can't be used in this way to mark the boundary between sentences. **Choice B** is incorrect. Without a comma preceding it, the conjunction "and" can't be used in this way to join sentences. **Choice C** is incorrect because it results in a run-on sentence. The sentences ("American...essays" and "Praising...Morrison") are fused without punctuation and/or a conjunction.

QUESTION 18

Choice A is the best answer. The convention being tested is finite and nonfinite verb forms within a sentence. A main clause requires a finite verb to perform the action of the subject (in this case, Ashford's "gestures" and "habit"), and this choice supplies the finite past tense verb "helped" to indicate what Ashford's gestures and habit helped accomplish.

Choice B is incorrect because the nonfinite participle "helping" doesn't supply the main clause with a finite verb. **Choice C** is incorrect because the relative clause "that helped" doesn't supply the main clause with a finite verb. **Choice D** is incorrect because the nonfinite to-infinitive "to help" doesn't supply the main clause with a finite verb.

QUESTION 19

Choice C is the best answer. The convention being tested is punctuation between a subject and a verb. When, as in this case, a subject ("her 2019 novel *Gingerbread*") is immediately followed by a verb ("offers"), no punctuation is needed.

Choice A is incorrect because no punctuation is needed between the subject and the verb. **Choice B** is incorrect because no punctuation is needed between the subject and the verb. **Choice D** is incorrect because no punctuation is needed between the subject and the verb.

QUESTION 20

Choice D is the best answer. The convention being tested is pronoun-antecedent agreement. The singular pronoun "it" agrees in number with the singular antecedent "violin" and thus indicates that the traditional violin (and not its curves) was made lighter.

Choice A is incorrect because the plural pronoun “those” doesn’t agree in number with the singular antecedent “violin.” *Choice B* is incorrect because the singular pronoun “one” is ambiguous in this context; the resulting sentence leaves unclear what Stradivari made lighter. *Choice C* is incorrect because the plural pronoun “them” doesn’t agree in number with the singular antecedent “violin.”

QUESTION 21

Choice C is the best answer. The convention being tested is the punctuation of a supplementary word or phrase between two main clauses. This choice correctly uses a comma to separate the supplementary adverb “however” from the preceding main clause (“They...antiquity”) and a semicolon to join the next main clause (“some...literature”) to the rest of the sentence. Further, placing the semicolon after “however” indicates that the information in the preceding main clause (neoclassical writers were not the first to adopt classical literary modes) is contrary to what might be assumed from the information in the previous sentence (the neoclassical writers were unique in imitating classical epic poetry and satires).

Choice A is incorrect because it fails to mark the boundary between the two main clauses with appropriate punctuation. *Choice B* is incorrect because commas can’t be used in this way to punctuate a supplementary word or phrase between two main clauses. *Choice D* is incorrect because placing the semicolon after “antiquity” illogically indicates that the information in the next main clause (prominent Renaissance figures were also influenced by classical literature) is contrary to the information in the previous clause (neoclassical writers were not the first to adopt classical literary modes).

QUESTION 22

Choice D is the best answer. “Nevertheless” logically signals that the claim in this sentence—that the telegenic Kennedy was ultimately considered the winner of the debate—is true despite the previous information about the poll of radio listeners.

Choice A is incorrect because “in other words” illogically signals that the claim in this sentence is a paraphrase of the previous information about the poll of radio listeners. Instead, Kennedy was ultimately considered the winner despite what that poll suggested about his performance. *Choice B* is incorrect because “therefore” illogically signals that the claim in this sentence is a result of the previous information about the poll of radio listeners. Instead, Kennedy was ultimately considered the winner despite what that poll suggested about his performance. *Choice C* is incorrect because “likewise” illogically signals that the claim in this sentence is similar to the previous information about the poll of radio listeners. Instead, Kennedy was ultimately considered the winner despite what that poll suggested about his performance.

QUESTION 23

Choice A is the best answer. “Still” logically signals that the information about Sher-Gil in this sentence—that she longed to leave Paris and return to India—contrasts with what one would expect after reading about Sher-Gil’s experiences in Paris in the previous sentences.

Choice B is incorrect because “therefore” illogically signals that the information about Sher-Gil in this sentence is a result or consequence of the descriptions in the previous sentences. Instead, this information contrasts with what one would expect after reading about Sher-Gil’s experiences in Paris. *Choice C* is incorrect because “indeed” illogically signals that the information about Sher-Gil in this sentence offers additional emphasis in support of the descriptions in the

previous sentences. Instead, this information contrasts with what one would expect after reading about Sher-Gil's experiences in Paris. *Choice D* is incorrect because "furthermore" illogically signals that the information about Sher-Gil in this sentence offers additional support for or confirmation of the descriptions in the previous sentences. Instead, this information contrasts with what one would expect after reading about Sher-Gil's experiences in Paris.

QUESTION 24

Choice D is the best answer. "Specifically" logically signals that the information in this sentence about Sauer's argument—that, according to Sauer, cultures play a role in their own development, as opposed to being shaped solely by natural surroundings—provides specific, precise details elaborating on the more general information in the previous sentence about Sauer's challenge to prevailing views.

Choice A is incorrect because "similarly" illogically signals that the information in this sentence about Sauer's argument is similar to, but separate from, the more general information in the previous sentence. Instead, it provides specific, precise details elaborating on that information. *Choice B* is incorrect because "finally" illogically signals that the information in this sentence about Sauer's argument indicates a last step in a process or a concluding summary. Instead, it provides specific, precise details elaborating on the general information in the previous sentence. *Choice C* is incorrect because "therefore" illogically signals that the information in this sentence about Sauer's argument is a result of the more general information in the previous sentence. Instead, it provides specific, precise details elaborating on that information.

QUESTION 25

Choice C is the best answer. "Consequently" logically signals that the information in this sentence—that many individual gold prospectors gave up their fortune-hunting dreams and became employees of mining companies—is a result or consequence of the previous information about the inaccessibility of the state's gold deposits.

Choice A is incorrect because "furthermore" illogically signals that the information in this sentence merely adds to the previous information about the inaccessibility of the state's gold deposits. Instead, it's a result or consequence of that information. *Choice B* is incorrect because "still" illogically signals that the information in this sentence offers a contrast or exception to the previous information about the inaccessibility of the state's gold deposits. Instead, it's a result or consequence of that information. *Choice D* is incorrect because "next" illogically signals that the information in this sentence is the next step in a process. Instead, it's a result or consequence of the previous information about the inaccessibility of the state's gold deposits.

QUESTION 26

Choice B is the best answer. The sentence presents the study, describing it as a 2013 analysis of Quanhucun cat bone fragments, and its conclusions, indicating what the analysis suggests about cat domestication in Quanhucun.

Choice A is incorrect because the sentence focuses on the study's methodology; it doesn't present conclusions from the study. *Choice C* is incorrect. While the sentence provides a general overview of the study, it doesn't present conclusions from the study. *Choice D* is incorrect. The sentence describes a finding from the study; it doesn't present conclusions from the study.

QUESTION 27

Choice A is the best answer. Noting that “guerdon” is of Anglo-French origin and “Laodicean” is of ancient Greek origin, the sentence uses “while” to emphasize a difference in the origins of the two words.

Choice B is incorrect. While the sentence emphasizes two words used in the Scripps National Spelling Bee, it doesn’t emphasize (or mention) the words’ linguistic origins. **Choice C** is incorrect. While the sentence specifies the linguistic origin of one word used in the Scripps National Spelling Bee, it doesn’t mention the other word or emphasize a difference in the two words’ origins.

Choice D is incorrect. While the sentence makes a generalization about words used in the Scripps National Spelling Bee, it doesn’t emphasize a difference in the words’ origins.



Reading and Writing

Module 2

(27 questions)

QUESTION 1

Choice C is the best answer because it most logically completes the text's discussion of John Ashbery's poems. As used in this context, "interpret" would mean decipher the meaning of. The text indicates that Ashbery's poems have many unusual features, that it's difficult to tell what exactly the poems' subject matter is, and that scholars strongly disagree about the poems. This context conveys the idea that it's difficult to interpret Ashbery's poems.

Choice A is incorrect because "delegate" means to assign someone as a representative of another person or to entrust something to someone else, neither of which would make sense in context. The text is focused only on the difficulty that readers have interpreting Ashbery's poems due to their many unusual features; it doesn't suggest anything about the poems being difficult to delegate. **Choice B** is incorrect because describing Ashbery's poems as difficult to "compose," or put together or produce, would make sense only if the text were about Ashbery's experience of writing the poems. It could be true that it was difficult for Ashbery to compose his poems, but the text doesn't address this; it instead discusses how readers interpret and engage with the poems.

Choice D is incorrect because describing Ashbery's poems as being difficult to "renounce," or give up or refuse, wouldn't make sense in context. The text focuses on the idea that features of Ashbery's poems are odd or unclear and have caused heated scholarly debate. This context suggests that the poems are difficult to interpret, not that the poems are difficult to renounce.

QUESTION 2

Choice D is the best answer because it most logically completes the text's discussion of the research that Lopes-Ferreira and her colleagues are conducting on the stingray species *Potamotrygon rex*. As used in this context, "a substantial" effect means an effect that is sizable or noteworthy. The text indicates that the researchers are seeking to determine whether there are "considerable variations" in the potency of stingray venom that are associated with variation in the stingrays' age and sex. This context suggests that the researchers want to find out whether stingray age and sex have a substantial effect on venom toxicity.

Choice A is incorrect because there's nothing in the text that suggests that the researchers have been studying whether the stingrays' age and sex have "a disconcerting," or an unsettling and disturbing, effect on the stingrays' venom. The text indicates that the researchers wish to determine if stingray age and sex cause large variations in the toxicity of stingray venom, not if the effect of age and sex is disconcerting. *Choice B* is incorrect because the text indicates that researchers want to find out whether differences in stingray age and sex produce differences in stingray venom, not that the researchers want to find out whether age and sex have "an acceptable," or a satisfactory, effect on venom. The text makes no mention of what would make an effect on venom toxicity acceptable and gives no indication that the researchers are interested in that question. *Choice C* is incorrect because it wouldn't make sense in context for the researchers to be looking for "an imperceptible," or an unnoticeable, effect of age and sex on stingray venom. The text says that the researchers are trying to determine if there are "considerable variations" in venom toxicity linked to age and sex, not that the researchers are trying to find effects that they can't perceive.

QUESTION 3

Choice B is the best answer because it most logically completes the text's discussion of Ochoa's prediction that humans will one day need to live in places other than Earth. As used in this context, "speculates" would mean puts forward an idea without firm evidence. The text states that Ochoa "doesn't have a definite idea" about when humans might need to live in other environments and characterizes Ochoa's prediction as a "conjecture," or a conclusion presented without convincing evidence. This context indicates that Ochoa speculates when she makes this prediction.

Choice A is incorrect because saying that Ochoa "demands," or insists or requires, that humans will one day need to live in other environments than Earth's wouldn't make sense in context. The text indicates that she's unsure about the timing but hypothesizes that it will someday happen. *Choice C* is incorrect because saying that Ochoa "doubts," or questions or disbelieves, that humans will one day need to live in other environments than Earth's wouldn't make sense in context. The text indicates that although Ochoa is unsure about the timing, she hypothesizes that humans will need to live in places other than Earth and encourages research into future travel to the moon. *Choice D* is incorrect because saying that Ochoa "establishes," or proves, that humans will one day need to live in other environments than Earth's wouldn't make sense in context. Rather than stating that Ochoa discusses her idea with certainty and supports it with evidence, the text indicates that Ochoa is unsure about when humans might need to live in other environments.

QUESTION 4

Choice D is the best answer because it most logically completes the text's discussion of the collaboration between the Crow Tribe and Montana State University. As used in this context, "exemplifies" means demonstrates. The text conveys how the Crow Tribe–Montana State University collaboration serves to illustrate the model of community-based participatory research introduced earlier in the text and expanded on later in the text.

Choice A is incorrect because referring to "circumvents," or avoids, wouldn't make sense in context. The text suggests that the Crow Tribe–Montana State University collaboration serves as an example of the principles of community-based participatory research, not that the collaboration evades this model. *Choice B* is incorrect because referring to "eclipses," or overshadows, wouldn't make sense in context. The text describes the Crow Tribe–Montana

State University collaboration as an equal partnership, which indicates that it's an example of the community-based participatory research model, not that it overshadows the model. *Choice C* is incorrect because saying that the collaboration "fabricates," or creates, the model wouldn't make sense in context. The text indicates that the Crow Tribe–Montana State University collaboration serves as an example of the model, not that it created the model.

QUESTION 5

Choice A is the best answer because it most logically completes the text's discussion of diaphragm contractions and hiccups. In this context, "involuntarily" means done without any control, or by reflex. The text explains that when a person's diaphragm repeatedly contracts and results in hiccups (which may be beneficial for infants), those muscle contractions are "uncontrollable." This context indicates that the diaphragm contractions occur without the person's control.

Choice B is incorrect because it wouldn't support the logical relationship established in the text's discussion of diaphragm contractions and hiccups. The text indicates that although specific causes for hiccups haven't been identified, it may be the case that the muscle contractions that occur have an important purpose in infants. It wouldn't make sense to say that even though the contractions occur "beneficially," or with a good or helpful effect, they might play a positive role in infants' breathing regulation. *Choice C* is incorrect because the text indicates that the diaphragm contractions that result in hiccups are "uncontrollable." Because those muscle contractions are described as happening automatically and without the person's control, it wouldn't make sense to describe them as occurring "strenuously," or in a way that requires great effort or energy. *Choice D* is incorrect because the text doesn't describe the quality of the diaphragm contractions that result in hiccups beyond stating that they are "uncontrollable." Nothing in the text indicates that those muscle contractions occur "smoothly," or evenly and continuously.

QUESTION 6

Choice A is the best answer because it most logically completes the text's discussion of a relationship between the dodder plant and its host plant. As used in this context, "synchronization" means the act of things happening at the same time. The text indicates that the dodder and its host plant flower in unison and that this synchronization occurs because the dodder makes use of a protein produced by the host shortly before flowering.

Choice B is incorrect because referring to "hibernation," or the state of being dormant or inactive, wouldn't make sense in context. The text focuses on something the dodder plant actively engages in—making use of a protein and producing flowers. *Choice C* is incorrect because stating that the dodder plant and its host engage together in "prediction," or the act of declaring or indicating something in advance, wouldn't make sense in context. Rather than indicating that the dodder plant and its host plant make a prediction about flowering activity, the text suggests that the host produces a protein as part of its regular flowering process and that the dodder then absorbs and uses that protein to flower at the same time. *Choice D* is incorrect because referring to "moderation," or the act of causing something to become less intense or extreme, wouldn't make sense in context. Although the text states that the dodder plant absorbs and uses a protein made by its host plant, it doesn't suggest that the dodder lessens the host plant's flowering activity; the two plants simply flower in unison.

QUESTION 7

Choice C is the best answer because it most logically completes the text's discussion of how Ofelia Zepeda has contributed to the field of linguistics. As used in this context, "extensive" means having a wide or considerable extent. The text indicates that Zepeda's many accomplishments in linguistics are varied, including teaching linguistics, writing poetry in more than one language, creating a grammar book, and cofounding a language institute. This context supports the idea that Zepeda's contributions to the field are extensive.

Choice A is incorrect because the sentence presents Zepeda's accomplishments as examples to support the claim made in the first part of the sentence. It wouldn't make sense to say that achievements as a professor, poet and author, and co-founder of a language institute demonstrate that Zepeda's contributions in her field are "pragmatic," or related to practical matters and not involving intellectual or artistic matters. **Choice B** is incorrect because the sentence presents Zepeda's accomplishments as a professor, poet and author, and cofounder of a language institute as examples to support the claim made in the first part of the sentence. There's no reason to believe that the positive achievements listed demonstrate that Zepeda's contributions in her field are "controversial," or have caused disputes and opposing viewpoints. **Choice D** is incorrect because in this context, "universal" would mean including or covering everything in a group. The sentence presents Zepeda's accomplishments as examples to support the claim made in the first part of the sentence, and it wouldn't make sense to say that these specific achievements—particularly as the author of a grammar book specific to the Tohono O'odham language—demonstrate that Zepeda's contributions relate to everything in the field of linguistics.

QUESTION 8

Choice D is the best answer because it most logically completes the text's discussion of the Three Sisters intercropping system. As used in this context, "intricate" would mean made up of complexly related elements. The text indicates that in the Three Sisters system, maize, squash, and beans form a "web of relations" in which the crops interact in various ways. The text's description of these interactions—the bean vines growing on the maize stalks, the squash vines keeping weeds away, and the beans adding nutrients that the maize and squash use—provides context suggesting that this "web of relations" is intricate.

Choice A is incorrect because describing the relationship among the crops in the Three Sisters system as "indecipherable," or impossible to comprehend, would not make sense in context. Although the text presents the relationship as complex, the text's description of the role that each crop plays makes it clear that the relationship is well understood, not indecipherable. **Choice B** is incorrect because the text discusses the practical benefits that each plant in the Three Sisters system provides to other members of the system, showing that the relationship among the crops that make up the system is not "ornamental," or mainly serving a decorative purpose. **Choice C** is incorrect because describing the relationship among the crops in the Three Sisters system as "obscure," or unknown or poorly understood, would not make sense in context. Although the text presents the relationship as complex, the text's description of the role that each crop plays makes it clear that the relationship is well understood, not obscure.

QUESTION 9

Choice B is the best answer because it presents a statement about Dorian that is directly supported by the text. The narrator of the text says that when Dorian sees his portrait, "his cheeks flushed for a moment with pleasure" and "a look of joy came into his eyes." The narrator goes on to say that Dorian looked at

the portrait “in wonder” and presents him as being so entranced by the portrait that he doesn’t notice what Hallward is saying to him. These details support the description of Dorian as being delighted by what he sees in the portrait.

Choice A is incorrect because Dorian isn’t depicted as interested in Hallward’s opinion of the portrait; rather, he is so enraptured by the painting that he’s hardly even aware of Hallward. *Choice C* is incorrect because the portrait of Dorian is the only painting mentioned in the text. Although Dorian is depicted as being delighted with this particular portrait, there’s no evidence in the text that he likes portraits better than other kinds of paintings. *Choice D* is incorrect because nothing in the text suggests that Dorian is uncertain about Hallward’s talent. Instead, the text is focused on Dorian’s delight with the portrait.

QUESTION 10

Choice C is the best answer because it presents the quotation that best illustrates the claim that the speaker is determined to experience the countryside around her. In the quotation, the speaker makes it clear that she plans to walk somewhere based on her own wishes (“where my own nature would be leading”) rather than follow anything else (“another guide”), and that she’ll walk “in ferny glens” alongside the mountain.

Choice A is incorrect because this quotation suggests that the speaker wants to avoid pursuing money and education (“busy chase of wealth and learning”) and instead return to some earlier interests (her “first feelings”); the quotation doesn’t address her determination to experience the countryside. *Choice B* is incorrect because the speaker is describing the circumstances under which she won’t walk, which doesn’t address her determination to experience the countryside. *Choice D* is incorrect because rather than conveying her determination to experience the countryside, the speaker is explaining a particular thing she won’t do (“seek not the shadowy region”).

QUESTION 11

Choice C is the best answer because it presents a quotation that illustrates the claim that Mrs. Spring Fragrance demonstrates concern for what’s happening at home while she’s in California. By giving reminders to “care for the cat, the birds, and the flowers,” “not eat too quickly,” and avoid engaging in strenuous activity in the heat, Mrs. Spring Fragrance shows that she’s thinking about what’s happening at home and wants to ensure everything is taken care of.

Choice A is incorrect because the quotation, while it does suggest that Mrs. Spring Fragrance has made fudge at home before, is focused on preparations for an upcoming festival, not on concerns for anything happening at home while Mrs. Spring Fragrance is away. *Choice B* is incorrect because the quotation has to do with an upcoming event during Mrs. Spring Fragrance’s trip—visiting San José and meeting someone new—rather than her concern for what’s happening at home. *Choice D* is incorrect because the quotation is focused on how Mrs. Spring Fragrance feels about her trip and the friends she’s seeing, not on her concern for what’s happening at home.

QUESTION 12

Choice B is the best answer because it most effectively illustrates the claim in the text that Hedda seeks to influence another character’s fate. In the quotation, Hedda says that she wants “to have power to mould a human destiny,” or shape a person’s fate, just as the text indicates. Additionally, the phrase “for once in my life” suggests that Hedda feels that she has never been able to shape anyone’s life, including her own, supporting the text’s assertion that she “is unable to freely determine her own future.”

Choice A is incorrect because this quotation shows Hedda being uncertain about what to do with her own life, not wanting to influence another person's fate. *Choice C* is incorrect because while this quotation shows Hedda's interest in finding out whether she has any power over another character, it doesn't clearly show that she wants to influence that person's fate. In this quotation, Hedda seems to have inferred or concluded ("then") that she doesn't have any influence over the person to whom she's speaking, and she's asking that person to confirm her lack of influence. *Choice D* is incorrect because this quotation expresses Hedda's belief that a man should be true to his principles, not her desire to influence another person's fate.

QUESTION 13

Choice B is the best answer because it most logically completes the text's discussion of artifacts and Kuulo Kataa's founding date. If it were true both that Kuulo Kataa was founded in the fourteenth century CE and that artifacts found in excavations of the settlement are from the thirteenth century CE, it would be reasonable to conclude that the artifacts weren't created in the Kuulo Kataa settlement. That would suggest, then, that the artifacts originated somewhere else and eventually reached the settlement through trading or as people migrated.

Choice A is incorrect because the existence of thirteenth-century CE artifacts recovered during excavations of a settlement founded in the fourteenth century CE isn't logically connected to artifacts from one century being more commonly recovered than artifacts from another century. Rather than suggesting anything about how frequently artifacts from different times are found, the existence of artifacts confirmed as predating the settlement's founding suggests that those items arrived in Kuulo Kataa during or after its establishment. *Choice C* is incorrect because the text focuses on time periods and says nothing about which region the founders of Kuulo Kataa have been thought to come from; similarly, the text doesn't suggest anything about where the thirteenth-century CE artifacts originated other than not from Kuulo Kataa. Therefore, it isn't logical to conclude that the mere existence of artifacts confirmed as predating the Kuulo Kataa settlement suggests that the founders of the settlement came from a particular region other than one previously assumed. *Choice D* is incorrect because the existence of artifacts from the thirteenth century CE at a site dated to the fourteenth century CE doesn't imply that fourteenth-century objects were damaged during excavations. There's nothing in the text to suggest that any objects were damaged; rather, the existence of artifacts confirmed as predating the settlement's founding suggests that those items were brought to Kuulo Kataa during or after its establishment.

QUESTION 14

Choice A is the best answer because it most logically completes the text's discussion of the evolution of bipedalism in humans. According to the text, one potential explanation for humans walking upright on two legs is that the behavior evolved from an ancestor that mostly stayed on the ground and walked on four limbs, as modern chimpanzees and gorillas do. However, the finding that orangutans, also a relative of humans, sometimes stand on two legs in trees while using their arms to balance and reach for fruits suggests another possible explanation: perhaps a tree-dwelling ancestor of humans began moving on two legs because it offered an advantage, such as access to certain foods.

Choice B is incorrect because the finding that modern orangutans (a relative of humans) sometimes stand on two legs in trees doesn't offer any insight into when either bipedalism or tree-climbing behavior emerged in human ancestors.

Additionally, the text indicates that one theory is that bipedalism evolved from a mostly ground-based ancestor that was already practicing knuckle-walking, not that bipedalism and knuckle-walking developed at the same time. *Choice C* is incorrect because the finding that orangutans (a relative of humans) sometimes stand on two legs in trees doesn't offer any insight into how difficult it would've been to move between the ground and the trees without bipedalism; there's no suggestion that climbing or moving in trees depends on the ability to walk on two legs rather than four, even if that ability might be helpful in certain circumstances. *Choice D* is incorrect because the finding that orangutans (a relative of humans) sometimes stand on two legs in trees doesn't suggest that a knuckle-walking human ancestor could've easily moved on two legs in trees. Although the text indicates that bipedalism may have evolved from a human ancestor that mostly stayed on the ground and walked on four limbs, it gives no indication of how easy it would've been for such an ancestor to move bipedally in trees.

QUESTION 15

Choice A is the best answer because it presents the conclusion that most logically follows from the text's discussion of the study of capuchin monkeys' cognitive abilities. The text explains that the study failed to distinguish between outcomes for the tasks performed by the capuchin monkeys, such that simpler tasks requiring less dexterity, or skill, were judged by the same criteria as tasks that demanded more dexterity. Because the study didn't account for this discrepancy, the researchers might have assumed that observed differences in performance were due to the abilities of the monkeys rather than the complexity of the tasks. In other words, the results may suggest cognitive differences among the monkeys even though such differences may not really exist.

Choice B is incorrect because the text focuses on the fact that the tasks assigned to the capuchin monkeys in the study varied in difficulty and that the variety wasn't taken into consideration. The text doesn't suggest that the capuchin monkeys couldn't perform certain tasks, just that some tasks were more difficult to do. *Choice C* is incorrect because the text doesn't suggest that the study's results are indicative of the abilities of capuchin monkeys but not of other monkey species; in fact, the text suggests that the results may not even be an accurate reflection of capuchin monkeys' abilities. *Choice D* is incorrect because the text doesn't indicate that the researchers compared results for artificial tasks with those for tasks encountered in the wild, although the tasks described in the text—sliding a panel and putting a straw in a bottle—are presumably artificial.

QUESTION 16

Choice D is the best answer because it presents the conclusion that most logically follows from the text's discussion of how digital technologies affected the process of book creation. The text explains that in the late 20th and early 21st centuries digital technologies lowered book production costs most significantly in manufacturing and distribution. The text goes on to point out that authoring, editing, and book design are distinct steps in the process that occur before manufacturing and distribution. Because the savings connected to digital technologies have been most significant in manufacturing and distribution, it's reasonable to infer that those technologies had less of an effect on writing, editing, and designing books.

Choice A is incorrect because the text focuses on lowered book production costs that occur after authoring has taken place; there's no indication in the text whether digital technologies made writing and publishing lengthy books easier.

Choice B is incorrect. Although it's logical to conclude that customers would expect the cost of books to decline if production costs have declined, the text doesn't address customer expectations for the cost of books or any other consumer goods. *Choice C* is incorrect because the text focuses broadly on how digital technologies have affected the cost of the publishing process; it doesn't address the kinds of books being published or how many copies are printed.

QUESTION 17

Choice A is the best answer. The convention being tested is pronoun-antecedent agreement. The plural pronoun "they" agrees in number with the plural antecedent "customers."

Choice B is incorrect because the singular pronoun "one" doesn't agree in number with the plural antecedent "customers." *Choice C* is incorrect because the second person pronoun "you" isn't conventional as a substitute for "customers." It suggests that the audience ("you") is the customer. *Choice D* is incorrect because the singular pronoun "it" doesn't agree in number with the plural antecedent "customers."

QUESTION 18

Choice A is the best answer. The convention being tested is the use of finite and nonfinite verb forms within a sentence. Relative clauses, such as the one beginning with "which," require a finite verb, a verb that can function as the main verb of a clause. This choice correctly supplies the clause with the finite past tense verb "provided."

Choice B is incorrect because the nonfinite participle "having provided" doesn't supply the clause with a finite verb. *Choice C* is incorrect because the nonfinite to-infinitive "to provide" doesn't supply the clause with a finite verb. *Choice D* is incorrect because the nonfinite participle "providing" doesn't supply the clause with a finite verb.

QUESTION 19

Choice A is the best answer. The convention being tested is the coordination of clauses within a sentence. This choice correctly uses a comma and the coordinating conjunction "but" to join a main clause ("Typically...value") and a subordinate clause ("when...Whitman") that precedes a main clause ("such...scholars").

Choice B is incorrect because it results in a run-on sentence. A main clause is fused without punctuation and/or a conjunction to a subordinate clause that precedes a main clause. *Choice C* is incorrect because it results in a comma splice. A comma can't be used in this way to mark the boundary between a main clause and a subordinate clause that precedes a main clause. *Choice D* is incorrect. Without a comma preceding it, the conjunction "but" can't be used in this way to join a main clause and a subordinate clause that precedes a main clause.

QUESTION 20

Choice C is the best answer. The convention being tested is the use of possessive determiners. The plural possessive determiner "their" agrees in number with the plural conjoined noun phrase "Watson and Crick" and thus indicates that the findings were those of Watson and Crick.

Choice A is incorrect because "they're" is the contraction for "they are," not a possessive determiner. *Choice B* is incorrect because "it's" is the contraction for "it is" or "it has," not a possessive determiner. *Choice D* is incorrect because the singular possessive determiner "its" doesn't agree in number with the plural conjoined noun phrase "Watson and Crick."

QUESTION 21

Choice B is the best answer. The convention being tested is the use of finite and nonfinite verb forms within a sentence. The modal “would,” which indicates the future from a perspective in the past, should be accompanied by a nonfinite base form verb. In this choice, the nonfinite base form verb “create” is used correctly in conjunction with the nonfinite base form verb “increase” to describe what the lock would do.

Choice A is incorrect because the finite present tense verb “creates” can’t be used in this way with the modal “would” to describe what the lock would do.

Choice C is incorrect because the present participle “creating” can’t be used in this way with the modal “would” to describe what the lock would do. **Choice D** is incorrect because the finite past tense verb “created” can’t be used in this way with the modal “would” to describe what the lock would do.

QUESTION 22

Choice D is the best answer. The convention being tested is end-of-sentence punctuation. This choice correctly uses a question mark to punctuate the interrogative clause “could the blueberries thrive,” which asks a direct question at the end of the sentence.

Choice A is incorrect because a period can’t be used in this way to punctuate an interrogative clause, such as “could the blueberries thrive,” at the end of a sentence. **Choice B** is incorrect because the context requires an interrogative clause. The declarative clause “the blueberries could thrive” incorrectly indicates that it was known that the blueberries could thrive in alkaline soil, whereas Michel had yet to find this out. **Choice C** is incorrect because a question mark can’t be used in this way to punctuate a declarative clause, such as “the blueberries could thrive,” at the end of a sentence.

QUESTION 23

Choice A is the best answer. The convention being tested is subject-verb agreement. The singular verb “allows” agrees in number with the singular subject “landing.”

Choice B is incorrect because the plural verb “are allowing” doesn’t agree in number with the singular subject “landing.” **Choice C** is incorrect because the plural verb “have allowed” doesn’t agree in number with the singular subject “landing.” **Choice D** is incorrect because the plural verb “allow” doesn’t agree in number with the singular subject “landing.”

QUESTION 24

Choice C is the best answer. “Finally” logically signals that the bill passing—following many attempts between 1968 and 1983—is the final, concluding event in the sequence described in the previous sentences.

Choice A is incorrect because “instead” illogically signals that the bill passing is an alternative to one of the events described in the previous sentences. It is the final event in the sequence. **Choice B** is incorrect because “likewise” illogically signals that the bill passing is similar to one of the events described in the previous sentences. Instead, it is the final event in the sequence. **Choice D** is incorrect because “additionally” illogically signals that the bill passing is merely another event described along with the events of the previous sentences. Instead, it is the final, concluding event in the sequence.

QUESTION 25

Choice A is the best answer. "For instance" logically signals that the information in this sentence—that larch trees lose their needles every fall—is an example supporting the claim in the previous sentence (that not all conifer species keep their leaves or needles year-round).

Choice B is incorrect because "nevertheless" illogically signals that the information in this sentence is true in spite of the claim about conifer species in the previous sentence. Instead, it's an example supporting that claim. **Choice C** is incorrect because "meanwhile" illogically signals that the information in this sentence is separate from (while occurring simultaneously with) the claim about conifer species in the previous sentence. Instead, it's an example supporting that claim. **Choice D** is incorrect because "in addition" illogically signals that the information in this sentence is merely an additional fact related to the claim about conifer species in the previous sentence. Instead, it's an example supporting that claim.

QUESTION 26

Choice A is the best answer. "In addition" logically signals that the detail in this sentence—that Coleridge-Taylor included traditional African music in his classical compositions—adds to the information in the previous sentence. Specifically, the previous sentence indicates one way in which Coleridge-Taylor emphasized his mixed-race ancestry, and the claim that follows indicates a second, additional way.

Choice B is incorrect because "actually" illogically signals that the detail in this sentence is surprising in light of the information in the previous sentence. Instead, the detail adds to the information, indicating a second, additional way in which Coleridge-Taylor emphasized his mixed-race ancestry. **Choice C** is incorrect because "however" illogically signals that the detail in this sentence contrasts with the information in the previous sentence. Instead, the detail adds to the information, indicating a second, additional way in which Coleridge-Taylor emphasized his mixed-race ancestry. **Choice D** is incorrect because "regardless" illogically signals that the detail in this sentence is true despite the information in the previous sentence. Instead, the detail adds to the information, indicating a second, additional way in which Coleridge-Taylor emphasized his mixed-race ancestry.

QUESTION 27

Choice D is the best answer. The sentence uses information from the notes to make a generalization about the kind of study Glickman, Brown, and Song conducted. Specifically, the sentence indicates that the study was of a kind that used statistical methods to address questions of authorship within the field of music.

Choice A is incorrect because the sentence summarizes the methodology and findings of a particular analysis of a single song; it doesn't make a generalization about the kind of study conducted. **Choice B** is incorrect because the sentence mentions the data and conclusion of a particular analysis of a single song; it doesn't make a generalization about the kind of study conducted. **Choice C** is incorrect because the sentence focuses on a specific conclusion from a particular analysis of a single song; it doesn't make a generalization about the kind of study conducted.

Math

Module 1

(22 questions)

QUESTION 1

Choice A is correct. A frequency table is a table that lists the data value and shows the number of times the data value occurs. In the data listed, the number 4 occurs four times, the number 8 occurs three times, and the number 13 occurs two times. This corresponds to the table in choice A.

Choice B is incorrect. This table has the values for number and frequency reversed. **Choice C** is incorrect because the frequency values don't represent the data listed. **Choice D** is incorrect. This table represents the listed number values as the frequency values.

QUESTION 2

Choice B is correct. The given expression may be rewritten as $x^2 + 8x - 5x - 40$. Since the first two terms of this expression have a common factor of x and the last two terms of this expression have a common factor of -5 , this expression may be rewritten as $x(x) + x(8) - 5(x) - 5(8)$, or $x(x + 8) - 5(x + 8)$. Since each term of this expression has a common factor of $(x + 8)$, it may be rewritten as $(x - 5)(x + 8)$.

Alternate approach: An expression of the form $x^2 + bx + c$, where b and c are constants, can be factored if there are two values that add to give b and multiply to give c . In the given expression, $b = 3$ and $c = -40$. The values of -5 and 8 add to give 3 and multiply to give -40 , so the expression can be factored as $(x - 5)(x + 8)$.

Choice A is incorrect. This expression is equivalent to $x^2 + 6x - 40$, not $x^2 + 3x - 40$.

Choice C is incorrect. This expression is equivalent to $x^2 - 3x - 40$, not $x^2 + 3x - 40$.

Choice D is incorrect. This expression is equivalent to $x^2 - 6x - 40$, not $x^2 + 3x - 40$.

QUESTION 3

Choice A is correct. Since Jay walks at a speed of 3 miles per hour for w hours, Jay walks a total of $3w$ miles. Since Jay runs at a speed of 5 miles per hour for r hours, Jay runs a total of $5r$ miles. Therefore, the total number of miles Jay travels can be represented by $3w + 5r$. Since the combined total number of miles is 14, the equation $3w + 5r = 14$ represents this situation.

Choice B is incorrect and may result from conceptual errors. **Choice C** is incorrect and may result from conceptual errors. **Choice D** is incorrect and may result from conceptual errors.

QUESTION 4

Choice D is correct. The sum of the angle measures of a triangle is 180° . Adding the measures of angles B and C gives $52 + 17 = 69^\circ$. Therefore, the measure of angle A is $180 - 69 = 111^\circ$.

Choice A is incorrect and may result from subtracting the sum of the measures of angles B and C from 90° , instead of from 180° . **Choice B** is incorrect and may result from subtracting the measure of angle C from the measure of angle B . **Choice C** is incorrect and may result from adding the measures of angles B and C but not subtracting the result from 180° .

QUESTION 5

Choice A is correct. It's given that the electrician charges a onetime fee plus an hourly rate. It's also given that the graph represents the total charge, in dollars, for x hours of work. This graph shows a linear relationship in the xy -plane. Thus, the total charge y , in dollars, for x hours of work can be represented as $y = mx + b$, where m is the slope and $(0, b)$ is the y -intercept of the graph of the equation in the xy -plane. Since the given graph represents the total charge, in dollars, by an electrician for x hours of work, it follows that its slope is m , or the electrician's hourly rate.

Choice B is incorrect. The electrician's onetime fee is represented by the y -coordinate of the y -intercept, not the slope, of the graph. **Choice C** is incorrect and may result from conceptual errors. **Choice D** is incorrect and may result from conceptual errors.

QUESTION 6

The correct answer is $\frac{3}{10}$. It's given that there are a total of 100 tiles of equal area, which is the total number of possible outcomes. According to the table, there are a total of 30 red tiles. The probability of an event occurring is the ratio of the number of favorable outcomes to the total number of possible outcomes.

By definition, the probability of selecting a red tile is given by $\frac{30}{100}$, or $\frac{3}{10}$. Note that $3/10$ and $.3$ are examples of ways to enter a correct answer.

QUESTION 7

Choice C is correct. It's given that an estimated 35% of people in the population support the legislation, with an associated margin of error of 3%. Subtracting and adding the margin of error from the estimate gives an interval of plausible values for the true percentage of people in the population who support the legislation. Therefore, it's plausible that between 32% and 38% of people in this population support the legislation. The corresponding numbers of people represented by these percentages in the population can be calculated by multiplying the total population, 50,000, by 0.32 and by 0.38, which gives $50,000(0.32) = 16,000$ and $50,000(0.38) = 19,000$, respectively. It follows that any value in the interval 16,000 to 19,000 is a plausible value for the total number of people in the population who support the proposed legislation. Of the choices given, only 16,750 is in this interval.

Choice A is incorrect. This is the number of people in the sample, rather than in the population, who support the legislation. **Choice B** is incorrect. This is the number of people in the sample who do not support the legislation. **Choice D** is incorrect. This is a plausible value for the total number of people in the population who do not support the proposed legislation.

QUESTION 8

The correct answer is 5. Multiplying both sides of the given equation by $x + 6$ results in $55 = x(x + 6)$. Applying the distributive property of multiplication to the right-hand side of this equation results in $55 = x^2 + 6x$. Subtracting 55 from both sides of this equation results in $0 = x^2 + 6x - 55$. The right-hand side of this equation can be rewritten by factoring. The two values that multiply to -55 and add to 6 are 11 and -5 . It follows that the equation $0 = x^2 + 6x - 55$ can be rewritten as $0 = (x + 11)(x - 5)$. Setting each factor equal to 0 yields two equations: $x + 11 = 0$ and $x - 5 = 0$. Subtracting 11 from both sides of the equation $x + 11 = 0$ results in $x = -11$. Adding 5 to both sides of the equation $x - 5 = 0$ results in $x = 5$. Therefore, the positive solution to the given equation is 5.

QUESTION 9

Choice B is correct. It's given that the airplane descends at a constant rate of 400 feet per minute. Since the altitude decreases by a constant amount during each fixed time period, the relationship between the airplane's altitude and time is linear. Since the airplane descends from an altitude of 9,500 feet to 5,000 feet, the airplane's altitude is decreasing with time. Thus, the relationship is best modeled by a decreasing linear function.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 10

Choice A is correct. The x -coordinate of any y -intercept of a graph is 0.

Substituting 0 for x in the given equation yields $g(0) = 11\left(\frac{1}{12}\right)^0$. Since any

nonzero number raised to the 0th power is 1, this gives $g(0) = 11 \cdot 1$, or $g(0) = 11$.

The y -intercept of the graph is, therefore, the point (0, 11).

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 11

Choice B is correct. Since PR and QS are diameters of the circle shown, OS , OR , OP , and OQ are radii of the circle and are therefore congruent. Since $\angle SOP$ and $\angle ROQ$ are vertical angles, they are congruent. Therefore, arc PS and arc QR are formed by congruent radii and have the same angle measure, so they are congruent arcs. Similarly, $\angle SOR$ and $\angle POQ$ are vertical angles, so they are congruent. Therefore, arc SR and arc PQ are formed by congruent radii and have the same angle measure, so they are congruent arcs. Let x represent the length of arc SR . Since arc SR and arc PQ are congruent arcs, the length of arc PQ can also be represented by x . It's given that the length of arc PS is twice the length of arc PQ . Therefore, the length of arc PS can be represented by the expression $2x$. Since arc PS and arc QR are congruent arcs, the length of arc QR can also be represented by $2x$. This gives the expression $x + x + 2x + 2x$. Since it's given that the circumference is 144π , the expression $x + x + 2x + 2x$ is equal to 144π . Thus $x + x + 2x + 2x = 144\pi$, or $6x = 144\pi$. Dividing both sides of this equation by 6 yields $x = 24\pi$. Therefore, the length of arc QR is $2(24\pi)$, or 48π .

Choice A is incorrect. This is the length of arc PQ , not arc QR . **Choice C** is incorrect and may result from conceptual or calculation errors. **Choice D** is incorrect and may result from conceptual or calculation errors.

QUESTION 12

Choice B is correct. The area of a rectangle is equal to its length multiplied by its width. Multiplying the given length, x units, by the given width, $(x - 15)$ units, yields $x(x - 15)$ square units. If the rectangle has an area of 76 square units, it follows that $x(x - 15) = 76$, or $x^2 - 15x = 76$. Subtracting 76 from both sides of this equation yields $x^2 - 15x - 76 = 0$. Factoring the left-hand side of this equation yields $(x - 19)(x + 4) = 0$. Applying the zero product property to this equation yields two solutions: $x = 19$ and $x = -4$. Since x is the rectangle's length, in units, which must be positive, the value of x is 19.

Choice A is incorrect. This is the width, in units, of the rectangle, not the value of x . **Choice C** is incorrect and may result from conceptual or calculation errors. **Choice D** is incorrect. This is the area, in square units, of the rectangle, not the value of x .

QUESTION 13

Choice C is correct. It's given that the relationship between t and n is exponential. The table shows that the value of n increases as the value of t increases. Therefore, the relationship between t and n can be represented by an increasing exponential equation of the form $n = a(1 + b)^t$, where a and b are positive constants. The table shows that when $t = 0$, $n = 604$. Substituting 0 for t and 604 for n in the equation $n = a(1 + b)^t$ yields $604 = a(1 + b)^0$, which is equivalent to $604 = a(1)$, or $604 = a$. Substituting 604 for a in the equation $n = a(1 + b)^t$ yields $n = 604(1 + b)^t$. The table also shows that when $t = 1$, $n = 606.42$. Substituting 1 for t and 606.42 for n in the equation $n = 604(1 + b)^t$ yields $606.42 = 604(1 + b)^1$, or $606.42 = 604(1 + b)$. Dividing both sides of this equation by 604 yields approximately $1.004 = 1 + b$. Subtracting 1 from both sides of this equation yields that the value of b is approximately 0.004. Substituting 0.004 for b in the equation $n = 604(1 + b)^t$ yields $n = 604(1 + 0.004)^t$. Therefore, of the choices, choice C best represents the relationship between t and n .

Choice A is incorrect and may result from conceptual or calculation errors. **Choice B** is incorrect and may result from conceptual or calculation errors. **Choice D** is incorrect and may result from conceptual or calculation errors.

QUESTION 14

Choice B is correct. Each given equation is written in slope-intercept form, $y = mx + b$, where m is the slope and $(0, b)$ is the y -intercept of the graph of the equation in the xy -plane. The graphs of two lines that have different slopes will intersect at exactly one point. The graph of the first equation is a line with slope 1. The graph of the second equation is a line with slope 8. Since the graphs are lines with different slopes, they will intersect at exactly one point.

Choice A is incorrect because two graphs of linear equations have 0 intersection points only if they are parallel and therefore have the same slope. **Choice C** is incorrect because two graphs of linear equations in the xy -plane can have only 0, 1, or infinitely many points of intersection. **Choice D** is incorrect because two graphs of linear equations in the xy -plane can have only 0, 1, or infinitely many points of intersection.

QUESTION 15

The correct answer is 40. It's given that $5G + 45R = 380$, where G is the number of green tokens and R is the number of red tokens won by one student and these tokens are worth a total of 380 points. Since the equation represents the situation where the student won points with green tokens and red tokens for a

total of 380 points, each term on the left-hand side of the equation represents the number of points won for one of the colors. Since the coefficient of G in the given equation is 5, a green token must be worth 5 points. Similarly, since the coefficient of R in the given equation is 45, a red token must be worth 45 points. Therefore, a red token is worth $45 - 5$ points, or 40 points, more than a green token.

QUESTION 16

Choice D is correct. Since the number of bacteria doubles every day, the relationship between t and y can be represented by an exponential equation of the form $y = a(b)^t$, where a is the number of bacteria at the start of the observation and the number of bacteria increases by a factor of b every day. It's given that there are 44,000 bacteria at the start of the observation. Therefore, $a = 44,000$. It's also given that the number of bacteria doubles, or increases by a factor of 2, every day. Therefore, $b = 2$. Substituting 44,000 for a and 2 for b in the equation $y = a(b)^t$ yields $y = 44,000(2)^t$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect. This equation represents a situation where the number of bacteria is decreasing by half, not doubling, every day.

QUESTION 17

Choice C is correct. The base of a cylinder is a circle with a diameter equal to the diameter of the cylinder. The volume, V , of a cylinder can be found by multiplying the area of the circular base, A , by the height of the cylinder, h , or $V = Ah$. The area of a circle can be found using the formula $A = \pi r^2$, where r is the radius of the circle. It's given that the diameter of the cylinder is 8 inches. Thus, the radius of this circle is 4 inches. Therefore, the area of the circular base of the cylinder is $A = \pi(4)^2$, or 16π square inches. It's given that the height h of the cylinder is 12 inches. Substituting 16π for A and 12 for h in the formula $V = Ah$ gives $V = 16\pi(12)$, or 192π cubic inches.

Choice A is incorrect. This is the area of the circular base of the cylinder.

Choice B is incorrect and may result from using 8, instead of 16, as the value of r^2 in the formula for the area of a circle. **Choice D** is incorrect and may result from using 8, instead of 4, for the radius of the circular base.

QUESTION 18

Choice A is correct. The given system of linear equations can be solved by the elimination method. Multiplying each side of the second equation in the given system by 3 yields $(2x + 2y)(3) = (10)(3)$, or $6x + 6y = 30$. Subtracting this equation from the first equation in the given system yields $(6x + 7y) - (6x + 6y) = (28) - (30)$, which is equivalent to $(6x - 6x) + (7y - 6y) = 28 - 30$, or $y = -2$.

Choice B is incorrect. This is the value of x , not the value of y . **Choice C** is incorrect and may result from conceptual or calculation errors. **Choice D** is incorrect and may result from conceptual or calculation errors.

QUESTION 19

The correct answer is $\frac{15}{17}$. It's given that angle J is the right angle in triangle JKL .

Therefore, the acute angles of triangle JKL are angle K and angle L . The hypotenuse of a right triangle is the side opposite its right angle. Therefore, the hypotenuse of triangle JKL is side KL . The cosine of an acute angle in a right

triangle is the ratio of the length of the side adjacent to the angle to the length of the hypotenuse. It's given that $\cos(K) = \frac{24}{51}$. This can be written as $\cos(K) = \frac{8}{17}$.

Since the cosine of angle K is a ratio, it follows that the length of the side adjacent to angle K is $8n$ and the length of the hypotenuse is $17n$, where n is a constant. Therefore, $JK = 8n$ and $KL = 17n$. The Pythagorean theorem states that in a right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the other two sides. For triangle JKL , it follows that $(JK)^2 + (JL)^2 = (KL)^2$. Substituting $8n$ for JK and $17n$ for KL yields $(8n)^2 + (JL)^2 = (17n)^2$. This is equivalent to $64n^2 + (JL)^2 = 289n^2$. Subtracting $64n^2$

from each side of this equation yields $(JL)^2 = 225n^2$. Taking the square root of each

side of this equation yields $JL = 15n$. Since $\cos(L) = \frac{JL}{KL}$, it follows that $\cos(L) = \frac{15n}{17n}$, which can be rewritten as $\cos(L) = \frac{15}{17}$. Note that $15/17$, .8824, .8823, and 0.882 are

examples of ways to enter a correct answer.

QUESTION 20

The correct answer is $\frac{25}{4}$. The given equation can be rewritten in the

form $f(x) = a(x - h)^2 + k$, where a , h , and k are constants. When $a > 0$, h is the value of x for which $f(x)$ reaches its minimum. The given

equation can be rewritten as $f(x) = 4\left(x^2 - \frac{50}{4}x\right) + 126$, which is equivalent to

$f(x) = 4\left(x^2 - \frac{50}{4}x + \left(\frac{50}{8}\right)^2 - \left(\frac{50}{8}\right)^2\right) + 126$. This equation can be rewritten as

$f(x) = 4\left(\left(x - \frac{50}{8}\right)^2 - \left(\frac{50}{8}\right)^2\right) + 126$, or $f(x) = 4\left(x - \frac{50}{8}\right)^2 - 4\left(\frac{50}{8}\right)^2 + 126$, which is

equivalent to $f(x) = 4\left(x - \frac{25}{4}\right)^2 - \frac{121}{4}$. Therefore, $h = \frac{25}{4}$, so the value of x for

which $f(x)$ reaches its minimum is $\frac{25}{4}$. Note that $25/4$ and 6.25 are examples of ways to enter a correct answer.

QUESTION 21

The correct answer is 24. A line in the xy -plane can be defined by the equation $y = mx + b$, where m is the slope of the line and b is the y -coordinate of the y -intercept of the line. It's given that line ℓ passes through the point $(0, 0)$.

Therefore, the y -coordinate of the y -intercept of line ℓ is 0. It's given that line ℓ is parallel to the line represented by the equation $y = 8x + 2$. Since parallel lines have the same slope, it follows that the slope of line ℓ is 8. Therefore, line ℓ can be defined by an equation in the form $y = mx + b$, where $m = 8$ and $b = 0$. Substituting 8 for m and 0 for b in $y = mx + b$ yields the equation $y = 8x + 0$, or $y = 8x$. If line ℓ passes through the point $(3, d)$, then when $x = 3$, $y = d$ for the equation $y = 8x$. Substituting 3 for x and d for y in the equation $y = 8x$ yields $d = 8(3)$, or $d = 24$.

QUESTION 22

The correct answer is $\frac{81}{4}$. The given linear equation is $2y = c$. Dividing both sides of this equation by 2 yields $y = \frac{c}{2}$. Substituting $\frac{c}{2}$ for y in the equation

of the parabola yields $\frac{c}{2} = -2x^2 + 9x$. Adding $2x^2$ and $-9x$ to both sides of this

equation yields $2x^2 - 9x + \frac{c}{2} = 0$. Since it's given that the line and the parabola intersect at exactly one point, the equation $2x^2 - 9x + \frac{c}{2} = 0$ must have exactly

one solution. An equation of the form $Ax^2 + Bx + C = 0$, where A , B , and C are constants, has exactly one solution when the discriminant, $B^2 - 4AC$, is

equal to 0. In the equation $2x^2 - 9x + \frac{c}{2} = 0$, where $A = 2$, $B = -9$, and $C = \frac{c}{2}$,

the discriminant is $(-9)^2 - 4(2)\left(\frac{c}{2}\right)$. Setting the discriminant equal to 0 yields

$(-9)^2 - 4(2)\left(\frac{c}{2}\right) = 0$, or $81 - 4c = 0$. Adding $4c$ to both sides of this equation

yields $81 = 4c$. Dividing both sides of this equation by 4 yields $c = \frac{81}{4}$. Note that $81/4$ and 20.25 are examples of ways to enter a correct answer.



Math

Module 2

(22 questions)

QUESTION 1

Choice B is correct. The median of a data set with an odd number of data values is defined as the middle value of the ordered list of values. The data set shown has nine values, so the median is the fifth value in the ordered list, which is 77.

Choice A is incorrect. This is the minimum value of the data set, not the median.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect. This is the mean of the data set, not the median.

QUESTION 2

The correct answer is 55. Subtracting 40 from both sides of the given equation yields $x = 55$. Therefore, the value of x is 55.

QUESTION 3

Choice C is correct. The area of a rectangle with length ℓ and width w can be found using the formula $A = \ell w$. It's given that the rectangle has a length of 17 cm and a width of 7 cm. Therefore, the area of this rectangle is $A = 17(7)$, or 119 cm^2 .

Choice A is incorrect. This is the sum of the length and width of the rectangle, not the area. *Choice B* is incorrect. This is the perimeter of the rectangle, not the area. *Choice D* is incorrect. This is the sum of the length and width of the rectangle squared, not the area.

QUESTION 4

Choice B is correct. Combining like terms inside the parentheses of the given expression, $20w - (4w + 3w)$, yields $20w - (7w)$. Combining like terms in this resulting expression yields $13w$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 5

Choice D is correct. It's given that the number y is 84 less than the number x . A number that's 84 less than the number x is equivalent to 84 subtracted from the number x , or $x - 84$. Therefore, the equation $y = x - 84$ represents the relationship between x and y .

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

QUESTION 6

Choice A is correct. Since the given expressions are equivalent and the numerator of the second expression is $\frac{1}{6}$ of the numerator of the first expression, the denominator of the second expression must also be $\frac{1}{6}$ of the denominator of the first expression. By the distributive property, $\frac{1}{6}(6x + 42)$ is equivalent to $\frac{1}{6}(6x) + \frac{1}{6}(42)$, or $x + 7$. Therefore, the value of b is 7.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 7

The correct answer is 240. It's given that 80% of the 300 seeds sprouted. Therefore, the number of seeds that sprouted can be calculated by multiplying the number of seeds that were planted by $\frac{80}{100}$, which gives $300\left(\frac{80}{100}\right)$, or 240.

QUESTION 8

Choice B is correct. It's given that Ty plans to walk at an average speed of 4 kilometers per hour. The number of kilometers Ty will walk is determined by the expression $4s$, where s is the number of hours Ty walks. The given goal of at least 24 kilometers means that the inequality $4s \geq 24$ represents the situation. Dividing both sides of this inequality by 4 gives $s \geq 6$, which corresponds to a minimum of 6 hours Ty must walk.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 9

The correct answer is 27. Multiplying both sides of the given equation by 3 yields $3(6 + x) = 3(9)$, or $18 + 3x = 27$. Therefore, the value of $18 + 3x$ is 27.

QUESTION 10

Choice C is correct. It's given that $f(x) = x^3 + 9$. Substituting 2 for x in this equation yields $f(2) = (2)^3 + 9$. This is equivalent to $f(2) = 8 + 9$, or $f(2) = 17$.

Choice A is incorrect. This is the value of $2 + 3 + 9$, not $2^3 + 9$.

Choice B is incorrect. This is the value of $2(3) + 9$, not $2^3 + 9$.

Choice D is incorrect. This is the value of $3^2 + 9$, not $2^3 + 9$.

QUESTION 11

Choice C is correct. It's given that $f(x)$ is the total cost, in dollars, to lease a car from this dealership with a monthly payment of x dollars. Therefore, the total cost, in dollars, to lease the car when the monthly payment is \$400 is represented by the value of $f(x)$ when $x = 400$. Substituting 400 for x in the equation $f(x) = 36x + 1,000$ yields $f(400) = 36(400) + 1,000$, or $f(400) = 15,400$. Thus, when the monthly payment is \$400, the total cost to lease a car is \$15,400.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 12

Choice D is correct. The value of $g(x)$ when $x = 8$ can be found by substituting 8 for x in the given equation $g(x) = 10x + 8$. This yields $g(8) = 10(8) + 8$, or $g(8) = 88$. Therefore, when $x = 8$, the value of $g(x)$ is 88.

Choice A is incorrect. This is the value of x when $g(x) = 8$, rather than the value of $g(x)$ when $x = 8$. **Choice B** is incorrect and may result from conceptual or calculation errors. **Choice C** is incorrect and may result from conceptual or calculation errors.

QUESTION 13

The correct answer is 47. Based on the figure, the angle with measure x° and the angle with measure 133° together form a straight line. Therefore, these two angles are supplementary, so the sum of their measures is 180° . It follows that $x + 133 = 180$. Subtracting 133 from both sides of this equation yields $x = 47$.

QUESTION 14

Choice D is correct. The x -coordinate a of the x -intercept $(a, 0)$ can be found by substituting 0 for y in the given equation, which gives $7x + 2(0) = -31$, or $7x = -31$.

Dividing both sides of this equation by 7 yields $x = -\frac{31}{7}$. Therefore, the value of a is $-\frac{31}{7}$. The y -coordinate b of the y -intercept $(0, b)$ can be found by substituting

0 for x in the given equation, which gives $7(0) + 2y = -31$, or $2y = -31$. Dividing both sides of this equation by 2 yields $y = -\frac{31}{2}$. Therefore, the value of b is $-\frac{31}{2}$. It

follows that the value of $\frac{b}{a}$ is $\frac{-\frac{31}{2}}{-\frac{31}{7}}$, which is equivalent to $\left(\frac{31}{2}\right)\left(\frac{7}{31}\right)$, or $\frac{7}{2}$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

QUESTION 15

Choice A is correct. If the object travels 108 centimeters at a speed of 12 centimeters per second, the time of travel can be determined by dividing

the total distance by the speed. This results in $\frac{108 \text{ centimeters}}{12 \text{ centimeters/second}}$, which is 9 seconds.

Choice B is incorrect and may result from conceptual or calculation errors.
 Choice C is incorrect and may result from conceptual or calculation errors.
 Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 16

Choice C is correct. It's given that John made a \$16 payment each month for p months. The total amount of these payments can be represented by the expression $16p$. The down payment can be added to that amount to find the total amount John paid, yielding the expression $16p + 37$. It's given that John paid a total of \$165. Therefore, the expression for the total amount John paid can be set equal to that amount, yielding the equation $16p + 37 = 165$.

Choice A is incorrect and may result from conceptual or calculation errors.
 Choice B is incorrect and may result from conceptual or calculation errors.
 Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 17

Choice D is correct. A linear relationship can be represented by an equation of the form $y = mx + b$, where m and b are constants. It's given in the table that when $x = 0$, $y = 18$. Substituting 0 for x and 18 for y in $y = mx + b$ yields $18 = m(0) + b$, or $18 = b$. Substituting 18 for b in the equation $y = mx + b$ yields $y = mx + 18$. It's also given in the table that when $x = 1$, $y = 13$. Substituting 1 for x and 13 for y in the equation $y = mx + 18$ yields $13 = m(1) + 18$, or $13 = m + 18$. Subtracting 18 from both sides of this equation yields $-5 = m$. Therefore, the equation $y = -5x + 18$ represents the relationship between x and y .

Choice A is incorrect and may result from conceptual or calculation errors.
 Choice B is incorrect and may result from conceptual or calculation errors.
 Choice C is incorrect and may result from conceptual or calculation errors.

QUESTION 18

Choice D is correct. It's given that the equation $h = -4.9t^2 + 7t + 9$ represents this situation, where h is the height, in meters, of the object t seconds after it is kicked. It follows that the height, in meters, from which the object was kicked is the value of h when $t = 0$. Substituting 0 for t in the equation $h = -4.9t^2 + 7t + 9$ yields $h = -4.9(0)^2 + 7(0) + 9$, or $h = 9$. Therefore, the object was kicked from a height of 9 meters.

Choice A is incorrect and may result from conceptual or calculation errors.
 Choice B is incorrect and may result from conceptual or calculation errors.
 Choice C is incorrect and may result from conceptual or calculation errors.

QUESTION 19

Choice B is correct. It's given that $h(x) = x^2 - 3$. Each table gives 1, 2, and 3 as the three given values of x . Substituting 1 for x in the equation $h(x) = x^2 - 3$ yields $h(1) = (1)^2 - 3$, or $h(1) = -2$. Substituting 2 for x in the equation $h(x) = x^2 - 3$ yields $h(2) = (2)^2 - 3$, or $h(2) = 1$. Finally, substituting 3 for x in the equation $h(x) = x^2 - 3$ yields $h(3) = (3)^2 - 3$, or $h(3) = 6$. Therefore, $h(x)$ is -2 when x is 1, $h(x)$ is 1 when x is 2, and $h(x)$ is 6 when x is 3. Choice B is a table with these values of x and their corresponding values of $h(x)$.

Choice A is incorrect. This is a table of values for the function $h(x) = x + 3$, not $h(x) = x^2 - 3$. Choice C is incorrect. This is a table of values for the function $h(x) = 2x - 3$, not $h(x) = x^2 - 3$. Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 20

Choice D is correct. Since f is a linear function, it can be defined by an equation of the form $f(x) = ax + b$, where a and b are constants. It's given that $f(0) = 8$. Substituting 0 for x and 8 for $f(x)$ in the equation $f(x) = ax + b$ yields $8 = a(0) + b$, or $8 = b$. Substituting 8 for b in the equation $f(x) = ax + b$ yields $f(x) = ax + 8$. It's given that $f(1) = 12$. Substituting 1 for x and 12 for $f(x)$ in the equation $f(x) = ax + 8$ yields $12 = a(1) + 8$, or $12 = a + 8$. Subtracting 8 from both sides of this equation yields $a = 4$. Substituting 4 for a in the equation $f(x) = ax + 8$ yields $f(x) = 4x + 8$. Therefore, an equation that defines f is $f(x) = 4x + 8$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

QUESTION 21

Choice A is correct. Subtracting $14j$ from each side of the given equation results in $5k = m - 14j$. Dividing each side of this equation by 5 results in

$$k = \frac{m - 14j}{5}$$

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 22

Choice D is correct. The hypotenuse of triangle RST is the longest side and is across from the right angle. The longest side length given is 584, which is the length of side TR . Therefore, the hypotenuse of triangle RST is side TR , so the right angle is angle S . The tangent of an acute angle in a right triangle is the ratio of the length of the opposite side, which is the side across from the angle, to the length of the adjacent side, which is the side closest to the angle that is not the hypotenuse. It follows that the opposite side of angle T is side RS

and the adjacent side of angle T is side ST . Therefore, $\tan T = \frac{RS}{ST}$. Substituting 440 for RS and 384 for ST in this equation yields $\tan T = \frac{440}{384}$. This is equivalent to $\tan T = \frac{55}{48}$. It's given that triangle RST is similar to triangle UVW , where S

corresponds to V and T corresponds to W . It follows that R corresponds to U . Therefore, the hypotenuse of triangle UVW is side WU , which means

$\tan W = \frac{UV}{VW}$. Since the lengths of corresponding sides of similar triangles are proportional, $\frac{RS}{ST} = \frac{UV}{VW}$. Therefore, $\tan W = \frac{UV}{VW}$ is equivalent to $\tan W = \frac{RS}{ST}$, or $\tan W = \tan T$. Thus, $\tan W = \frac{55}{48}$.

Choice A is incorrect. This is the value of $\cos W$, not $\tan W$. **Choice B** is incorrect. This is the value of $\sin W$, not $\tan W$. **Choice C** is incorrect. This is the value of $\frac{1}{\tan W}$, not $\tan W$.

**SAT**

Scoring Your Paper SAT Practice Test #1

Congratulations on completing an SAT[®] practice test.
To score your test, follow the instructions in this guide.

IMPORTANT: This scoring guide is for students who completed the paper version of this digital SAT practice test.

1 Total Score 400–1600 Scale	Total Score	
2 Section Scores 200–800 Scale	Reading and Writing	Math
	Modules 1 & 2	Modules 1 & 2

Scores Overview

Each assessment in the digital SAT Suite (SAT, PSAT/NMSQT[®], PSAT[™] 10, and PSAT[™] 8/9) reports test scores on a common scale.

For more details about scores, visit sat.org/scores.

How to Calculate Your Practice Test Scores

The worksheets on pages 390 and 391 help you calculate your test scores.

GET SET UP

- 1 In addition to your practice test, you'll need the conversion tables and answer key at the end of this guide.

SCORE YOUR PRACTICE TEST

- 2 Compare your answers to the answer key on page 390, and count up the total number of correct answers for each section. Write the number of correct answers for each section in the answer key at the bottom of that section.

CALCULATE YOUR SCORES

- 3 Using your marked-up answer key and the conversion tables, follow the directions on page 391 to get your section and test scores.

**SAT Practice Test Worksheet:
Section and Total Scores**

Conversion: Calculate Your Section and Total Scores

Look for numbers in round brackets () to refer to the conversion steps to convert the raw score of this section into a scaled score. Then, look for numbers in square brackets [] to refer to the conversion steps to convert the scaled score of this section into a section score. Finally, look for numbers in curly braces { } to refer to the conversion steps to convert the section scores into a total score.

Raw Score Conversion Table: Section Scores

Raw Score	Reading and Writing Section Score	Math Section Score	Science Section Score	Total Score
1	10	10	10	30
2	15	15	15	45
3	20	20	20	60
4	25	25	25	75
5	30	30	30	90
6	35	35	35	105
7	40	40	40	120
8	45	45	45	135
9	50	50	50	150
10	55	55	55	165
11	60	60	60	180
12	65	65	65	195
13	70	70	70	210
14	75	75	75	225
15	80	80	80	240
16	85	85	85	255
17	90	90	90	270
18	95	95	95	285
19	100	100	100	300
20	105	105	105	315
21	110	110	110	330
22	115	115	115	345
23	120	120	120	360
24	125	125	125	375
25	130	130	130	390
26	135	135	135	405
27	140	140	140	420
28	145	145	145	435
29	150	150	150	450
30	155	155	155	465
31	160	160	160	480
32	165	165	165	495
33	170	170	170	510
34	175	175	175	525
35	180	180	180	540
36	185	185	185	555
37	190	190	190	570
38	195	195	195	585
39	200	200	200	600
40	205	205	205	615
41	210	210	210	630
42	215	215	215	645
43	220	220	220	660
44	225	225	225	675
45	230	230	230	690
46	235	235	235	705
47	240	240	240	720
48	245	245	245	735
49	250	250	250	750
50	255	255	255	765
51	260	260	260	780
52	265	265	265	795
53	270	270	270	810
54	275	275	275	825
55	280	280	280	840
56	285	285	285	855
57	290	290	290	870
58	295	295	295	885
59	300	300	300	900
60	305	305	305	915
61	310	310	310	930
62	315	315	315	945
63	320	320	320	960
64	325	325	325	975
65	330	330	330	990
66	335	335	335	1005
67	340	340	340	1020
68	345	345	345	1035
69	350	350	350	1050
70	355	355	355	1065
71	360	360	360	1080
72	365	365	365	1095
73	370	370	370	1110
74	375	375	375	1125
75	380	380	380	1140
76	385	385	385	1155
77	390	390	390	1170
78	395	395	395	1185
79	400	400	400	1200
80	405	405	405	1215
81	410	410	410	1230
82	415	415	415	1245
83	420	420	420	1260
84	425	425	425	1275
85	430	430	430	1290
86	435	435	435	1305
87	440	440	440	1320
88	445	445	445	1335
89	450	450	450	1350
90	455	455	455	1365
91	460	460	460	1380
92	465	465	465	1395
93	470	470	470	1410
94	475	475	475	1425
95	480	480	480	1440
96	485	485	485	1455
97	490	490	490	1470
98	495	495	495	1485
99	500	500	500	1500
100	505	505	505	1515
101	510	510	510	1530
102	515	515	515	1545
103	520	520	520	1560
104	525	525	525	1575
105	530	530	530	1590
106	535	535	535	1605
107	540	540	540	1620
108	545	545	545	1635
109	550	550	550	1650
110	555	555	555	1665
111	560	560	560	1680
112	565	565	565	1695
113	570	570	570	1710
114	575	575	575	1725
115	580	580	580	1740
116	585	585	585	1755
117	590	590	590	1770
118	595	595	595	1785
119	600	600	600	1800
120	605	605	605	1815
121	610	610	610	1830
122	615	615	615	1845
123	620	620	620	1860
124	625	625	625	1875
125	630	630	630	1890
126	635	635	635	1905
127	640	640	640	1920
128	645	645	645	1935
129	650	650	650	1950
130	655	655	655	1965
131	660	660	660	1980
132	665	665	665	1995
133	670	670	670	2010
134	675	675	675	2025
135	680	680	680	2040
136	685	685	685	2055
137	690	690	690	2070
138	695	695	695	2085
139	700	700	700	2100
140	705	705	705	2115
141	710	710	710	2130
142	715	715	715	2145
143	720	720	720	2160
144	725	725	725	2175
145	730	730	730	2190
146	735	735	735	2205
147	740	740	740	2220
148	745	745	745	2235
149	750	750	750	2250
150	755	755	755	2265
151	760	760	760	2280
152	765	765	765	2295
153	770	770	770	2310
154	775	775	775	2325
155	780	780	780	2340
156	785	785	785	2355
157	790	790	790	2370
158	795	795	795	2385
159	800	800	800	2400
160	805	805	805	2415
161	810	810	810	2430
162	815	815	815	2445
163	820	820	820	2460
164	825	825	825	2475
165	830	830	830	2490
166	835	835	835	2505
167	840	840	840	2520
168	845	845	845	2535
169	850	850	850	2550
170	855	855	855	2565
171	860	860	860	2580
172	865	865	865	2595
173	870	870	870	2610
174	875	875	875	2625
175	880	880	880	2640
176	885	885	885	2655
177	890	890	890	2670
178	895	895	895	2685
179	900	900	900	2700
180	905	905	905	2715
181	910	910	910	2730
182	915	915	915	2745
183	920	920	920	2760
184	925	925	925	2775
185	930	930	930	2790
186	935	935	935	2805
187	940	940	940	2820
188	945	945	945	2835
189	950	950	950	2850
190	955	955	955	2865
191	960	960	960	2880
192	965	965	965	2895
193	970	970	970	2910
194	975	975	975	2925
195	980	980	980	2940
196	985	985	985	2955
197	990	990	990	2970
198	995	995	995	2985
199	1000	1000	1000	3000
200	1005	1005	1005	3015
201	1010	1010	1010	3030
202	1015	1015	1015	3045
203	1020	1020	1020	3060
204	1025	1025	1025	3075
205	1030	1030	1030	3090
206	1035	1035	1035	3105
207	1040	1040	1040	3120
208	1045	1045	1045	3135
209	1050	1050	1050	3150
210	1055	1055	1055	3165
211	1060	1060	1060	3180
212	1065	1065	1065	3195
213	1070	1070	1070	3210
214	1075	1075	1075	3225
215	1080	1080	1080	3240
216	1085	1085	1085	3255
217	1090	1090	1090	3270
218	1095	1095	1095	3285
219	1100	1100	1100	3300
220	1105	1105	1105	3315
221	1110	1110	1110	3330
222	1115	1115	1115	3345
223	1120	1120	1120	3360
224	1125	1125	1125	3375
225	1130	1130	1130	3390
226	1135	1135	1135	3405
227	1140	1140	1140	3420
228	1145	1145	1145	3435
229	1150	1150	1150	3450
230	1155	1155	1155	3465
231	1160	1160	1160	3480
232	1165	1165	1165	3495
233	1170	1170	1170	3510
234	1175	1175	1175	3525
235	1180	1180	1180	3540
236	1185	1185	1185	3555
237	1190	1190	1190	3570
238	1195	1195	1195	3585
239	1200	1200	1200	3600
240	1205	1205	1205	3615
241	1210	1210	1210	3630
242	1215	1215	1215	3645
243	1220	1220	1220	3660
244	1225	1225	1225	3675
245	1230	1230	1230	3690
246	1235	1235	1235	3705
247	1240	1240	1240	3720
248	1245	1245	1245	3735
249	1250	1250	1250	3750
250	1255	1255	1255	3765
251	1260	1260	1260	3780
252	1265	1265	1265	3795
253	1270	1270	1270	3810
254	1275	1275	1275	3825
255	1280	1280	1280	3840

Get Section and Total Scores

Section and total scores for the paper version of this digital SAT practice test are expressed as ranges. That's because the scoring method described in this guide is a simplified (and therefore slightly less precise) version of the one used in Bluebook™, the digital test application.

To obtain your Reading and Writing and Math section scores, use the provided answer key to determine the number of questions you answered correctly in each section. These numbers constitute your *raw scores* for the two sections. Use the provided table to convert your raw score for each section into a *scaled score* range consisting of a "lower" and "upper" value. Add the two lower values together and the two upper values together to obtain your total score range.

GET YOUR READING AND WRITING SECTION SCORE

Calculate your SAT Reading and Writing section score (it's on a scale of 200–800).

- 1 Use the answer key on page 390 to find the number of questions in module 1 and module 2 that you answered correctly.
- 2 To determine your Reading and Writing raw score, add the number of correct answers you got on module 1 and module 2. **Exclude the questions in grayed-out rows from your calculation.**
- 3 Use the Raw Score Conversion Table: Section Scores on page 391 to turn your raw score into your Reading and Writing section score.
- 4 The "lower" and "upper" values associated with your raw score establish the range of scores you might expect to receive had this been an actual test.

GET YOUR MATH SECTION SCORE

Calculate your SAT Math section score (it's on a scale of 200–800).

- 1 Use the answer key on page 390 to find the number of questions in module 1 and module 2 that you answered correctly.
- 2 To determine your Math raw score, add the number of correct answers you got on module 1 and module 2. **Exclude the questions in grayed-out rows from your calculation.**
- 3 Use the Raw Score Conversion Table: Section Scores on page 391 to turn your raw score into your Math section score.
- 4 The "lower" and "upper" values associated with your raw score establish the range of scores you might expect to receive had this been an actual test.

GET YOUR TOTAL SCORE

Add together the "lower" values for the Reading and Writing and Math sections, and then add together the "upper" values for the two sections. The result is your total score, expressed as a range, for this SAT practice test. The total score is on a scale of 400–1600.

1 Total Score 400–1600 Scale	Total Score	
2 Section Scores 200–800 Scale	Reading and Writing	Math
	Modules 1 & 2	Modules 1 & 2

Your total score on this SAT practice test is the sum of your Reading and Writing section score and your Math section score. On this paper version of the digital SAT practice test, you'll receive a lower and upper score for each test section and the total score. This is the range of scores that you might expect to receive.



Use the worksheets on pages 390 and 391 to calculate your section and total scores.

SAT Practice Test Worksheet: Answer Key

Mark each of your correct answers below, then add them up to get your raw score on each module.

Reading and Writing

Module 1

QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS
1	A	
2	C	
3	C	
4	B	
5	C	
6	D	
7	D	
8	D	
9	B	
10	C	
11	D	
12	C	
13	A	
14	D	
15	B	
16	B	
17	D	
18	A	
19	C	
20	D	
21	C	
22	D	
23	A	
24	D	
25	C	
26	B	
27	A	

Module 2

QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS
1	C	
2	D	
3	B	
4	D	
5	A	
6	A	
7	C	
8	D	
9	B	
10	C	
11	C	
12	B	
13	B	
14	A	
15	A	
16	D	
17	A	
18	A	
19	A	
20	C	
21	B	
22	D	
23	A	
24	C	
25	A	
26	A	
27	D	

Math

Module 1

QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS
1	A	
2	B	
3	A	
4	D	
5	A	
6	.3, 3/10	
7	C	
8	5	
9	B	
10	A	
11	B	
12	B	
13	C	
14	B	
15	40	
16	D	
17	C	
18	A	
19	.8823, .8824, 15/17	
20	6.25, 25/4	
21	24	
22	20.25, 81/4	

Module 2

QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS
1	B	
2	55	
3	C	
4	B	
5	D	
6	A	
7	240	
8	B	
9	27	
10	C	
11	C	
12	D	
13	47	
14	D	
15	A	
16	C	
17	D	
18	D	
19	B	
20	D	
21	A	
22	D	

READING AND WRITING SECTION RAW SCORE

(Total # of Correct Answers,
Excluding Grayed-Out Rows)

Module 1

Module 2

MATH SECTION RAW SCORE

(Total # of Correct Answers,
Excluding Grayed-Out Rows)

Module 1

Module 2

SAT Practice Test Worksheet: Section and Total Scores

Conversion: Calculate Your Section and Total Scores

Enter the number of correct answers (raw scores from the previous page) for each of the modules in the boxes below and add them together to get your section raw score. Find that section raw score in the first column of the table below and then enter the corresponding lower and upper values in the two-column boxes. Add each of your lower and upper values for the test sections separately to calculate your total SAT score range.

READING AND WRITING MODULE 1 RAW SCORE (0-25)	+	READING AND WRITING MODULE 2 RAW SCORE (0-25)	=	READING AND WRITING SECTION RAW SCORE (0-50)	→	LOWER UPPER READING AND WRITING SECTION SCORE RANGE (200-800)	↓			
MATH MODULE 1 RAW SCORE (0-20)	+	MATH MODULE 2 RAW SCORE (0-20)	=	MATH SECTION RAW SCORE (0-40)	→	LOWER UPPER MATH SECTION SCORE RANGE (200-800)		+	LOWER UPPER READING AND WRITING SECTION SCORE RANGE (200-800)	=

Raw Score Conversion Table: Section Scores

RAW SCORE		Reading and Writing Section Score Range		Math Section Score Range		RAW SCORE		Reading and Writing Section Score Range		Math Section Score Range	
(# OF CORRECT ANSWERS)		LOWER	UPPER	LOWER	UPPER	(# OF CORRECT ANSWERS)		LOWER	UPPER	LOWER	UPPER
0		200	250	200	250	26		440	480	430	490
1		200	250	200	250	27		450	490	450	510
2		200	250	200	250	28		450	490	460	520
3		200	250	200	250	29		460	500	470	530
4		200	250	200	250	30		470	510	490	550
5		200	250	200	250	31		480	520	500	560
6		200	250	200	250	32		490	530	520	580
7		200	250	200	250	33		490	550	530	590
8		200	250	220	320	34		500	560	540	620
9		200	250	270	330	35		510	570	560	640
10		200	250	290	330	36		520	580	580	660
11		200	250	300	340	37		530	590	600	700
12		250	360	310	350	38		550	610	640	740
13		290	370	320	360	39		560	620	710	800
14		320	380	330	370	40		570	630	750	800
15		330	390	340	380	41		580	650		
16		340	400	340	380	42		600	660		
17		360	400	350	390	43		620	680		
18		370	410	360	400	44		640	700		
19		380	420	370	410	45		660	720		
20		380	420	380	420	46		680	740		
21		390	430	380	420	47		700	760		
22		400	440	390	430	48		720	780		
23		410	450	400	440	49		730	800		
24		420	460	400	460	50		750	800		
25		430	470	420	480						

The SAT[®]

Practice Test #2

Make time to take the practice test.
It is one of the best ways to get ready
for the SAT.

After you have taken the practice test, score it right away
using materials provided in *The Official Digital SAT Study Guide*.

This version of the SAT Practice Test is for students using
this guide. As a reminder, most students taking the
digital SAT will do so using Bluebook[™], the digital testing
application. To best prepare for test day, download Bluebook
at bluebook.app.collegeboard.org to take the practice test in
the digital format.



SAT[®]



Test begins on the next page.

Reading and Writing

27 QUESTIONS

DIRECTIONS

The questions in this section address a number of important reading and writing skills. Each question includes one or more passages, which may include a table or graph. Read each passage and question carefully, and then choose the best answer to the question based on the passage(s).

All questions in this section are multiple-choice with four answer choices. Each question has a single best answer.

1

In the early 1800s, the Cherokee scholar Sequoyah created the first script, or writing system, for an Indigenous language in the United States. Because it represented the sounds of spoken Cherokee so accurately, his script was easy to learn and thus quickly achieved _____ use: by 1830, over 90 percent of the Cherokee people could read and write it.

Which choice completes the text with the most logical and precise word or phrase?

- A) widespread
- B) careful
- C) unintended
- D) infrequent

2

Like the 1945 play it reimagines—Federico García Lorca's *The House of Bernarda Alba*—Marcus Gardley's 2014 play *The House That Will Not Stand* prominently features women. In both plays, the all-female cast _____ an array of female characters, including a strong mother and several daughters dealing with individual struggles.

Which choice completes the text with the most logical and precise word or phrase?

- A) engulfs
- B) encourages
- C) comprises
- D) provokes

3

During a 2014 archaeological dig in Spain, Vicente Lull and his team uncovered the skeleton of a woman from El Algar, an Early Bronze Age society, buried with valuable objects signaling a high position of power. This finding may persuade researchers who have argued that Bronze Age societies were ruled by men to _____ that women may have also held leadership roles.

Which choice completes the text with the most logical and precise word or phrase?

- A) waive
- B) concede
- C) refute
- D) require

4

The following text is adapted from Oscar Wilde's 1895 play *The Importance of Being Earnest*.

CECILY: Have we got to part?

ALGERNON: I am afraid so. It's a very painful parting.

CECILY: It is always painful to part from people whom one has known for a very brief space of time. The absence of old friends one can endure with equanimity. But even a momentary separation from anyone to whom one has just been introduced is almost unbearable.

As used in the text, what does the word "endure" most nearly mean?

- A) Regret
- B) Persist
- C) Tolerate
- D) Encourage

5

The following text is from the 1924 poem "Cycle" by D'Arcy McNickle, who was a citizen of the Confederated Salish and Kootenai Tribes.

There shall be new roads wending,
A new beating of the drum—

Men's eyes shall have fresh seeing,
Grey lives reprise their span—
But under the new sun's being,
Completing what night began,

There'll be the same backs bending,
The same sad feet shall drum—
When this night finds its ending
And day shall have come.....

Which choice best states the main purpose of the text?

- A) To consider how the repetitiveness inherent in human life can be both rewarding and challenging
- B) To question whether activities completed at one time of day are more memorable than those completed at another time of day
- C) To refute the idea that joy is a more commonly experienced emotion than sadness is
- D) To demonstrate how the experiences of individuals relate to the experiences of their communities

6

The following text is from Charlotte Forten Grimké's 1888 poem "At Newport."

Oh, deep delight to watch the gladsome waves
Exultant leap upon the rugged rocks;
Ever repulsed, yet ever rushing on—
Filled with a life that will not know defeat;
To see the glorious hues of sky and sea.
The distant snowy sails, glide spirit like,
Into an unknown world, to feel the sweet
Enchantment of the sea thrill all the soul,
Clearing the clouded brain, making the heart
Leap joyous as it own bright, singing waves!

Which choice best describes the function of the underlined portion in the text as a whole?

- A) It portrays the surroundings as an imposing and intimidating scene.
- B) It characterizes the sea's waves as a relentless and enduring force.
- C) It conveys the speaker's ambivalence about the natural world.
- D) It draws a contrast between the sea's waves and the speaker's thoughts.

7

The following text is adapted from Aphra Behn's 1689 novel *The Lucky Mistake*. Atlante and Rinaldo are neighbors who have been secretly exchanging letters through Charlot, Atlante's sister.

[Atlante] gave this letter to Charlot; who immediately ran into the balcony with it, where she still found Rinaldo in a melancholy posture, leaning his head on his hand: She showed him the letter, but was afraid to toss it to him, for fear it might fall to the ground; so he ran and fetched a long cane, which he cleft at one end, and held it while she put the letter into the cleft, and stayed not to hear what he said to it. But never was man so transported with joy, as he was at the reading of this letter; it gives him new wounds; for to the generous, nothing obliges love so much as love.

Which choice best describes the overall structure of the text?

- A) It describes the delivery of a letter, and then portrays a character's happiness at reading that letter.
- B) It establishes that a character is desperate to receive a letter, and then explains why another character has not yet written that letter.
- C) It presents a character's concerns about delivering a letter, and then details the contents of that letter.
- D) It reveals the inspiration behind a character's letter, and then emphasizes the excitement that another character feels upon receiving that letter.

8

The following text is adapted from Frances Hodgson Burnett's 1911 novel *The Secret Garden*. Mary, a young girl, recently found an overgrown hidden garden.

Mary was an odd, determined little person, and now she had something interesting to be determined about, she was very much absorbed, indeed. She worked and dug and pulled up weeds steadily, only becoming more pleased with her work every hour instead of tiring of it. It seemed to her like a fascinating sort of play.

Which choice best states the main idea of the text?

- A) Mary hides in the garden to avoid doing her chores.
- B) Mary is getting bored with pulling up so many weeds in the garden.
- C) Mary is clearing out the garden to create a space to play.
- D) Mary feels very satisfied when she's taking care of the garden.

9

Believing that living in an impractical space can heighten awareness and even improve health, conceptual artists Madeline Gins and Shusaku Arakawa designed an apartment building in Japan to be more fanciful than functional. A kitchen counter is chest-high on one side and knee-high on the other; a ceiling has a door to nowhere. The effect is disorienting but invigorating; after four years there, filmmaker Nobu Yamaoka reported significant health benefits.

Which choice best states the main idea of the text?

- A) Although inhabiting a home surrounded by fanciful features such as those designed by Gins and Arakawa can be rejuvenating, it is unsustainable.
- B) Designing disorienting spaces like those in the Gins and Arakawa building is the most effective way to create a physically stimulating environment.
- C) As a filmmaker, Yamaoka has long supported the designs of conceptual artists such as Gins and Arakawa.
- D) Although impractical, the design of the apartment building by Gins and Arakawa may improve the well-being of the building's residents.

10

The following text is from Maggie Pogue Johnson's 1910 poem "Poet of Our Race." In this poem, the speaker is addressing Paul Laurence Dunbar, a Black author.

Thou, with stroke of mighty pen,
Hast told of joy and mirth,
And read the hearts and souls of men
As cradled from their birth.
The language of the flowers,
Thou hast read them all,
And e'en the little brook
Responded to thy call.

Which choice best states the main purpose of the text?

- A) To praise a certain writer for being especially perceptive regarding people and nature
- B) To establish that a certain writer has read extensively about a variety of topics
- C) To call attention to a certain writer's careful and elaborately detailed writing process
- D) To recount fond memories of an afternoon spent in nature with a certain writer

11

"To You" is an 1856 poem by Walt Whitman. In the poem, Whitman suggests that he deeply understands the reader, whom he addresses directly, writing, _____

Which quotation from "To You" most effectively illustrates the claim?

- A) "Your true soul and body appear before me."
- B) "Whoever you are, now I place my hand upon you, that you be my poem."
- C) "I should have made my way straight to you long ago."
- D) "Whoever you are, I fear you are walking the walks of dreams."

12

Approximate Rates of Speech and Information
Conveyed for Five Languages

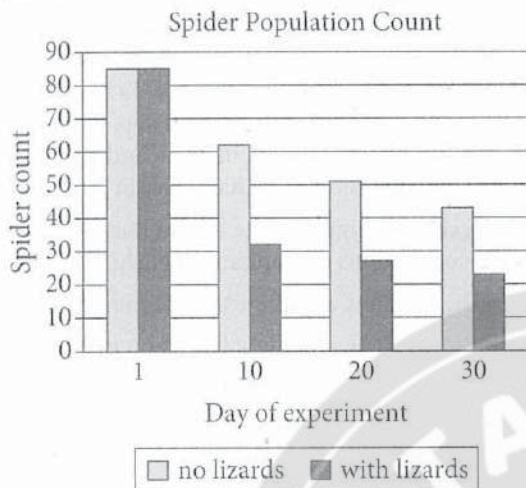
Language	Rate of speech (syllables per second)	Rate of information conveyed (bits per second)
Serbian	7.2	39.1
Spanish	7.7	42.0
Vietnamese	5.3	42.5
Thai	4.7	33.8
Hungarian	5.9	34.6

A group of researchers working in Europe, Asia, and Oceania conducted a study to determine how quickly different Eurasian languages are typically spoken (in syllables per second) and how much information they can effectively convey (in bits per second). They found that, although languages vary widely in the speed at which they are spoken, the amount of information languages can effectively convey tends to vary much less. Thus, they claim that two languages with very different spoken rates can nonetheless convey the same amount of information in a given amount of time.

Which choice best describes data from the table that support the researchers' claim?

- A) Among the five languages in the table, Thai and Hungarian have the lowest rates of speech and the lowest rates of information conveyed.
- B) Vietnamese conveys information at approximately the same rate as Spanish despite being spoken at a slower rate.
- C) Among the five languages in the table, the language that is spoken the fastest is also the language that conveys information the fastest.
- D) Serbian and Spanish are spoken at approximately the same rate, but Serbian conveys information faster than Spanish does.

13



To investigate the effect of lizard predation on spider populations, a student in a biology class placed spiders in two enclosures, one with lizards and one without, and tracked the number of spiders in the enclosures for 30 days. The student concluded that the reduction in the spider population count in the enclosure with lizards by day 30 was entirely attributable to the presence of the lizards.

Which choice best describes data from the graph that weaken the student's conclusion?

- A) The spider population count was the same in both enclosures on day 1.
- B) The spider population count also substantially declined by day 30 in the enclosure without lizards.
- C) The largest decline in spider population count in the enclosure with lizards occurred from day 1 to day 10.
- D) The spider population count on day 30 was lower in the enclosure with lizards than in the enclosure without lizards.

14

Although military veterans make up a small proportion of the total population of the United States, they occupy a significantly higher proportion of the jobs in the civilian government. One possible explanation for this disproportionate representation is that military service familiarizes people with certain organizational structures that are also reflected in the civilian government bureaucracy, and this familiarity thus _____

Which choice most logically completes the text?

- A) makes civilian government jobs especially appealing to military veterans.
- B) alters the typical relationship between military service and subsequent career preferences.
- C) encourages nonveterans applying for civilian government jobs to consider military service instead.
- D) increases the number of civilian government jobs that require some amount of military experience to perform.

15

The city of Pompeii, which was buried in ash following the eruption of Mount Vesuvius in 79 CE, continues to be studied by archaeologists.

Unfortunately, as _____ attest, archaeological excavations have disrupted ash deposits at the site, causing valuable information about the eruption to be lost.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) researchers, Roberto Scandone and Christopher Kilburn,
- B) researchers, Roberto Scandone and Christopher Kilburn
- C) researchers Roberto Scandone and Christopher Kilburn
- D) researchers Roberto Scandone, and Christopher Kilburn

16

Seneca sculptor Marie Watt's blanket art comes in a range of shapes and sizes. In 2004, Watt sewed strips of blankets together to craft a 10-by-13-inch _____ in 2014, she arranged folded blankets into two large stacks and then cast them in bronze, creating two curving 18-foot-tall blue-bronze pillars.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) sampler later,
- B) sampler;
- C) sampler,
- D) sampler, later,

17

Gathering accurate data on water flow in the United States is challenging because of the country's millions of miles of _____ the volume and speed of water at any given location can vary drastically over time.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) waterways and the fact that,
- B) waterways, and the fact that,
- C) waterways, and, the fact that
- D) waterways and the fact that

18

In assessing the films of Japanese director Akira Kurosawa, _____ have missed his equally deep engagement with Japanese artistic traditions such as Noh theater.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) many critics have focused on Kurosawa's use of Western literary sources but
- B) Kurosawa's use of Western literary sources has been the focus of many critics, who
- C) there are many critics who have focused on Kurosawa's use of Western literary sources, but they
- D) the focus of many critics has been on Kurosawa's use of Western literary sources; they

19

Joshua Hinson, director of the language revitalization program of the Chickasaw Nation in Oklahoma, helped produce the world's first Indigenous-language instructional app, Chickasaw _____ Chickasaw TV, in 2010; and a Rosetta Stone language course in Chickasaw, in 2015.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) Basic; in 2009, an online television network;
- B) Basic; in 2009, an online television network,
- C) Basic, in 2009; an online television network,
- D) Basic, in 2009, an online television network,

20

A group of ecologists led by Axel Mithöfer at the Max Planck Institute for Chemical Ecology in Germany examined the defensive responses of two varieties of the sweet potato _____ TN57, which is known for its insect resistance, and TN66, which is much more susceptible to pests.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) plant.
- B) plant;
- C) plant
- D) plant:

21

When, in the 1800s, geologists first realized that much of Earth had once been covered by great sheets of ice, some theorized that the phenomenon was cyclical, occurring at regular intervals. Each Ice Age is so destructive, though, that it largely erases the geological evidence of its predecessor.

_____ geologists were unable to confirm the theory of cyclical Ice Ages until the 1960s.

Which choice completes the text with the most logical transition?

- A) Hence,
- B) Moreover,
- C) Nevertheless,
- D) Next,

22

While researching a topic, a student has taken the following notes:

- The Seikan Tunnel is a rail tunnel in Japan.
- It connects the island of Honshu to the island of Hokkaido.
- It is roughly 33 miles long.
- The Channel Tunnel is a rail tunnel in Europe.
- It connects Folkestone, England, to Coquelles, France.
- It is about 31 miles long.

The student wants to compare the lengths of the two rail tunnels. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) Some of the world's rail tunnels, including one tunnel that extends from Folkestone, England, to Coquelles, France, are longer than 30 miles.
- B) The Seikan Tunnel is roughly 33 miles long, while the slightly shorter Channel Tunnel is about 31 miles long.
- C) The Seikan Tunnel, which is roughly 33 miles long, connects the Japanese islands of Honshu and Hokkaido.
- D) Both the Seikan Tunnel, which is located in Japan, and the Channel Tunnel, which is located in Europe, are examples of rail tunnels.

23

While researching a topic, a student has taken the following notes:

- Ancient Native American and Australian Aboriginal cultures described the Pleiades star cluster as having seven stars.
- It was referred to as the Seven Sisters in the mythology of ancient Greece.
- Today, the cluster appears to have only six stars.
- Two of the stars have moved so close together that they now appear as one.

The student wants to specify the reason the Pleiades' appearance changed. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) Ancient Native American and Australian Aboriginal cultures described the Pleiades, which was referred to in Greek mythology as the Seven Sisters, as having seven stars.
- B) Although once referred to as the Seven Sisters, the Pleiades appears to have only six stars today.
- C) In the time since ancient cultures described the Pleiades as having seven stars, two of the cluster's stars have moved so close together that they now appear as one.
- D) The Pleiades has seven stars, but two are so close together that they appear to be a single star.

24

While researching a topic, a student has taken the following notes:

- Pinnipeds, which include seals, sea lions, and walruses, live in and around water.
- Pinnipeds are descended not from sea animals but from four-legged, land-dwelling carnivores.
- Canadian paleobiologist Natalia Rybczynski recently found a fossil with four legs, webbed toes, and the skull and teeth of a seal.
- Rybczynski refers to her rare find as a “transitional fossil.”
- The fossil illustrates an early stage in the evolution of pinnipeds from their land-dwelling ancestors.

The student wants to emphasize the fossil's significance. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) Canadian paleobiologist Natalia Rybczynski's fossil has the skull and teeth of a seal, which, like sea lions and walruses, is a pinniped.
- B) Pinnipeds are descended from four-legged, land-dwelling carnivores; a fossil that resembles both was recently found.
- C) Having four legs but the skull and teeth of a seal, the rare fossil illustrates an early stage in the evolution of pinnipeds from their land-dwelling ancestors.
- D) A “transitional fossil” was recently found by paleobiologist Natalia Rybczynski.

25

While researching a topic, a student has taken the following notes:

- Gaspar Enriquez is an artist.
- He specializes in portraits of Mexican Americans.
- A portrait is an artistic representation of a person.
- Enriquez completed a painting of the sculptor Luis Jimenez in 2003.
- He completed a drawing of the writer Rudolfo Anaya in 2016.

The student wants to emphasize a difference between the two portraits. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) The portraits, or artistic representations, of Luis Jimenez and Rudolfo Anaya were both completed by Enriquez in the early 2000s.
- B) Enriquez has completed portraits of numerous Mexican Americans, including sculptor Luis Jimenez and writer Rudolfo Anaya.
- C) While both are by Enriquez, the 2003 portrait of Luis Jimenez is a painting, and the 2016 portrait of Rudolfo Anaya is a drawing.
- D) Luis Jimenez was a Mexican American sculptor, and Rudolfo Anaya was a Mexican American writer.

26

While researching a topic, a student has taken the following notes:

- *Las sergas de Esplandián* was a novel popular in sixteenth-century Spain.
- The novel featured a fictional island inhabited solely by Black women and known as California.
- That same century, Spanish explorers learned of an “island” off the west coast of Mexico.
- They called it California after the island in the novel.
- The “island” was actually the peninsula now known as Baja California (“Lower California”), which lies to the south of the US state of California.

The student wants to emphasize the role a misconception played in the naming of a place. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) The novel *Las sergas de Esplandián* featured a fictional island known as California.
- B) To the south of the US state of California lies Baja California (“Lower California”), originally called California after a fictional place.
- C) In the sixteenth century, Spanish explorers learned of a peninsula off the west coast of Mexico and called it California.
- D) Thinking it was an island, Spanish explorers called a peninsula California after an island in a popular novel.

27

While researching a topic, a student has taken the following notes:

- In 1851, German American artist Emanuel Leutze painted *Washington Crossing the Delaware*.
- His huge painting (149 × 255 inches) depicts the first US president crossing a river with soldiers in the Revolutionary War.
- In 2019, Cree artist Kent Monkman painted *mistikôsiwak (Wooden Boat People): Resurgence of the People*.
- Monkman’s huge painting (132 × 264 inches) was inspired by Leutze’s.
- It portrays Indigenous people in a boat rescuing refugees.

The student wants to emphasize a similarity between the two paintings. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) Monkman, a Cree artist, finished his painting in 2019; Leutze, a German American artist, completed his in 1851.
- B) Although Monkman’s painting was inspired by Leutze’s, the people and actions the two paintings portray are very different.
- C) Leutze’s and Monkman’s paintings are both huge, measuring 149 × 255 inches and 132 × 264 inches, respectively.
- D) Leutze’s painting depicts Revolutionary War soldiers, while Monkman’s depicts Indigenous people and refugees.

STOP

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

Reading and Writing

27 QUESTIONS

DIRECTIONS

The questions in this section address a number of important reading and writing skills. Each question includes one or more passages, which may include a table or graph. Read each passage and question carefully, and then choose the best answer to the question based on the passage(s).

All questions in this section are multiple-choice with four answer choices. Each question has a single best answer.

1

In addition to being an accomplished psychologist himself, Francis Cecil Sumner was a _____ increasing the opportunity for Black students to study psychology, helping to found the psychology department at Howard University, a historically Black university, in 1930.

Which choice completes the text with the most logical and precise word or phrase?

- A) proponent of
- B) supplement to
- C) beneficiary of
- D) distraction for

2

For her 2021 art installation *Anthem*, Wu Tsang joined forces with singer and composer Beverly Glenn-Copeland to produce a piece that critics found truly _____: they praised Tsang for creatively transforming a museum rotunda into a dynamic exhibit by projecting filmed images of Glenn-Copeland onto a massive 84-foot curtain and filling the space with the sounds of his and other voices singing.

Which choice completes the text with the most logical and precise word or phrase?

- A) restrained
- B) inventive
- C) inexplicable
- D) mystifying

3

Scholarly discussions of gender in Shakespeare's comedies often celebrate the rebellion of the playwright's characters against the rigid expectations _____ by Elizabethan society. Most of the comedies end in marriage, with characters returning to their socially dictated gender roles after previously defying them, but there are some notable exceptions.

Which choice completes the text with the most logical and precise word or phrase?

- A) interjected
- B) committed
- C) illustrated
- D) prescribed

4

The work of Kiowa painter T.C. Cannon derives its power in part from the tension among his _____ influences: classic European portraiture, with its realistic treatment of faces; the American pop art movement, with its vivid colors; and flatstyle, the intertribal painting style that rejects the effect of depth typically achieved through shading and perspective.

Which choice completes the text with the most logical and precise word or phrase?

- A) complementary
- B) unknown
- C) disparate
- D) interchangeable

5

Text 1

Conventional wisdom long held that human social systems evolved in stages, beginning with hunter-gatherers forming small bands of members with roughly equal status. The shift to agriculture about 12,000 years ago sparked population growth that led to the emergence of groups with hierarchical structures: associations of clans first, then chiefdoms, and finally, bureaucratic states.

Text 2

In a 2021 book, anthropologist David Graeber and archaeologist David Wengrow maintain that humans have always been socially flexible, alternately forming systems based on hierarchy and collective ones with decentralized leadership. The authors point to evidence that as far back as 50,000 years ago some hunter-gatherers adjusted their social structures seasonally, at times dispersing in small groups but also assembling into communities that included esteemed individuals.

Based on the texts, how would Graeber and Wengrow (Text 2) most likely respond to the “conventional wisdom” presented in Text 1?

- A) By conceding the importance of hierarchical systems but asserting the greater significance of decentralized collective societies
- B) By disputing the idea that developments in social structures have followed a linear progression through distinct stages
- C) By acknowledging that hierarchical roles likely weren't a part of social systems before the rise of agriculture
- D) By challenging the assumption that groupings of hunter-gatherers were among the earliest forms of social structure

6

In 1934 physicist Eugene Wigner posited the existence of a crystal consisting entirely of electrons in a honeycomb-like structure. The so-called Wigner crystal remained largely conjecture, however, until Feng Wang and colleagues announced in 2021 that they had captured an image of one. The researchers trapped electrons between two semiconductors and then cooled the apparatus, causing the electrons to settle into a crystalline structure. By inserting an ultrathin sheet of graphene above the crystal, the researchers obtained an impression—the first visual confirmation of the Wigner crystal.

Which choice best states the main idea of the text?

- A) Researchers have obtained the most definitive evidence to date of the existence of the Wigner crystal.
- B) Researchers have identified an innovative new method for working with unusual crystalline structures.
- C) Graphene is the most important of the components required to capture an image of a Wigner crystal.
- D) It's difficult to acquire an image of a Wigner crystal because of the crystal's honeycomb structure.

7

For many years, the only existing fossil evidence of mixopterid eurypterids—an extinct family of large aquatic arthropods known as sea scorpions and related to modern arachnids and horseshoe crabs—came from four species living on the paleocontinent of Laurussia. In a discovery that expands our understanding of the geographical distribution of mixopterids, paleontologist Bo Wang and others have identified fossilized remains of a new mixopterid species, *Terropterus xiushanensis*, that lived over 400 million years ago on the paleocontinent of Gondwana.

According to the text, why was Wang and his team's discovery of the *Terropterus xiushanensis* fossil significant?

- A) The fossil constitutes the first evidence found by scientists that mixopterids lived more than 400 million years ago.
- B) The fossil helps establish that mixopterids are more closely related to modern arachnids and horseshoe crabs than previously thought.
- C) The fossil helps establish a more accurate timeline of the evolution of mixopterids on the paleocontinents of Laurussia and Gondwana.
- D) The fossil constitutes the first evidence found by scientists that mixopterids existed outside the paleocontinent of Laurussia.

8

The following text is adapted from Edith Nesbit's 1906 novel *The Railway Children*.

Mother did not spend all her time in paying dull [visits] to dull ladies, and sitting dully at home waiting for dull ladies to pay [visits] to her. She was almost always there, ready to play with the children, and read to them, and help them to do their home-lessons. Besides this she used to write stories for them while they were at school, and read them aloud after tea, and she always made up funny pieces of poetry for their birthdays and for other great occasions.

According to the text, what is true about Mother?

- A) She wishes that more ladies would visit her.
- B) Birthdays are her favorite special occasion.
- C) She creates stories and poems for her children.
- D) Reading to her children is her favorite activity.

9

"The Young Girl" is a 1920 short story by Katherine Mansfield. In the story, the narrator takes an unnamed seventeen-year-old girl and her younger brother out for a meal. In describing the teenager, Mansfield frequently contrasts the character's pleasant appearance with her unpleasant attitude, as when Mansfield writes of the teenager, _____

Which quotation from "The Young Girl" most effectively illustrates the claim?

- A) "I heard her murmur, 'I can't bear flowers on a table.' They had evidently been giving her intense pain, for she positively closed her eyes as I moved them away."
- B) "While we waited she took out a little, gold powder-box with a mirror in the lid, shook the poor little puff as though she loathed it, and dabbed her lovely nose."
- C) "I saw, after that, she couldn't stand this place a moment longer, and, indeed, she jumped up and turned away while I went through the vulgar act of paying for the tea."
- D) "She didn't even take her gloves off. She lowered her eyes and drummed on the table. When a faint violin sounded she winced and bit her lip again. Silence."

10

Estimates of Tyrannosaurid Bite Force

Study	Year	Estimation method	Approximate bite force (newtons)
Cost et al.	2019	muscular and skeletal modeling	35,000–63,000
Gignac and Erickson	2017	tooth-bone interaction analysis	8,000–34,000
Meers	2002	body-mass scaling	183,000–235,000
Bates and Falkingham	2012	muscular and skeletal modeling	35,000–57,000

The largest tyrannosaurids—the family of carnivorous dinosaurs that includes *Tarbosaurus*, *Albertosaurus*, and, most famously, *Tyrannosaurus rex*—are thought to have had the strongest bites of any land animals in Earth's history.

Determining the bite force of extinct animals can be difficult, however, and paleontologists Paul Barrett and Emily Rayfield have suggested that an estimate of dinosaur bite force may be significantly influenced by the methodology used in generating that estimate.

Which choice best describes data from the table that support Barrett and Rayfield's suggestion?

- A) The study by Meers used body-mass scaling and produced the lowest estimated maximum bite force, while the study by Cost et al. used muscular and skeletal modeling and produced the highest estimated maximum.
- B) In their study, Gignac and Erickson used tooth-bone interaction analysis to produce an estimated bite force range with a minimum of 8,000 newtons and a maximum of 34,000 newtons.
- C) The bite force estimates produced by Bates and Falkingham and by Cost et al. were similar to each other, while the estimates produced by Meers and by Gignac and Erickson each differed substantially from any other estimate.
- D) The estimated maximum bite force produced by Cost et al. exceeded the estimated maximum produced by Bates and Falkingham, even though both groups of researchers used the same method to generate their estimates.

11

When digging for clams, their primary food, sea otters damage the roots of eelgrass plants growing on the seafloor. Near Vancouver Island in Canada, the otter population is large and well established, yet the eelgrass meadows are healthier than those found elsewhere off Canada's coast. To explain this, conservation scientist Erin Foster and colleagues compared the Vancouver Island meadows to meadows where otters are absent or were reintroduced only recently. Finding that the Vancouver Island meadows have a more diverse gene pool than the others do, Foster hypothesized that damage to eelgrass roots increases the plant's rate of sexual reproduction; this, in turn, boosts genetic diversity, which benefits the meadow's health overall.

Which finding, if true, would most directly undermine Foster's hypothesis?

- A) At some sites in the study, eelgrass meadows are found near otter populations that are small and have only recently been reintroduced.
- B) At several sites not included in the study, there are large, well-established sea otter populations but no eelgrass meadows.
- C) At several sites not included in the study, eelgrass meadows' health correlates negatively with the length of residence and size of otter populations.
- D) At some sites in the study, the health of plants unrelated to eelgrass correlates negatively with the length of residence and size of otter populations.

12

In the mountains of Brazil, *Barbacenia tomentosa* and *Barbacenia macrantha*—two plants in the Velloziaceae family—establish themselves on soilless, nutrient-poor patches of quartzite rock. Plant ecologists Anna Abrahão and Patricia de Britto Costa used microscopic analysis to determine that the roots of *B. tomentosa* and *B. macrantha*, which grow directly into the quartzite, have clusters of fine hairs near the root tip; further analysis indicated that these hairs secrete both malic and citric acids. The researchers hypothesize that the plants depend on dissolving underlying rock with these acids, as the process not only creates channels for continued growth but also releases phosphates that provide the vital nutrient phosphorus.

Which finding, if true, would most directly support the researchers' hypothesis?

- A) Other species in the Velloziaceae family are found in terrains with more soil but have root structures similar to those of *B. tomentosa* and *B. macrantha*.
- B) Though *B. tomentosa* and *B. macrantha* both secrete citric and malic acids, each species produces the acids in different proportions.
- C) The roots of *B. tomentosa* and *B. macrantha* carve new entry points into rocks even when cracks in the surface are readily available.
- D) *B. tomentosa* and *B. macrantha* thrive even when transferred to the surfaces of rocks that do not contain phosphates.

13

Ancestral Puebloans, the civilization from which present-day Pueblo tribes descended, emerged as early as 1500 B.C.E. in an area of what is now the southwestern United States and dispersed suddenly in the late 1200s C.E., abandoning established villages with systems for farming crops and turkeys. Recent analysis comparing turkey remains at Mesa Verde, one such village in southern Colorado, to samples from modern turkey populations in the Rio Grande Valley of north central New Mexico determined that the latter birds descended in part from turkeys cultivated at Mesa Verde, with shared genetic markers appearing only after 1280. Thus, researchers concluded that _____

Which choice most logically completes the text?

- A) conditions of the terrains in the Rio Grande Valley and Mesa Verde had greater similarities in the past than they do today.
- B) some Ancestral Puebloans migrated to the Rio Grande Valley in the late 1200s and carried farming practices with them.
- C) Indigenous peoples living in the Rio Grande Valley primarily planted crops and did not cultivate turkeys before 1280.
- D) the Ancestral Puebloans of Mesa Verde likely adopted the farming practices of Indigenous peoples living in other regions.

14

Ratified by more than 90 countries, the Nagoya Protocol is an international agreement ensuring that Indigenous communities are compensated when their agricultural resources and knowledge of wild plants and animals are utilized by agricultural corporations. However, the protocol has shortcomings. For example, it allows corporations to insist that their agreements with communities to conduct research on the commercial uses of the communities' resources and knowledge remain confidential. Therefore, some Indigenous advocates express concern that the protocol may have the unintended effect of _____

Which choice most logically completes the text?

- A) diminishing the monetary reward that corporations might derive from their agreements with Indigenous communities.
- B) limiting the research that corporations conduct on the resources of the Indigenous communities with which they have signed agreements.
- C) preventing independent observers from determining whether the agreements guarantee equitable compensation for Indigenous communities.
- D) discouraging Indigenous communities from learning new methods for harvesting plants and animals from their corporate partners.

15

The domestic sweet potato (*Ipomoea batatas*) descends from a wild plant native to South America. It also populates the Polynesian Islands, where evidence confirms that Native Hawaiians and other Indigenous peoples were cultivating the plant centuries before seafaring first occurred over the thousands of miles of ocean separating them from South America. To explain how the sweet potato was first introduced in Polynesia, botanist Pablo Muñoz-Rodríguez and colleagues analyzed the DNA of numerous varieties of the plant, concluding that Polynesian varieties diverged from South American ones over 100,000 years ago. Given that Polynesia was peopled only in the last three thousand years, the team concluded that _____

Which choice most logically completes the text?

- A) the cultivation of the sweet potato in Polynesia likely predates its cultivation in South America.
- B) Polynesian peoples likely acquired the sweet potato from South American peoples only within the last three thousand years.
- C) human activity likely played no role in the introduction of the sweet potato in Polynesia.
- D) Polynesian sweet potato varieties likely descend from a single South American variety that was domesticated, not wild.

16

In Death Valley National Park's Racetrack Playa, a flat, dry lakebed, are 162 rocks—some weighing less than a pound but others almost 700 pounds—that move periodically from place to place, seemingly of their own volition. Racetrack-like trails in the _____ mysterious migration.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) playas sediment mark the rock's
- B) playa's sediment mark the rocks
- C) playa's sediment mark the rocks'
- D) playas' sediment mark the rocks'

17

Nigerian author Buchi Emecheta's celebrated literary oeuvre includes *The Joys of Motherhood*, a novel about the changing roles of women in 1950s _____ a television play about the private struggles of a newlywed couple in Nigeria; and *Head Above Water*, her autobiography.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) Lagos, *A Kind of Marriage*,
- B) Lagos; *A Kind of Marriage*,
- C) Lagos, *A Kind of Marriage*:
- D) Lagos; *A Kind of Marriage*

18

In 2016, engineer Vanessa Galvez oversaw the installation of 164 bioswales, vegetated channels designed to absorb and divert stormwater, along the streets of Queens, New York. By reducing the runoff flowing into city sewers, _____

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) the mitigation of both street flooding and the resulting pollution of nearby waterways has been achieved by bioswales.
- B) the bioswales have mitigated both street flooding and the resulting pollution of nearby waterways.
- C) the bioswales' mitigation of both street flooding and the resulting pollution of nearby waterways has been achieved.
- D) both street flooding and the resulting pollution of nearby waterways have been mitigated by bioswales.

19

From afar, African American fiber artist Bisa Butler's portraits look like paintings, their depictions of human faces, bodies, and clothing so intricate that it seems only a fine brush could have rendered them. When viewed up close, however, the portraits reveal themselves to be _____ stitching barely visible among the thousands of pieces of printed, microcut fabric.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) quilts, and the
- B) quilts, the
- C) quilts; the
- D) quilts. The

20

Compared to that of alumina glass, _____ silica glass atoms are so far apart that they are unable to re-form bonds after being separated.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) silica glass is at a significant disadvantage due to its more dispersed atomic arrangement:
- B) silica glass has a more dispersed atomic arrangement, resulting in a significant disadvantage:
- C) a significant disadvantage of silica glass is that its atomic arrangement is more dispersed:
- D) silica glass's atomic arrangement is more dispersed, resulting in a significant disadvantage:

21

In the historical novel *The Surrender Tree*, Cuban American author Margarita Engle uses poetry rather than prose _____ the true story of Cuban folk hero Rosa La Bayamesa.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) tells
- B) told
- C) is telling
- D) to tell

22

Sociologist Alton Okinaka sits on the review board tasked with adding new sites to the Hawai'i Register of Historic Places, which includes Pi'ilanihale Heiau and the 'Ōpaeka'a Road Bridge. Okinaka doesn't make such decisions _____ all historical designations must be approved by a group of nine other experts from the fields of architecture, archaeology, history, and Hawaiian culture.

Which choice completes the text so that it conforms to the conventions of Standard English?

- A) single-handedly, however;
- B) single-handedly; however,
- C) single-handedly, however,
- D) single-handedly however

23

When Chinese director Chloé Zhao accepted the Oscar in 2021 for her film *Nomadland*, she made Academy Award history. _____ only one other woman, Kathryn Bigelow of the United States, had been named best director at the Oscars, making Zhao the second woman and the first Asian woman to win the award.

Which choice completes the text with the most logical transition?

- A) As a result,
- B) Previously,
- C) However,
- D) Likewise,

24

Researchers Helena Mihaljević-Brandt, Lucía Santamaría, and Marco Tullney report that while mathematicians may have traditionally worked alone, evidence points to a shift in the opposite direction. _____ mathematicians are choosing to collaborate with their peers—a trend illustrated by a rise in the number of mathematics publications credited to multiple authors.

Which choice completes the text with the most logical transition?

- A) Similarly,
- B) For this reason,
- C) Furthermore,
- D) Increasingly,

25

When soil becomes contaminated by toxic metals, it can be removed from the ground and disposed of in a landfill. _____ contaminated soil can be detoxified via phytoremediation: plants that can withstand high concentrations of metals absorb the pollutants and store them in their shoots, which are then cut off and safely disposed of, preserving the health of the plants.

Which choice completes the text with the most logical transition?

- A) Alternatively,
- B) Specifically,
- C) For example,
- D) As a result,

26

While researching a topic, a student has taken the following notes:

- In the late 1890s, over 14,000 unique varieties of apples were grown in the US.
- The rise of industrial agriculture in the mid-1900s narrowed the range of commercially grown crops.
- Thousands of apple varieties considered less suitable for commercial growth were lost.
- Today, only 15 apple varieties dominate the market, making up 90% of apples purchased in the US.
- The Lost Apple Project, based in Washington State, attempts to find and grow lost apple varieties.

The student wants to emphasize the decline in unique apple varieties in the US and specify why this decline occurred. Which choice most effectively uses relevant information from the notes to accomplish these goals?

- A) The Lost Apple Project is dedicated to finding some of the apple varieties lost following a shift in agricultural practices in the mid-1900s.
- B) While over 14,000 apple varieties were grown in the US in the late 1890s, only 15 unique varieties make up most of the apples sold today.
- C) Since the rise of industrial agriculture, US farmers have mainly grown the same few unique apple varieties, resulting in the loss of thousands of varieties less suitable for commercial growth.
- D) As industrial agriculture rose to prominence in the mid-1900s, the number of crops selected for cultivation decreased dramatically.

27

While researching a topic, a student has taken the following notes:

- The *Atlantic Monthly* magazine was first published in 1857.
- The magazine focused on politics, art, and literature.
- In 2019, historian Cathryn Halverson published the book *Faraway Women and the "Atlantic Monthly."*
- Its subject is female authors whose autobiographies appeared in the magazine in the early 1900s.
- One of the authors discussed is Juanita Harrison.

The student wants to introduce Cathryn Halverson's book to an audience already familiar with the *Atlantic Monthly*. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) Cathryn Halverson's *Faraway Women and the "Atlantic Monthly"* discusses female authors whose autobiographies appeared in the magazine in the early 1900s.
- B) A magazine called the *Atlantic Monthly*, referred to in Cathryn Halverson's book title, was first published in 1857.
- C) *Faraway Women and the "Atlantic Monthly"* features contributors to the *Atlantic Monthly*, first published in 1857 as a magazine focusing on politics, art, and literature.
- D) An author discussed by Cathryn Halverson is Juanita Harrison, whose autobiography appeared in the *Atlantic Monthly* in the early 1900s.

STOP

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

Math

22 QUESTIONS

DIRECTIONS

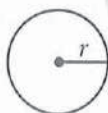
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE



$$A = \pi r^2$$

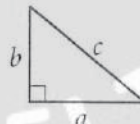
$$C = 2\pi r$$



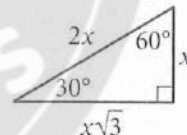
$$A = \ell w$$



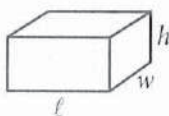
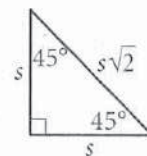
$$A = \frac{1}{2}bh$$



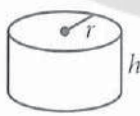
$$c^2 = a^2 + b^2$$



Special Right Triangles



$$V = \ell wh$$



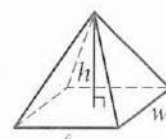
$$V = \pi r^2 h$$



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



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



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

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

The number of radians of arc in a circle is 2π .

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

For multiple-choice questions, solve each problem, choose the correct answer from the choices provided, and then circle your answer in this book. Circle only one answer for each question. If you change your mind, completely erase the circle. You will not get credit for questions with more than one answer circled, or for questions with no answers circled.

For student-produced response questions, solve each problem and write your answer next to or under the question in the test book as described below.

- Once you've written your answer, circle it clearly. You will not receive credit for anything written outside the circle, or for any questions with more than one circled answer.
- If you find **more than one correct answer**, write and circle only one answer.
- Your answer can be up to 5 characters for a **positive** answer and up to 6 characters (including the negative sign) for a **negative** answer, but no more.
- If your answer is a **fraction** that is too long (over 5 characters for positive, 6 characters for negative), write the decimal equivalent.
- If your answer is a **decimal** that is too long (over 5 characters for positive, 6 characters for negative), truncate it or round at the fourth digit.
- If your answer is a **mixed number** (such as $3\frac{1}{2}$), write it as an improper fraction ($\frac{7}{2}$) or its decimal equivalent (3.5).
- Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

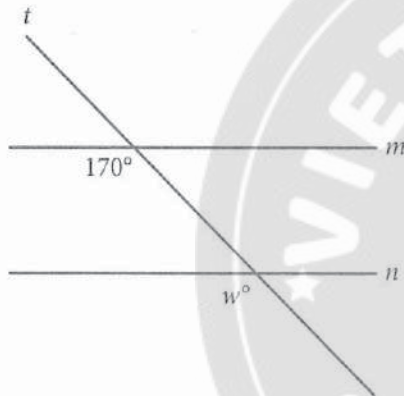
1

$$4x + 6 = 18$$

Which equation has the same solution as the given equation?

- A) $4x = 108$
- B) $4x = 24$
- C) $4x = 12$
- D) $4x = 3$

2



Note: Figure not drawn to scale.

In the figure, line m is parallel to line n . What is the value of w ?

- A) 17
- B) 30
- C) 70
- D) 170

3

Each value in the data set shown represents the height, in centimeters, of a plant.

6, 10, 13, 2, 15, 22, 10, 4, 4, 4

What is the mean height, in centimeters, of these plants?

4

$$2.5b + 5r = 80$$

The given equation describes the relationship between the number of birds, b , and the number of reptiles, r , that can be cared for at a pet care business on a given day. If the business cares for 16 reptiles on a given day, how many birds can it care for on this day?

- A) 0
- B) 5
- C) 40
- D) 80

5

A cube has an edge length of 41 inches. What is the volume, in cubic inches, of the cube?

- A) 164
- B) 1,681
- C) 10,086
- D) 68,921

6

13 is $p\%$ of 25. What is the value of p ?

7

A model predicts that the population of Springfield was 15,000 in 2005. The model also predicts that each year for the next 5 years, the population p increased by 4% of the previous year's population. Which equation best represents this model, where x is the number of years after 2005, for $x \leq 5$?

- A) $p = 0.96(15,000)^x$
- B) $p = 1.04(15,000)^x$
- C) $p = 15,000(0.96)^x$
- D) $p = 15,000(1.04)^x$

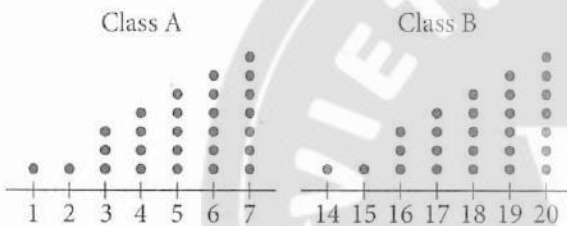
8

$$-4x^2 - 7x = -36$$

What is the positive solution to the given equation?

- A) $\frac{7}{4}$
- B) $\frac{9}{4}$
- C) 4
- D) 7

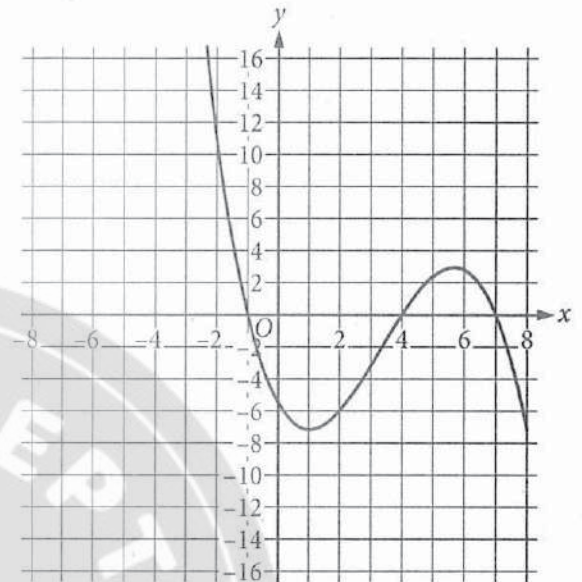
9



Each of the dot plots shown represents the number of glue sticks brought in by each student for two classes, class A and class B. Which statement best compares the standard deviations of the numbers of glue sticks brought in by each student for these two classes?

- A) The standard deviation of the number of glue sticks brought in by each student for class A is less than the standard deviation of the number of glue sticks brought in by each student for class B.
- B) The standard deviation of the number of glue sticks brought in by each student for class A is equal to the standard deviation of the number of glue sticks brought in by each student for class B.
- C) The standard deviation of the number of glue sticks brought in by each student for class A is greater than the standard deviation of the number of glue sticks brought in by each student for class B.
- D) There is not enough information to compare these standard deviations.

10



The graph of $y = f(x)$ is shown, where the function f is defined by $f(x) = ax^3 + bx^2 + cx + d$ and a , b , c , and d are constants. For how many values of x does $f(x) = 0$?

- A) One
- B) Two
- C) Three
- D) Four

11

The exponential function g is defined by $g(x) = 19 \cdot a^x$, where a is a positive constant. If $g(3) = 2,375$, what is the value of $g(4)$?

12

$$\begin{aligned} y &= (x - 2)(x + 4) \\ y &= 6x - 12 \end{aligned}$$

Which ordered pair (x, y) is the solution to the given system of equations?

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

13

Triangle FGH is similar to triangle JKL , where angle F corresponds to angle J and angles G and K are right angles. If $\sin(F) = \frac{308}{317}$, what is the value of $\sin(J)$?

- A) $\frac{75}{317}$
 B) $\frac{308}{317}$
 C) $\frac{317}{308}$
 D) $\frac{317}{75}$

14

The function $f(t) = 60,000(2)^{\frac{t}{410}}$ gives the number of bacteria in a population t minutes after an initial observation. How much time, in minutes, does it take for the number of bacteria in the population to double?

15

$$p = \frac{k}{4j + 9}$$

The given equation relates the distinct positive numbers p , k , and j . Which equation correctly expresses $4j + 9$ in terms of p and k ?

- A) $4j + 9 = \frac{k}{p}$
 B) $4j + 9 = kp$
 C) $4j + 9 = k - p$
 D) $4j + 9 = \frac{p}{k}$

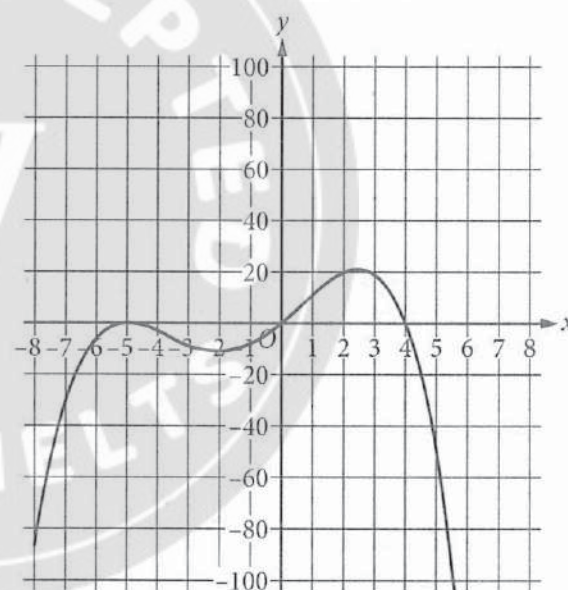
16

Line p is defined by $4y + 8x = 6$. Line r is perpendicular to line p in the xy -plane. What is the slope of line r ?

17

Point O is the center of a circle. The measure of arc RS on this circle is 100° . What is the measure, in degrees, of its associated angle ROS ?

18



Which of the following could be the equation of the graph shown in the xy -plane?

- A) $y = -\frac{1}{10}x(x - 4)(x + 5)$
 B) $y = -\frac{1}{10}x(x - 4)(x + 5)^2$
 C) $y = -\frac{1}{10}x(x - 5)(x + 4)$
 D) $y = -\frac{1}{10}x(x - 5)^2(x + 4)$

19

For $x > 0$, the function f is defined as follows:

$$f(x) \text{ equals } 201\% \text{ of } x$$

Which of the following could describe this function?

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

20

$$f(x) = 4x^2 + 64x + 262$$

The function g is defined by $g(x) = f(x + 5)$. For what value of x does $g(x)$ reach its minimum?

- A) -13
- B) -8
- C) -5
- D) -3

21

Poll Results

Angel Cruz	483
Terry Smith	320

The table shows the results of a poll. A total of 803 voters selected at random were asked which candidate they would vote for in the upcoming election. According to the poll, if 6,424 people vote in the election, by how many votes would Angel Cruz be expected to win?

- A) 163
- B) 1,304
- C) 3,864
- D) 5,621

22

$$\begin{aligned}y &= 2x^2 - 21x + 64 \\ y &= 3x + a\end{aligned}$$

In the given system of equations, a is a constant. The graphs of the equations in the given system intersect at exactly one point, (x, y) , in the xy -plane. What is the value of x ?

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

STOP

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

Math

22 QUESTIONS

DIRECTIONS

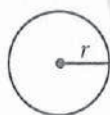
The questions in this section address a number of important math skills. Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE



$$A = \pi r^2$$

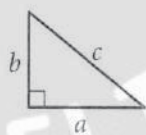
$$C = 2\pi r$$



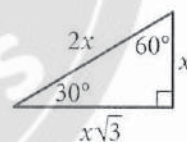
$$A = \ell w$$



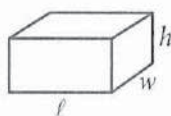
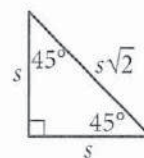
$$A = \frac{1}{2}bh$$



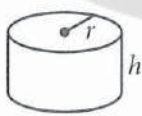
$$c^2 = a^2 + b^2$$



Special Right Triangles



$$V = \ell wh$$



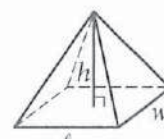
$$V = \pi r^2 h$$



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



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



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

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

The number of radians of arc in a circle is 2π .

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

For multiple-choice questions, solve each problem, choose the correct answer from the choices provided, and then circle your answer in this book. Circle only one answer for each question. If you change your mind, completely erase the circle. You will not get credit for questions with more than one answer circled, or for questions with no answers circled.

For student-produced response questions, solve each problem and write your answer next to or under the question in the test book as described below.

- Once you've written your answer, circle it clearly. You will not receive credit for anything written outside the circle, or for any questions with more than one circled answer.
- If you find **more than one correct answer**, write and circle only one answer.
- Your answer can be up to 5 characters for a **positive** answer and up to 6 characters (including the negative sign) for a **negative** answer, but no more.
- If your answer is a **fraction** that is too long (over 5 characters for positive, 6 characters for negative), write the decimal equivalent.
- If your answer is a **decimal** that is too long (over 5 characters for positive, 6 characters for negative), truncate it or round at the fourth digit.
- If your answer is a **mixed number** (such as $3\frac{1}{2}$), write it as an improper fraction ($\frac{7}{2}$) or its decimal equivalent (3.5).
- Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

1

$$\begin{aligned} 3x &= 12 \\ -3x + y &= -6 \end{aligned}$$

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

- A) -3
- B) 6
- C) 18
- D) 30

2

Which expression is equivalent to $11x^3 - 5x^3$?

- A) $16x^3$
- B) $6x^3$
- C) $6x^6$
- D) $16x^6$

3

$$66x = 66x$$

How many solutions does the given equation have?

- A) Exactly one
- B) Exactly two
- C) Infinitely many
- D) Zero

4

A proposal for a new library was included on an election ballot. A radio show stated that 3 times as many people voted in favor of the proposal as people who voted against it. A social media post reported that 15,000 more people voted in favor of the proposal than voted against it. Based on these data, how many people voted against the proposal?

- A) 7,500
- B) 15,000
- C) 22,500
- D) 45,000

5

Caleb used juice to make popsicles. The function $f(x) = -5x + 30$ approximates the volume, in fluid ounces, of juice Caleb had remaining after making x popsicles. Which statement is the best interpretation of the y -intercept of the graph of $y = f(x)$ in the xy -plane in this context?

- A) Caleb used approximately 5 fluid ounces of juice for each popsicle.
- B) Caleb had approximately 5 fluid ounces of juice when he began to make the popsicles.
- C) Caleb had approximately 30 fluid ounces of juice when he began to make the popsicles.
- D) Caleb used approximately 30 fluid ounces of juice for each popsicle.

6

An angle has a measure of $\frac{16\pi}{15}$ radians. What is the measure of the angle, in degrees?

7

$$\begin{aligned} y &\leq x + 7 \\ y &\geq -2x - 1 \end{aligned}$$

Which point (x, y) is a solution to the given system of inequalities in the xy -plane?

- A) $(-14, 0)$
- B) $(0, -14)$
- C) $(0, 14)$
- D) $(14, 0)$

8

A right triangle has legs with lengths of 24 centimeters and 21 centimeters. If the length of this triangle's hypotenuse, in centimeters, can be written in the form $3\sqrt{d}$, where d is an integer, what is the value of d ?

9

Value	Data set A frequency	Data set B frequency
30	2	9
34	4	7
38	5	5
42	7	4
46	9	2

Data set A and data set B each consist of 27 values. The table shows the frequencies of the values for each data set. Which of the following statements best compares the means of the two data sets?

- A) The mean of data set A is greater than the mean of data set B.
- B) The mean of data set A is less than the mean of data set B.
- C) The mean of data set A is equal to the mean of data set B.
- D) There is not enough information to compare the means of the data sets.

10

Triangle XYZ is similar to triangle RST such that X , Y , and Z correspond to R , S , and T , respectively. The measure of $\angle Z$ is 20° and $2XY = RS$. What is the measure of $\angle T$?

- A) 2°
- B) 10°
- C) 20°
- D) 40°

11

Keenan made 32 cups of vegetable broth. Keenan then filled x small jars and y large jars with all the vegetable broth he made. The equation $3x + 5y = 32$ represents this situation. Which is the best interpretation of $5y$ in this context?

- A) The number of large jars Keenan filled
- B) The number of small jars Keenan filled
- C) The total number of cups of vegetable broth in the large jars
- D) The total number of cups of vegetable broth in the small jars

12

$$x(x + 1) - 56 = 4x(x - 7)$$

What is the sum of the solutions to the given equation?

13

The function $f(x) = \frac{1}{9}(x - 7)^2 + 3$ gives a metal ball's height above the ground $f(x)$, in inches, x seconds after it started moving on a track, where $0 \leq x \leq 10$. Which of the following is the best interpretation of the vertex of the graph of $y = f(x)$ in the xy -plane?

- A) The metal ball's minimum height was 3 inches above the ground.
- B) The metal ball's minimum height was 7 inches above the ground.
- C) The metal ball's height was 3 inches above the ground when it started moving.
- D) The metal ball's height was 7 inches above the ground when it started moving.

14

$$F(x) = \frac{9}{5}(x - 273.15) + 32$$

The function F gives the temperature, in degrees Fahrenheit, that corresponds to a temperature of x kelvins. If a temperature increased by 2.10 kelvins, by how much did the temperature increase, in degrees Fahrenheit?

- A) 3.78
- B) 35.78
- C) 487.89
- D) 519.89

15

x	y
k	13
$k + 7$	-15

The table gives the coordinates of two points on a line in the xy -plane. The y -intercept of the line is $(k - 5, b)$, where k and b are constants. What is the value of b ?

16

One of the factors of $2x^3 + 42x^2 + 208x$ is $x + b$, where b is a positive constant. What is the smallest possible value of b ?

17

The function f is defined by $f(x) = 7x - 84$. What is the x -intercept of the graph of $y = f(x)$ in the xy -plane?

- A) $(-12, 0)$
- B) $(-7, 0)$
- C) $(7, 0)$
- D) $(12, 0)$

18

A certain park has an area of 11,863,808 square yards. What is the area, in square miles, of this park? (1 mile = 1,760 yards)

- A) 1.96
- B) 3.83
- C) 3,444.39
- D) 6,740.8

19

One gallon of paint will cover 220 square feet of a surface. A room has a total wall area of w square feet. Which equation represents the total amount of paint P , in gallons, needed to paint the walls of the room twice?

- A) $P = \frac{w}{110}$
- B) $P = 440w$
- C) $P = \frac{w}{220}$
- D) $P = 220w$

20

$$48x - 72y = 30y + 24$$

$$ry = \frac{1}{6} - 16x$$

In the given system of equations, r is a constant. If the system has no solution, what is the value of r ?

21

$$\frac{x^2}{\sqrt{x^2 - c^2}} = \frac{c^2}{\sqrt{x^2 - c^2}} + 39$$

In the given equation, c is a positive constant. Which of the following is one of the solutions to the given equation?

- A) $-c$
- B) $-c^2 - 39^2$
- C) $-\sqrt{39^2 - c^2}$
- D) $-\sqrt{c^2 + 39^2}$

22

$$f(x) = ax^2 + 4x + c$$

In the given quadratic function, a and c are constants. The graph of $y = f(x)$ in the xy -plane is a parabola that opens upward and has a vertex at the point (h, k) , where h and k are constants. If $k < 0$ and $f(-9) = f(3)$, which of the following must be true?

- I. $c < 0$
- II. $a \geq 1$
- A) I only
- B) II only
- C) I and II
- D) Neither I nor II

STOP

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

The SAT[®]

Practice Test #2

ANSWER EXPLANATIONS

These answer explanations are for students using
The Official Digital SAT Study Guide.



Reading and Writing

Module 1

(27 questions)

QUESTION 1

Choice A is the best answer because it most logically completes the text's discussion of the writing system created by Sequoyah. In this context, "widespread" means widely accepted or practiced. The text indicates that because Sequoyah's script accurately represented the spoken sounds of the Cherokee language and was easy to learn, nearly all Cherokee people were able to read and write it soon after it was created. This context demonstrates that the script was widely used by the Cherokee people.

Choice B is incorrect. In this context, "careful" would mean exercised with care and attentive concern. Although the work of creating a writing system likely involved great care, the text indicates that the system was "easy to learn," which conflicts with the idea that using this system requires a noteworthy amount of care. **Choice C** is incorrect because in this context "unintended" means not deliberate. The idea that using Sequoyah's script was unintentional conflicts directly with the claim that it was easy to learn and used by "over 90% of the Cherokee people" by 1830. In fact, because one had to learn this system, it's not clear how one could use it unintentionally. **Choice D** is incorrect because in this context "infrequent" means rare or not occurring often, which conflicts directly with the claim that "over 90% of the Cherokee people" were using Sequoyah's script by 1830.

QUESTION 2

Choice C is the best answer because it most logically completes the text's discussion of Gardley's play. In this context, "comprises" means constitutes or makes up the totality of, and the text indicates that *The House That Will Not Stand* had an "all-female cast" that stands in some relationship to "an array of female characters" in the play. Because all cast members are female, the characters must be played by these female cast members; therefore the cast constitutes, or comprises, the collection of characters.

Choice A is incorrect. In this context, "engulfs" would mean encloses or overwhelms, and although it is fairly common to describe an actor as embodying (or personifying realistically) a character, there is nothing in the text to suggest that the cast members enclosed or overwhelmed the characters they played. **Choice B** is incorrect because in this context, "encourages" would mean inspires with courage or hope. Although the text does mention "a strong mother and several daughters dealing with individual struggles,"

which might suggest that there are moments of encouragement among the characters during the play, there is nothing to suggest that the cast members encouraged the characters they portrayed. *Choice D* is incorrect because, in this context, "provokes" would mean instigates or incites to anger. Nothing in the text addresses provocation or what it might mean for actors to provoke the characters they are playing.

QUESTION 3

Choice B is the best answer because it most logically completes the text's discussion of the significance of the 2014 archaeological finding at El Algar. In this context, "concede" means to admit something is true after first resisting that admission. The text indicates that some researchers believe "Bronze Age societies were ruled by men." But the Bronze Age burial of a woman at El Algar included "valuable objects signaling a high position of power," which would raise the possibility that "women may have also held leadership roles." Thus, the text is calling into question the notion that only men were leaders in these societies and speculating that people holding this view may reconsider their opinion.

Choice A is incorrect because "waive" means to refrain from insisting that something, such as a right or a requirement, be observed; the word isn't used, however, in contexts where someone acknowledges that an opinion they hold may be invalid, as is the case in the text. *Choice C* is incorrect. According to the text, the finding from the El Algar burial site undermines the view that Bronze Age societies were exclusively ruled by men. However, "refute" means to demonstrate that something is false and would not make sense in context. Lull and team's finding supports the view that women may have also held leadership roles, not that they did not participate in such roles. *Choice D* is incorrect because in this context, "require" means to demand or specify as mandatory. However, it would not make sense for contemporary researchers to demand that Bronze Age "women may have also held leadership roles."

QUESTION 4

Choice C is the best answer because as used in the text, "endure" most nearly means tolerate. In the text, Cecily and Algernon discuss parting, or saying goodbye. Cecily remarks on the deep pain of saying goodbye to people whom one has only known briefly and then comments on the equanimity, or calm steadiness, one experiences when separated from old friends. The text sets up an ironic contrast: one can easily tolerate, or put up with, the absence of close friends, but even a very short separation from a new acquaintance is unbearable.

Choice A is incorrect. Nothing in the text suggests that Cecily associates regret, or a feeling of sorrow, with the absence of old friends. Rather, the text sets up an ironic contrast between the feeling of calm steadiness one feels when separated from old friends and the unbearable pain of being separated from new acquaintances. *Choice B* is incorrect. Although in some contexts "endure" can mean persist, or proceed stubbornly, it doesn't have that meaning in this context because what is being endured is the absence of old friends. Whereas one can persist *despite* the absence of someone else, one can't persist the absence itself. *Choice D* is incorrect because the text doesn't convey that Cecily encourages, or urges, old friends to be absent. Although it may be that Cecily prefers new acquaintances to friends she has known for a long time, the text focuses on her feelings as a result of others' absences, not on her treatment of others.

QUESTION 5

Choice A is the best answer because it accurately states the main purpose of the text. The text begins by discussing the promise of the future, with positive references to renewal such as "new roads," "new beating of the drum," and "fresh seeing." But with the "new sun," the text continues, there will still be "the same backs bending" and "the same sad feet" drumming, indicating that these difficulties will follow people into this new day. The poem thus considers both the rewards and challenges associated with the repetitiveness of human life.

Choice B is incorrect because the text doesn't say anything about how memorable activities are, let alone compare the memorability of activities completed at different times of the day. **Choice C** is incorrect. Although the text contrasts hope with difficulty, it does not compare the relative frequency of joyful feelings with that of sad feelings. **Choice D** is incorrect because the text makes no distinction between the experiences of individuals and the experiences of their communities.

QUESTION 6

Choice B is the best answer because it most accurately describes how the underlined portion functions in the text as a whole. The text presents the speaker's experience of viewing the sea. In the underlined portion, the speaker focuses on the idea that the waves hitting rocks on the shore are a relentless and enduring force: they are constantly pushed back ("ever repulsed") but always return ("ever rushing on"), as though they have an energy that can't be overcome ("a life that will not know defeat").

Choice A is incorrect. Although the underlined portion characterizes the waves as a relentless force (always "repulsed" but still "rushing on" and never being defeated), the speaker doesn't suggest that the surroundings are intimidating. Instead, the speaker presents the scene in a positive way, describing the "deep delight" of the "gladsome," or cheerful, waves and feeling "the heart / Leap joyous" while viewing the sea. **Choice C** is incorrect because the underlined portion doesn't suggest that the speaker is ambivalent, or has mixed feelings about, the natural world. Instead, it presents a single view of one part of the immediate surroundings: the speaker characterizes the sea's waves as an unstoppable force, since they are constantly pushed back but always return ("ever repulsed, yet ever rushing on"). **Choice D** is incorrect. Although the text later suggests the speaker's view of her own thoughts by referring to a "clouded brain" and a heart that leaps joyously, this reference neither occurs within the underlined portion nor establishes a clear contrast with the relentless determination of the waves. The underlined portion addresses only the speaker's view of the waves and doesn't suggest what her own thoughts might be.

QUESTION 7

Choice A is the best answer because it most accurately describes the overall structure of the text. The narrator begins by explaining how Charlot carefully delivers Atlante's letter to Rinaldo, and then relates that Rinaldo feels "transported with joy" after reading the letter. Therefore, the overall structure of the text is best described as a description of the delivery of a letter followed by the portrayal of a character's happiness after reading the letter.

Choice B is incorrect because the text indicates that the letter has been written; there's no explanation why another character hasn't written one. In addition, the text's description of Rinaldo "in a melancholy posture" suggests that he's sad and thoughtful, not that he's desperate to receive the letter. **Choice C** is incorrect.

Although the text states that Charlot won't toss the letter to Rinaldo because she doesn't want it to fall, the text doesn't refer to the contents of the letter. Instead, the text describes how happy Rinaldo feels after reading it. *Choice D* is incorrect. Although the text does describe Rinaldo's reaction to the letter, the text doesn't begin by discussing Atlante's inspiration for writing the letter. Instead, the text begins by discussing the delivery of the letter.

QUESTION 8

Choice D is the best answer because it most accurately states the main idea of the text. The text describes Mary's activities in an overgrown hidden garden, saying that she was "very much absorbed" and was "only becoming more pleased with her work every hour" rather than getting tired of it. She also thinks of garden activities as a "fascinating sort of play." Thus, the main idea of the text is that Mary feels very satisfied when taking care of the garden.

Choice A is incorrect because the text never makes any mention of Mary's chores. *Choice B* is incorrect because the text indicates that Mary finds pulling up weeds to be fascinating, not boring. *Choice C* is incorrect because Mary thinks of garden activities in and of themselves as play, not as something necessary to do to create a space to play.

QUESTION 9

Choice D is the best answer because it most accurately states the main idea of the text. According to the text, conceptual artists Gins and Arakawa have designed an apartment building that is disorienting because of several unconventional elements, such as uneven kitchen counters and "a door to nowhere." The text goes on to suggest that there may be benefits to this kind of design because filmmaker Yamaoka lived in the apartment building for four years and reported health benefits. Thus, although the design is impractical, it may improve the well-being of the apartment building's residents.

Choice A is incorrect. Although the text mentions that Yamaoka lived in the apartment for four years, it doesn't address how long someone can beneficially live in a home surrounded by fanciful features or whether doing so can be sustained. *Choice B* is incorrect. Although the text mentions the potential benefits of living in a home with disorienting design features, it doesn't suggest that this is the most effective method to create a physically stimulating environment. *Choice C* is incorrect because the text refers to Yamaoka to support the claim that Gins and Arakawa's apartment building design may be beneficial, but the text doesn't indicate that Yamaoka supports the designs of other conceptual artists.

QUESTION 10

Choice A is the best answer because it most accurately states the main purpose of the text. In the first part of the text, the speaker addresses Paul Laurence Dunbar's ability to understand people (he has "read the hearts and souls of men" and written of their "joy and mirth"). In the second part of the text, the speaker describes Dunbar's thorough understanding of the natural world (he has read "the language of the flowers" and engaged with "the little brook"). Thus, the text mainly praises Dunbar for being especially perceptive about people and nature.

Choice B is incorrect because the speaker describes Dunbar as having read the "hearts and souls of men" and the "language of flowers" to convey Dunbar's ability to comprehend people and nature, not to suggest that Dunbar has literally read any of these things or has read a great deal about them.

Choice C is incorrect because the text notes how well Dunbar has made sense of the topics he's written about but doesn't address any specific parts of Dunbar's writing process beyond the suggestion that he used a pen. *Choice D* is incorrect because the text focuses on Dunbar's understanding of people and nature as expressed in his writing. Nothing in the text suggests that the speaker is recalling a particular afternoon actually spent in nature with Dunbar; even if there had been a shared experience, the text isn't focused on reminiscing.

QUESTION 11

Choice A is the best answer because it most directly illustrates the text's claim about Whitman's poem, "To You." The text says that in this poem, Whitman suggests that he deeply understands the poem's reader. This quotation says that the reader's "true soul and body appear before" Whitman, thereby asserting that he can see the reader as the reader truly is, suggesting that he deeply understands the reader.

Choice B is incorrect because this quotation describes Whitman making the reader the subject of the poem ("you be my poem"), not Whitman deeply understanding the reader. *Choice C* is incorrect because instead of suggesting that Whitman deeply understands the reader, it emphasizes Whitman's regret at not having addressed the reader sooner. *Choice D* is incorrect. Although this quotation shows Whitman directly addressing the reader and expressing concern about the reader, it doesn't illustrate the idea that Whitman suggests that he deeply understands the reader. The quotation is simply expressing concern about the reader, which doesn't necessarily imply deep understanding of the reader.

QUESTION 12

Choice B is the best answer because it provides the most direct support from the table for the claim that two languages can convey similar amounts of information even if they're spoken at different rates. The table shows the approximate rates at which five languages are spoken and the rates at which those five languages convey information. Vietnamese is spoken at around 5.3 syllables per second, whereas Spanish is spoken at around 7.7 syllables per second, but the two languages convey information at very similar rates: Vietnamese at a rate of around 42.5 bits per second and Spanish at a rate of around 42.0 bits per second. Thus, the description of Vietnamese conveying information at around the same rate that Spanish does despite being spoken more slowly supports the claim in the text that languages can convey the same amount of information even if spoken at different rates.

Choice A is incorrect because it isn't true that Thai and Hungarian have the lowest rates of speech of the five languages shown. According to the table, Hungarian is spoken at around 5.9 syllables per second, which is faster than Vietnamese (5.3 syllables per second). Additionally, even if this statement were true, the assertion that two languages are spoken the slowest and convey information the slowest wouldn't support the claim that languages can convey the same amount of information even if they're spoken at different rates.

Choice C is incorrect because it isn't true that the fastest-spoken language (Spanish, at 7.7 syllables per second) also conveys information the fastest: Spanish conveys information at 42.0 bits per second, which is slower than the 42.5 bits-per-second rate at which Vietnamese conveys information. Additionally, even if this statement were true, the assertion that the language spoken the fastest also conveys information the fastest has no bearing on the claim that languages can convey the same amount of information even if they're spoken at different rates. *Choice D* is incorrect because it isn't true

that Serbian conveys information faster than Spanish does. According to the table, Serbian conveys information at a rate of around 39.1 bits per second, which is slower than the 42.0 bits-per-second rate at which Spanish conveys information.

QUESTION 13

Choice B is the best answer because it describes data from the graph that weaken the student's conclusion about the reduction in the spider population in the enclosure with lizards. The graph shows that the enclosure with lizards and the enclosure without lizards each began with about 85 spiders, and that the number of spiders in each enclosure fell over the 30 days of the study. The student's claim is that the reduction in spiders in the enclosure with lizards is "entirely attributable to the presence of the lizards," meaning that the spider population wouldn't have declined except for the presence of the lizards. This claim is weakened, however, by the fact that the enclosure without lizards also saw a substantial reduction in the number of spiders. Since the number of spiders fell in the enclosure without lizards as well as in the enclosure with lizards, there must be some other factor than just the presence of the lizards that contributed to the reduction in the spider population.

Choice A is incorrect because the fact that the two enclosures started with the same number of spiders is irrelevant to the claim that the reduction in spider population by day 30 in the enclosure with lizards can be entirely attributed to the lizards. **Choice C** is incorrect because the fact that the spider population in the enclosure with lizards fell more between days 1 and 10 than in other periods has nothing to do with the student's claim that the reduction in spiders in that enclosure by day 30 can be entirely attributed to the lizards. **Choice D** is incorrect. Although it's true that on day 30 the spider population was lower in the enclosure with lizards than in the enclosure without lizards, this fact doesn't weaken the student's claim that the reduction in the spider population in the enclosure with lizards can be entirely attributed to the lizards. Indeed, the lower spider population in the enclosure with lizards suggests that the lizards are contributing to the reduction in the spider population, though the fact that the spider population also fell substantially in the other enclosure means that the lizards aren't the only cause of the reduction.

QUESTION 14

Choice A is the best answer because it presents the conclusion that most logically follows from the text's discussion of military veterans working in civilian government jobs in the United States. The text indicates that the proportion of military veterans working in civilian government jobs is considerably higher than the proportion of military veterans in the population as a whole. The text also notes that the unusually high representation of military veterans in these jobs may be a result of the organizational structures shared by civilian government entities and the military. Hence, it's reasonable to infer that it's the familiarity of the structures of civilian government that makes jobs there particularly attractive to military veterans.

Choice B is incorrect because the text doesn't address what a typical relationship between military service and later career preferences would be, and there's no indication that it's atypical for veterans to work in civilian government jobs after they've left the military. On the contrary, the text suggests that many military veterans are drawn to such jobs. **Choice C** is incorrect because the text is focused on the high representation of military veterans in civilian government jobs and doesn't address nonveterans or their possible interest in military service. **Choice D** is incorrect because the

text conveys that military veterans may be particularly interested in civilian government jobs due to the familiarity of organizational structures that are already in place, but there's no reason to think that this interest would mean that more civilian government jobs will start to require military experience.

QUESTION 15

Choice C is the best answer. The convention being tested is the punctuation of a restrictive coordinated noun phrase. No punctuation is needed within or around the coordinated noun phrase "researchers Roberto Scandone and Christopher Kilburn" because it would create an illogical separation between the noun "researchers" and the coordinated noun phrase "Roberto Scandone and Christopher Kilburn."

Choice A is incorrect because no punctuation is needed. Placing a pair of commas around the coordinated noun phrase "Roberto Scandone and Christopher Kilburn" creates an illogical separation between the noun "researchers" and the aforementioned coordinated noun phrase. In this case, it illogically suggests that researchers in general bear the specific names Roberto Scandone and Christopher Kilburn. **Choice B** is incorrect because no punctuation is needed between the noun "researchers" and the coordinated noun phrase "Roberto Scandone and Christopher Kilburn." **Choice D** is incorrect because no punctuation is needed within the coordinated noun phrase "Roberto Scandone and Christopher Kilburn."

QUESTION 16

Choice B is the best answer. The convention being tested is the coordination of main clauses within a sentence. This choice uses a semicolon in a conventional way to join the first main clause ("In 2004...sampler") and the second main clause ("in 2014...pillars").

Choice A is incorrect because it results in a comma splice. Without a conjunction following it, a comma can't be used in this way to join two main clauses. The word "later" is an adverb and cannot be used to join two main clauses unless it is preceded by a conjunction. **Choice C** is incorrect because it results in a comma splice. Without a conjunction following it, a comma can't be used in this way to join two main clauses. **Choice D** is incorrect because it results in a comma splice. Without a conjunction following it, a comma can't be used in this way to join two main clauses. The word "later" is an adverb and cannot be used to join two main clauses unless it is preceded by a conjunction.

QUESTION 17

Choice D is the best answer. The convention being tested is punctuation within two coordinated noun phrases. When, as in this case, a noun phrase ("the country's millions of miles of waterways") is coordinated with another noun phrase ("the fact") followed by an integrated relative clause ("that the volume...time"), no punctuation is needed.

Choice A is incorrect because no punctuation is needed. **Choice B** is incorrect because no punctuation is needed. **Choice C** is incorrect because no punctuation is needed.

QUESTION 18

Choice A is the best answer. The convention being tested is subject-modifier placement. This choice makes the noun phrase "many critics" the subject of the sentence and places it immediately after the modifying phrase "in assessing... Kurosawa." In doing so, this choice clearly establishes that it is the critics—and not another noun in the sentence—who assess Kurosawa's films.

Choice B is incorrect because it results in a dangling modifier. The placement of the noun phrase “Kurosawa’s...sources” immediately after the modifying phrase illogically suggests that his use of Western literary sources is what assesses Kurosawa’s films. *Choice C* is incorrect because it results in a dangling modifier. The placement of the function word “there” immediately after the modifying phrase illogically suggests that “there” is what assesses Kurosawa’s films. *Choice D* is incorrect because it results in a dangling modifier. The placement of the noun phrase “the focus...critics” immediately after the modifying phrase illogically suggests that the critics’ focus is what assesses Kurosawa’s films.

QUESTION 19

Choice C is the best answer. The convention being tested is the punctuation of items in a complex series. It’s conventional to use a semicolon to separate items in a complex series with internal punctuation, and in this choice, the semicolon after “2009” is conventionally used to separate the first item (“the world’s...2009”) and the second item (“an online...2010”) in the series of things that Hinson helped create. Further, the comma after “Basic” correctly pairs with the comma after “app,” and the comma after “network” correctly pairs with the comma after “TV” to set off the supplemental elements (“Chickasaw Basic” and “Chickasaw TV”) that provide the names of the app and the TV network, respectively. Altogether, the punctuation in this choice results in a sentence that clearly indicates that Hinson helped make a language app in 2009, an online TV network in 2010, and a language course in 2015.

Choice A is incorrect because it fails to punctuate the complex series in a way that makes clear that Hinson helped make a language app in 2009, an online TV network in 2010, and a language course in 2015. *Choice B* is incorrect because it fails to punctuate the complex series in a way that makes clear that Hinson helped make a language app in 2009, an online TV network in 2010, and a language course in 2015. *Choice D* is incorrect because the comma after “2009” doesn’t match the semicolon used to separate the second and third items in the complex series.

QUESTION 20

Choice D is the best answer. The convention being tested is punctuation use between a main clause and a supplementary phrase. In this choice, a colon is correctly used to mark the boundary between the main clause (“A group...plant”) and the supplementary element (“TN57...pests”) and to introduce the following elaboration on the specific varieties of sweet potato plants that were examined.

Choice A is incorrect because it results in a rhetorically unacceptable sentence fragment beginning with “TN57.” *Choice B* is incorrect because a semicolon can’t be used in this way to join the main clause (“A group...plant”) and the supplementary element (“TN57...pests”). A semicolon is conventionally used to join two main clauses, whereas a colon is conventionally used to introduce an element that explains or amplifies the information in the preceding clause. *Choice C* is incorrect because it fails to mark the boundary between the main clause (“A group...plant”) and the supplementary element (“TN57...pests”) with appropriate punctuation.

QUESTION 21

Choice A is the best answer. “Hence” logically signals that the information in this sentence—that geologists couldn’t confirm the theory of cyclical Ice Ages until the 1960s—is a consequence of the previous information about the destructiveness of each Ice Age and the erasure of necessary geological evidence.

Choice B is incorrect because “moreover” illogically signals that the information in this sentence is merely additional to the previous information about the destructiveness of each Ice Age. Instead, the sentence identifies a specific consequence of that information. *Choice C* is incorrect because “nevertheless” illogically signals that the information in this sentence is true despite the previous information about the destructiveness of each Ice Age. Instead, the sentence identifies a specific consequence of that information. *Choice D* is incorrect because “next” illogically signals that the information in this sentence is the next step in a process. Instead, the sentence identifies a specific consequence of the previous information.

QUESTION 22

Choice B is the best answer. The sentence compares the lengths of the two rail tunnels, noting that the Channel Tunnel (about 31 miles long) is slightly shorter than the Seikan Tunnel (roughly 33 miles long).

Choice A is incorrect. The sentence makes a generalization about the length of some rail tunnels; it doesn’t compare the lengths of the two rail tunnels. *Choice C* is incorrect. The sentence describes a single rail tunnel; it doesn’t compare the lengths of the two rail tunnels. *Choice D* is incorrect. While the sentence mentions the two rail tunnels, it doesn’t compare their lengths.

QUESTION 23

Choice C is the best answer. The sentence specifies the reason the Pleiades’ appearance changed, noting that two of the cluster’s stars have moved so close together that they now appear as one star.

Choice A is incorrect. The sentence specifies how ancient Native American and Australian Aboriginal cultures described the Pleiades; it doesn’t specify the reason the Pleiades’ appearance changed. *Choice B* is incorrect. The sentence describes the appearance of the Pleiades today; it doesn’t specify the reason the Pleiades’ appearance changed. *Choice D* is incorrect. The sentence explains why two of the Pleiades’ stars appear to be a single star; it doesn’t specify the reason the Pleiades’ appearance changed.

QUESTION 24

Choice C is the best answer. The sentence effectively emphasizes the fossil’s significance, explaining that the fossil is rare and illustrates an early stage in the evolution of pinnipeds from their land-dwelling ancestors.

Choice A is incorrect. The sentence describes the fossil Rybczynski found; it doesn’t emphasize the fossil’s significance. *Choice B* is incorrect. The sentence mentions that a fossil resembling both pinnipeds and their ancestors was found; it doesn’t emphasize the fossil’s significance. *Choice D* is incorrect. The sentence notes a term used to describe the fossil Rybczynski found; it doesn’t emphasize the fossil’s significance.

QUESTION 25

Choice C is the best answer. The sentence emphasizes a difference between the portraits, noting that one is a painting and the other is a drawing.

Choice A is incorrect. The sentence emphasizes a similarity between the two portraits rather than a difference. *Choice B* is incorrect. The sentence makes a generalization about Enriquez’s portraits; it doesn’t emphasize a difference between the portraits of Jimenez and Anaya. *Choice D* is incorrect. While the sentence notes a difference between Jimenez and Anaya, it doesn’t emphasize a difference between, or even mention, their portraits.

QUESTION 26

Choice D is the best answer. The sentence emphasizes the role a misconception played in the naming of a place, explaining that Spanish explorers mistook a peninsula for an island and, as a result, named the peninsula after a fictional island, California.

Choice A is incorrect. The sentence mentions a novel that featured a fictional island, California; it doesn't emphasize the role a misconception played in the naming of a place. **Choice B** is incorrect. The sentence notes that Baja California was originally named after a fictional place; it doesn't emphasize the role a misconception—specifically, the Spanish explorers' mistaken belief that the peninsula was an island—played in the naming of a place. **Choice C** is incorrect. The sentence indicates when Spanish explorers learned of the peninsula they called California; it doesn't emphasize the role a misconception played in the naming of a place.

QUESTION 27

Choice C is the best answer. The sentence emphasizes a similarity between the two paintings, noting that Leutze's painting (which measures 149 × 255 inches) and Monkman's painting (which measures 132 × 264 inches) are both very large.

Choice A is incorrect. The sentence mentions that Monkman's painting was completed in 2019 and Leutze's was completed in 1851; it doesn't emphasize a similarity between the two paintings. **Choice B** is incorrect. While the sentence acknowledges that one painting was inspired by the other, it emphasizes differences between the two paintings; it doesn't emphasize a similarity between them. **Choice D** is incorrect. The sentence mentions a difference between the two paintings; it doesn't emphasize a similarity between them.

Reading and Writing

Module 2

(27 questions)

QUESTION 1

Choice A is the best answer because it most logically completes the text's discussion of Francis Cecil Sumner. As used in this context, "proponent of" means supporter of. The text says that Sumner helped to found the psychology department at historically Black Howard University in 1930. This is evidence that Sumner supported increasing the opportunity for Black students to study psychology.

Choice B is incorrect because the phrase "supplement to," or addition to, wouldn't make sense in context. The text discusses Sumner's efforts to increase the number of Black psychology students, but it doesn't make sense to describe him as an addition to his efforts. **Choice C** is incorrect because Sumner was already an accomplished psychologist himself when he helped to found the Howard University psychology department. While Black students were the beneficiaries of his efforts—that is, they received help because of his efforts—it wouldn't make sense in this context to describe Sumner as a "beneficiary of" opportunities, because he was the one doing the helping. **Choice D** is incorrect because founding a psychology department at Howard University wouldn't be a "distraction for" Sumner's aim to increase the opportunity for Black students to study psychology—that is, it wouldn't be something that draws Sumner's attention away from that goal, but rather the opposite.

QUESTION 2

Choice B is the best answer because it most logically completes the text's discussion of the art installation *Anthem*. In this context, "inventive" means characterized by invention and creativity. The text explains that critics' responses to the installation involved praise for Tsang's creative transformation of a space into a dynamic exhibit with huge images and lots of sound. This context conveys that the critics found the piece particularly creative.

Choice A is incorrect because the text indicates that critics praised the installation for being dynamic and including huge images and lots of sound, and it wouldn't make sense to describe such an exhibit as "restrained," or limited and not extravagant or showy. **Choice C** is incorrect because it wouldn't make sense to say that critics found the installation "inexplicable," or incapable of being explained or interpreted, since the critics were able to explain their praise for the installation's transformation of a space with huge images and

lots of sound. *Choice D* is incorrect because the text focuses on the idea that critics praised Tsang for creatively transforming a space into a dynamic exhibit, not that they found the installation “mystifying,” or bewildering and hard to understand. Nothing in the text suggests that the critics couldn’t understand the piece.

QUESTION 3

Choice D is the best answer because it most logically completes the text’s discussion of gender roles in Shakespeare’s comedies. As used in this context, “prescribed” would mean laid down as rules. The text indicates that the characters in the comedies often defy gender roles that are “socially dictated” (even if most characters do return to those roles eventually) and that scholars have been very interested in these acts of defiance. This context indicates that what the characters are rebelling against are standards of behavior prescribed by the society of the time.

Choice A is incorrect because saying that expectations about gender were “interjected,” or suddenly inserted between other things, wouldn’t make sense in context. There’s no suggestion in the text that the issue of gender roles was inserted between other things or was an interruption in a larger discussion. *Choice B* is incorrect because the text indicates that Shakespeare depicts characters rebelling against expectations about gender that have been “socially dictated,” not expectations that society has “committed,” or carried out, entrusted, or promised. *Choice C* is incorrect because the text indicates that Shakespeare depicts characters rebelling against expectations about gender that have been “socially dictated,” not expectations that have been “illustrated,” or clarified with examples. Although it’s possible for expectations about gender roles to be illustrated, there’s nothing in the text to indicate that characters in Shakespeare’s comedies rebel against illustrations of gender expectations.

QUESTION 4

Choice C is the best answer because it most logically completes the text’s discussion of the artistic styles that have influenced Cannon’s work. As used in this context, “disparate” means distinct or dissimilar. The text indicates that a tension exists among the styles that have influenced Cannon’s work and goes on to describe how those styles differ: classic European portraiture favors realism, American pop art uses vivid colors, and intertribal flatstyle rejects the use of shading and perspective to achieve depth. This context suggests that the styles that have influenced Cannon’s work are disparate.

Choice A is incorrect because the text indicates that there is a tension among the influences on Cannon’s artwork, so it wouldn’t make sense to say that the influences are “complementary,” or that they complete one another or make up for one another’s deficiencies. *Choice B* is incorrect because it wouldn’t make sense to characterize Cannon’s influences as “unknown,” or not familiar; it’s clear that the influences are known because the text goes on to list them. *Choice D* is incorrect because the text indicates that there is a tension among the influences on Cannon’s work, not that they are “interchangeable,” or capable of being used in one another’s place.

QUESTION 5

Choice B is the best answer because it describes the most likely way that Graeber and Wengrow (Text 2) would respond to the “conventional wisdom” presented in Text 1. According to Text 1, the conventional wisdom about human social systems is that they developed through stages, beginning with

hunter-gatherer bands, then moving to clan associations, then chiefdoms, and finally arriving at states with bureaucratic structures. Text 2 indicates that Graeber and Wengrow believe that human social systems have been flexible, shifting between different types of structures, including both hierarchical and collective systems, and that these shifts may have even occurred seasonally. This suggests that Graeber and Wengrow would dispute the idea that developments in social structures have followed a linear progression through distinct stages.

Choice A is incorrect because nothing in Text 2 suggests that Graeber and Wengrow believe that decentralized collective societies are more significant than hierarchical systems. Text 2 is focused on Graeber and Wengrow's view that humans have flexibly shifted among various social structures, not on the importance of particular structures relative to others. *Choice C* is incorrect because Text 2 doesn't include any information suggesting that Graeber and Wengrow believe that hierarchies didn't emerge until after the rise of agriculture. In fact, Text 2 indicates that Graeber and Wengrow cite evidence suggesting that some hunter-gatherer groups formed social structures with hierarchical elements ("communities that included esteemed individuals") 50,000 years ago, long before the rise of agriculture, which Text 1 says occurred around 12,000 years ago. *Choice D* is incorrect because there's no information in Text 2 suggesting that Graeber and Wengrow would challenge the assumption that groupings of hunter-gatherers were among the earliest forms of social structure. Although Text 1 does indicate that hunter-gatherer groups are assumed to be the earliest human social system, Text 2 says only that Graeber and Wengrow believe that some hunter-gatherer groups made use of different social structures at different times. Text 2 doesn't imply that Graeber and Wengrow doubt that hunter-gatherer groups preceded most other social structures.

QUESTION 6

Choice A is the best answer because it most accurately states the main idea of the text. According to the text, Eugene Wigner hypothesized that a crystal could exist that would be composed of electrons and have a honeycomb-like shape. The text goes on to say that the existence of the Wigner crystal remained unconfirmed until Feng Wang and colleagues were able to make an impression of one using two semiconductors and an ultrathin sheet of graphene. Thus, the main idea is that researchers have obtained the most definitive evidence to date of the existence of the Wigner crystal.

Choice B is incorrect because the text focuses on one kind of crystal—the Wigner crystal—and doesn't discuss crystalline structures in general. And although the text conveys that Wang and colleagues figured out a way to capture an image of a Wigner crystal, it doesn't address the idea of applying this approach to other types of crystals. *Choice C* is incorrect because the text describes in general the process Wang and colleagues followed to obtain an impression of the Wigner crystal; it doesn't address the relative importance of each component in that process. *Choice D* is incorrect because the text doesn't state that researchers had a hard time getting an impression of the Wigner crystal because of its honeycomb structure. Nothing in the text indicates why it took so long to prove the existence of this crystal or take an impression of it.

QUESTION 7

Choice D is the best answer because it states why Wang and his team's discovery of the *Terropteris xiushanensis* fossil was significant. The text explains that up until Wang and his team's discovery, the only fossil evidence of mixopterids came from the paleocontinent of Laurussia. Wang and his team, however, identified fossil remains of a mixopterid species from the

paleocontinent Gondwana. Therefore, the team's discovery was significant because the fossil remains of a mixopterid species were outside of the paleocontinent Laurussia.

Choice A is incorrect. Although the text states that Wang and his team identified fossilized remains of a mixopterid species that lived more than 400 million years ago, it doesn't indicate that mixopterid fossils previously found by scientists dated to a more recent period than that. *Choice B* is incorrect. Although the text states that mixopterids are related to modern arachnids and horseshoe crabs, it doesn't suggest that the fossil discovered by Wang and his team confirmed that this relationship is closer than scientists had previously thought. *Choice C* is incorrect because the team's fossil established the presence of mixopterids on Gondwana, not on Laurussia. Moreover, the text only discusses the fossil in relation to the geographical distribution of mixopterids, not in relation to their evolution.

QUESTION 8

Choice C is the best answer because it describes something that is true of Mother, as presented in the text. The text indicates that in addition to other activities, Mother writes stories for her children while they are at school and makes up "funny pieces of poetry" for certain occasions.

Choice A is incorrect because the text suggests that Mother prefers to spend her time with her children and doesn't sit at home hoping that ladies will visit her. *Choice B* is incorrect because the text says only that Mother makes up poetry for the children's birthdays, not that she likes birthdays more than other special occasions. *Choice D* is incorrect because the text doesn't suggest that Mother prefers reading to her children over the other activities she does with them, such as playing with them and writing stories and poems for them.

QUESTION 9

Choice B is the best answer because it most effectively illustrates the claim in the text that in describing the teenaged girl, Mansfield contrasts the character's pleasant appearance with her unpleasant attitude. In the quotation, Mansfield describes the teenager as having a "lovely nose" (a compliment about her appearance) but also as treating her makeup puff "as though she loathed it" (a judgment suggesting her unpleasant attitude).

Choice A is incorrect because the teenager's reaction to the flowers doesn't make it clear that she has an unpleasant attitude, and nothing in the quotation indicates that any part of her appearance is pleasant. *Choice C* is incorrect because the quotation suggests that the teenager has an unpleasant attitude (being upset with the location and leaving the table before the narrator has paid for the meal) but doesn't give any indication that she has a pleasant appearance. *Choice D* is incorrect because the quotation suggests that the teenager may have an unpleasant attitude (lowering her eyes, wincing, and sitting in silence) but doesn't give any indication that any part of her appearance is pleasant.

QUESTION 10

Choice C is the best answer because it accurately describes data from the table that support Barrett and Rayfield's suggestion about bite force estimates. According to the text, Barrett and Rayfield believe that estimates of dinosaur bite force may be strongly influenced by the methods used to produce them—that is, that different methods may produce significantly different results. The table shows that the studies by Bates and Falkingham and by Cost et al.

used the same estimation method (muscular and skeletal modeling) and produced similar bite force estimates (approximately 35,000–57,000 newtons and 35,000–63,000 newtons, respectively). The study by Meers, however, used body-mass scaling and produced a much higher bite force estimate (183,000–235,000 newtons), while the study by Gignac and Erickson used tooth-bone interaction analysis and produced a much lower bite force estimate (8,000–34,000 newtons). The fact that one method produced similar estimates in two different studies and that two different methods used in other studies produced substantially different estimates supports the idea that dinosaur bite force estimates are significantly influenced by the methodology used to produce them.

Choice A is incorrect because it inaccurately describes data from the table. The table does show that the studies by Meers and by Cost et al. used different estimation methods and produced very different ranges of estimated dinosaur bite force, which would support Barrett and Rayfield's suggestion that different methodologies may produce significantly different estimates. However, the table doesn't show that the study by Meers produced the lowest estimated maximum bite force while the study by Cost et al. produced the highest. In fact, the study by Meers estimated a maximum bite force of approximately 235,000 newtons, which is the highest of all the estimated maximums. *Choice B* is incorrect. Although the data from Gignac and Ericson's study are accurately described, a single set of findings from one study using only one methodology can't show that different methodologies may produce significantly different dinosaur bite force estimates, as Barrett and Rayfield suggest. *Choice D* is incorrect. Although the table shows that the maximum bite force estimated by Cost et al. was higher than that estimated by Bates and Falkingham, the difference is relatively small; in fact, both teams estimated a minimum bite force of approximately 35,000 newtons and a maximum bite force close to approximately 60,000 newtons. Because these findings demonstrate that a single methodology (muscular and skeletal modeling) produced similar overall results in two studies, the findings don't support Barrett and Rayfield's suggestion that different methodologies may produce significantly different dinosaur bite force estimates.

QUESTION 11

Choice C is the best answer because it presents a finding that, if true, would weaken Foster's hypothesis that damage to eelgrass roots improves the health of eelgrass meadows by boosting genetic diversity. The text indicates that sea otters damage eelgrass roots but that eelgrass meadows near Vancouver Island, where there's a large otter population, are comparatively healthy. When Foster and her colleagues compared the Vancouver Island eelgrass meadows to those that don't have established otter populations, the researchers found that the Vancouver Island meadows are more genetically diverse than the other meadows are. This finding led Foster to hypothesize that damage to the eelgrass roots encourages eelgrass reproduction, thereby improving genetic diversity and the health of the meadows. If, however, other meadows not included in the study are less healthy the larger the local otter population is and the longer the otters have been in residence, that would suggest that damage to the eelgrass roots, which would be expected to increase with the size and residential duration of the otter population, isn't leading meadows to be healthier. Such a finding would therefore weaken Foster's hypothesis.

Choice A is incorrect because finding that small, recently introduced otter populations are near other eelgrass meadows in the study wouldn't weaken Foster's hypothesis. If otter populations were small and only recently established, they wouldn't be expected to have caused much damage to

eelgrass roots, so even if those eelgrass meadows were less healthy than the Vancouver Island meadows, that wouldn't undermine Foster's hypothesis. In fact, it would be consistent with Foster's hypothesis since it would suggest that the greater damage caused by larger, more established otter populations is associated with healthier meadows. *Choice B* is incorrect because the existence of areas with otters but without eelgrass meadows wouldn't reveal anything about whether the damage that otters cause to eelgrass roots ultimately benefits eelgrass meadows. *Choice D* is incorrect because the health of plants other than eelgrass would have no bearing on Foster's hypothesis that damage to eelgrass roots leads to greater genetic diversity and meadow health. It would be possible for otters to have a negative effect on other plants while nevertheless improving the health of eelgrass meadows by damaging eelgrass roots.

QUESTION 12

Choice C is the best answer because it presents a finding that, if true, would support the researchers' hypothesis about the plants' dependence on dissolving rock. The text indicates that the roots of the two plant species grow directly into quartzite rock, where hairs on the roots secrete acids that dissolve the rock. The researchers hypothesize that the plants depend on this process because dissolving rock opens spaces for the roots to grow and releases phosphates that provide the plants with phosphorous, a vital nutrient. If the plants carry out this process of dissolving rock even when the rock already has spaces into which the roots could grow, that would support the researchers' hypothesis because it suggests that the plants are getting some advantage—such as access to phosphorous—from the action of dissolving rock. If the plants don't benefit from dissolving rock, they would be expected to grow in the cracks that already exist, as doing so would mean that the plants don't have to spend energy creating and secreting acids; if, however, the plants create new entry points by dissolving rock even when cracks already exist, that would support the hypothesis that they depend on dissolving rock for some benefit.

Choice A is incorrect because the existence of soil-inhabiting members of the Velloziaceae family with similar root structures to those of the two species discussed in the text wouldn't support the researchers' hypothesis that the species discussed in the text depend on dissolving rock. If other such members exist, that might suggest that the root structures can serve more functions than secreting acids to dissolve rock (since dissolving rock may not be necessary for plants living in soil), but that wouldn't suggest anything about whether the species discussed in the text benefit from dissolving rock.

Choice B is incorrect because differences in the proportions of citric and malic acid secreted by the two species would be irrelevant to the hypothesis that the plants depend on dissolving rock. There's no information in the text to suggest that the proportion of each acid has any bearing on the process of dissolving rock or on any benefits the plants might receive from that process. *Choice D* is incorrect because if the two species thrive on rocks without phosphates, that would weaken the researchers' hypothesis that the plants depend on dissolving rock partly because dissolving rock gives them access to phosphates. If the plants can survive on rocks without getting a vital nutrient by dissolving those rocks, then either the nutrient isn't actually vital for those plants or they can get the nutrient in some way other than by dissolving rocks.

QUESTION 13

Choice B is the best answer because it presents the conclusion that most logically follows from the text's discussion of Ancestral Puebloans' migration to the Rio Grande Valley. The text states that in the late 1200s C.E., the Ancestral

Puebloan civilization abandoned villages in its original homeland, which included the Mesa Verde site. The text goes on to say that recent genetic analysis has demonstrated that the modern turkey population in the Rio Grande Valley descends partly from the ancient turkeys raised at Mesa Verde, and that the genetic markers shared by the two turkey populations first appeared at Mesa Verde only after 1280 C.E. Therefore, it can reasonably be concluded that some Ancestral Puebloans migrated to the Rio Grande Valley in the late 1200s and carried their agricultural practices—including the farming of turkeys—to their new home.

Choice A is incorrect because the text never compares the condition of the Rio Grande Valley's terrain to that of Mesa Verde's terrain, either in the present or in the past. *Choice C* is incorrect. Although genetic analysis has demonstrated that the modern turkey population in the Rio Grande valley descended in part from the turkey population raised by the Ancestral Puebloans of Mesa Verde before their migration to the valley in 1280, this finding doesn't eliminate the possibility that Indigenous peoples living in the valley before 1280 might also have farmed turkeys. *Choice D* is incorrect. The text doesn't consider the possibility that before their migration to the Rio Grande Valley after 1280, the Ancestral Puebloans of Mesa Verde might have adopted turkey farming from an outside Indigenous civilization in another region; instead, the text provides evidence suggesting that the Ancestral Puebloans brought turkey farming to another region—the Rio Grande Valley—after 1280.

QUESTION 14

Choice C is the best answer because it most logically completes the argument about an unintended effect of the Nagoya Protocol. The text explains that the Nagoya Protocol is an agreement ensuring that Indigenous communities are compensated when their agricultural resources and knowledge are used by corporations. The text then states that the protocol allows corporations to keep their agreements with Indigenous communities confidential, about which some Indigenous advocates express concern. *Choice C*, when inserted into the blank, gives a good justification for the advocates' concern: such secrecy could mean that the public is unable to determine whether participating Indigenous communities were properly compensated under these agreements.

Choice A is incorrect. The text suggests that because corporations can keep their agreements with Indigenous communities confidential, Indigenous communities, not corporations, might not be compensated fairly. *Choice B* is incorrect because the text doesn't suggest that the ability of corporations to keep their agreements with Indigenous communities confidential would place limits on how much research corporations can undertake. *Choice D* is incorrect because the text doesn't indicate that Indigenous communities aim to learn new harvesting methods from their corporate partners. Rather, the text suggests that corporations use the knowledge of Indigenous communities for their research.

QUESTION 15

Choice C is the best answer because it most logically completes the text's discussion of the sweet potato in Polynesia. The text indicates that the sweet potato is found in Polynesia but originated in South America, and that the sweet potato was being cultivated by Native Hawaiians and other Indigenous peoples in Polynesia long before sea voyages between South America and Polynesia began. The text goes on to note that research by Muñoz-Rodríguez and colleagues has established that the Polynesian varieties of sweet potato split from South American varieties more than 100,000 years ago, which is

thousands of years before humans settled in Polynesia. If Polynesian peoples were cultivating the sweet potato before sea voyages between Polynesia and South America began, and if Polynesian varieties of sweet potato diverged from South American varieties well before people were in Polynesia, it can reasonably be concluded that humans didn't play a role in bringing the sweet potato to Polynesia.

Choice A is incorrect. The text doesn't provide any information about when the sweet potato began to be cultivated in South America, so there's no support for the conclusion that cultivation began in Polynesia before it began in South America. **Choice B** is incorrect because the text indicates that the sweet potato was being cultivated in Polynesia long before sea journeys between Polynesia and South America began. Therefore, it wouldn't be reasonable to conclude that Polynesian peoples acquired the sweet potato from South American peoples. Additionally, the text indicates that the Polynesian varieties of sweet potato diverged from the South American varieties thousands of years before people settled in Polynesia, which suggests that the sweet potato was already present in Polynesia when people arrived. **Choice D** is incorrect because the text states that the domestic sweet potato, which is found in Polynesia, descends from a wild South American plant, not from a domesticated South American plant. The only people that the text describes as cultivating the sweet potato are Native Hawaiians and other Indigenous peoples of Polynesia.

QUESTION 16

Choice C is the best answer. The convention being tested is the use of plural and possessive nouns. The singular possessive noun "playa's" and the plural possessive noun "rocks'" correctly indicate that the sediment is that of one playa (the Racetrack Playa) and that there are multiple rocks that have mysteriously migrated across the sediment.

Choice A is incorrect because the context requires the singular possessive noun "playa's" and the plural possessive noun "rocks'," not the plural noun "playas" and the singular possessive noun "rock's." **Choice B** is incorrect because the context requires the plural possessive noun "rocks'," not the plural noun "rocks." **Choice D** is incorrect because the context requires the singular possessive noun "playa's," not the plural possessive noun "playas'."

QUESTION 17

Choice B is the best answer. The convention being tested is the punctuation of items in a complex series (a series including internal punctuation). In this choice, the semicolon after "Lagos" is conventionally used to separate the first item ("The Joys...Lagos") and the second item ("A Kind...Nigeria") in the series. Further, the comma after "Marriage" correctly separates the title "A Kind of Marriage" from the supplementary phrase ("a television...Nigeria") that describes it.

Choice A is incorrect because the comma after "Lagos" doesn't match the semicolon used later in the series to separate the second item ("A Kind...Nigeria") from the third item ("and...autobiography"). **Choice C** is incorrect because the comma after "Lagos" doesn't match the semicolon used later in the series to separate the second item ("A Kind...Nigeria") from the third item ("and...autobiography"). Additionally, a colon can't be used in this way to separate the title "A Kind of Marriage" from the supplementary phrase ("a television...Nigeria") that describes it. **Choice D** is incorrect because it fails to use appropriate punctuation to separate the title "A Kind of Marriage" from the supplementary phrase ("a television...Nigeria") that describes it.

QUESTION 18

Choice B is the best answer. The convention being tested is subject-modifier placement. This choice makes the noun phrase "the bioswales" the subject of the sentence and places it immediately after the modifying phrase "By reducing...sewers." In doing so, this choice clearly establishes that the bioswales—and not another noun in the sentence—are reducing runoff flowing into city sewers.

Choice A is incorrect because it results in a dangling modifier. The placement of the noun phrase "the mitigation...waterways" immediately after the modifying phrase results in unclear modification. The resulting sentence makes it hard to determine what is responsible for "reducing the runoff": the bioswales or some other noun in the sentence. **Choice C** is incorrect because it results in a dangling modifier. The placement of the noun phrase "the bioswales' mitigation...waterways" immediately after the modifying phrase results in unclear modification. The resulting sentence makes it hard to determine what is responsible for "reducing the runoff": the bioswales or some other noun in the sentence. **Choice D** is incorrect because it results in a dangling modifier. The placement of the noun phrase "street flooding and the resulting pollution" immediately after the modifying phrase illogically suggests that the "flooding and pollution" are reducing runoff flowing into city sewers.

QUESTION 19

Choice B is the best answer. The convention being tested is punctuation use between a main clause and a supplementary phrase. This choice correctly uses a comma to mark the boundary between the main clause ("the portraits...quilts") and the supplementary noun phrase ("the stitching...fabric") that provides a further description of how the portraits can be identified as quilts.

Choice A is incorrect. A comma and the conjunction "and" can't be used in this way to join a main clause and a supplementary noun phrase. **Choice C** is incorrect because a semicolon can't be used in this way to join a main clause and a supplementary noun phrase. **Choice D** is incorrect because it results in a rhetorically unacceptable sentence fragment beginning with "the stitching."

QUESTION 20

Choice D is the best answer. The convention being tested is subject-modifier placement. This choice makes "silica glass's atomic arrangement" the subject of the sentence and places it immediately after the modifying phrase "compared to that of alumina glass." In doing so, this choice clearly establishes that silica glass's atomic arrangement—and not another noun in the sentence—is being compared to the atomic arrangement ("that") of alumina glass.

Choice A is incorrect because it results in a dangling modifier. The placement of the noun phrase "silica glass" immediately after the modifying phrase illogically suggests that silica glass itself (rather than its atomic arrangement) is being compared to alumina glass's atomic arrangement. **Choice B** is incorrect because it results in a dangling modifier. The placement of the noun phrase "silica glass" immediately after the modifying phrase illogically suggests that silica glass itself (rather than its atomic arrangement) is being compared to alumina glass's atomic arrangement. **Choice C** is incorrect because it results in a dangling modifier. The placement of the noun phrase "a significant disadvantage" immediately after the modifying phrase illogically suggests that "a significant disadvantage" is being compared to alumina glass's atomic arrangement.

QUESTION 21

Choice D is the best answer. The convention being tested is the use of finite and nonfinite verb forms within a sentence. The nonfinite to-infinitive “to tell” is correctly used to form a nonfinite (infinitive) clause that explains the reason Engle uses poetry in her novel.

Choice A is incorrect because the finite present tense verb “tells” can’t be used in this way to explain the reason that Engle uses poetry in her novel. **Choice B** is incorrect because the finite past tense verb “told” can’t be used in this way to explain the reason that Engle uses poetry in her novel. **Choice C** is incorrect because the finite present progressive tense verb “is telling” can’t be used in this way to explain the reason that Engle uses poetry in her novel.

QUESTION 22

Choice A is the best answer. The convention being tested is the punctuation of a supplementary word or phrase between two main clauses. This choice correctly uses a comma to separate the supplementary adverb “however” from the preceding main clause (“Okinaka doesn’t...single-handedly”) and a semicolon to join the next main clause (“all...culture”) to the rest of the sentence. Further, placing the semicolon after “however” correctly indicates that the information in the preceding main clause (Okinaka doesn’t make such decisions single-handedly) is contrary to what might be assumed from the information in the previous sentence (Okinaka sits on the review board that adds new sites to the Hawaii Register of Historic Places).

Choice B is incorrect because placing the semicolon after “single-handedly” and the comma after “however” illogically indicates that the information in the next main clause (all historical designations must be approved by a group of experts) is contrary to the information in the previous clause (Okinaka doesn’t make such decisions single-handedly). **Choice C** is incorrect because it results in a comma splice. Commas can’t be used in this way to punctuate a supplementary word or phrase between two main clauses. **Choice D** is incorrect because it results in a run-on sentence. The two main clauses are fused without punctuation and/or a conjunction.

QUESTION 23

Choice B is the best answer. “Previously” logically signals that the event described in this sentence—Bigelow being named best director—occurred before Zhao’s win. The fact that only one other woman had won the award before puts Zhao’s win in perspective.

Choice A is incorrect because “as a result” illogically signals that the event described in this sentence occurred as a result or consequence of Zhao’s win. Instead, it occurred before Zhao was named best director and puts Zhao’s win in perspective. **Choice C** is incorrect because “however” illogically signals that the event described in this sentence occurred in spite of or in contrast to Zhao’s win. Instead, it occurred before Zhao was named best director and puts Zhao’s win in perspective. **Choice D** is incorrect because “likewise” illogically signals that this sentence merely adds a second, similar piece of information to the information about Zhao’s win. Instead, the fact that only one other woman had won the award before puts Zhao’s win in perspective.

QUESTION 24

Choice D is the best answer. “Increasingly” logically signals that the claim in this sentence—that mathematicians are collaborating with their peers—marks a change relative to what was traditionally done. As the previous sentence

explains, while mathematicians may have traditionally worked alone, evidence points to a shift in the opposite direction. The claim describes the shift: a rise in collaboration.

Choice A is incorrect because “similarly” illogically signals that the claim in this sentence is similar to, but separate from, the previous claim about the shift away from mathematicians working alone. Instead, the claim about the rise in collaboration elaborates on the previous claim, describing the shift. *Choice B* is incorrect because “for this reason” illogically signals that the claim in this sentence is caused by the previous claim about the shift away from mathematicians working alone. Instead, the claim about the rise in collaboration elaborates on the previous claim, describing the shift. *Choice C* is incorrect because “furthermore” illogically signals that the claim in this sentence is in addition to the previous claim about the shift away from mathematicians working alone. Instead, the claim about the rise in collaboration elaborates on the previous claim, describing the shift.

QUESTION 25

Choice A is the best answer. “Alternatively” logically signals that the soil decontamination method described in this sentence—removing toxic metals from the soil via phytoremediation—offers an alternative to the previously described method (removing the contaminated soil from the ground).

Choice B is incorrect because “specifically” illogically signals that the soil decontamination method described in this sentence specifies or elaborates on an aspect of the previously described method (removing the contaminated soil from the ground). Instead, phytoremediation is an alternative to that method. *Choice C* is incorrect because “for example” illogically signals that the soil decontamination method described in this sentence is an example of the previously described method (removing the contaminated soil from the ground). Instead, phytoremediation is an alternative to that method. *Choice D* is incorrect because “as a result” illogically signals that the soil decontamination method described in this sentence is a result or consequence of the previously described method (removing the contaminated soil from the ground). Instead, phytoremediation is an alternative to that method.

QUESTION 26

Choice C is the best answer. The sentence emphasizes the decline in unique apple varieties in the US and specifies why this decline occurred, noting that thousands of apple varieties were lost because US farmers started mainly growing the same few unique varieties.

Choice A is incorrect. The sentence introduces the Lost Apple Project; it doesn’t emphasize the decline in unique apple varieties in the US and specify why this decline occurred. *Choice B* is incorrect. While the sentence emphasizes the decline in unique apple varieties in the US, it doesn’t explain why this decline occurred. *Choice D* is incorrect. The sentence emphasizes the general decline of crop varieties in the mid-1900s; it doesn’t emphasize the specific decline in unique apple varieties in the US.

QUESTION 27

Choice A is the best answer. The sentence effectively introduces Cathryn Halverson’s book to an audience already familiar with the *Atlantic Monthly*, noting the title of Halverson’s book and describing its content without providing background information about the *Atlantic Monthly*.

Choice B is incorrect. The sentence introduces the *Atlantic Monthly* and mentions that it's referred to in Cathryn Halverson's book title; it doesn't effectively introduce Halverson's book. *Choice C* is incorrect. The sentence assumes that the audience is unfamiliar with the *Atlantic Monthly*, providing background information about the magazine; it doesn't effectively introduce Halverson's book to an audience already familiar with the *Atlantic Monthly*. *Choice D* is incorrect. While the sentence assumes that the audience is familiar with the *Atlantic Monthly*, it doesn't effectively introduce Cathryn Halverson's book.



Math

Module 1

(22 questions)

QUESTION 1

Choice C is correct. Subtracting 6 from both sides of the given equation yields $4x = 12$, which is the equation given in choice C. Since this equation is equivalent to the given equation, it has the same solution as the given equation.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 2

Choice D is correct. It's given that lines m and n are parallel. Since line t intersects both lines m and n , it's a transversal. The angles in the figure marked as 170° and w° are on the same side of the transversal, where one is an interior angle with line m as a side, and the other is an exterior angle with line n as a side. Thus, the marked angles are corresponding angles. When two parallel lines are intersected by a transversal, corresponding angles are congruent and, therefore, have equal measure. It follows that $w^\circ = 170^\circ$. Therefore, the value of w is 170.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

QUESTION 3

The correct answer is 9. The mean of a data set is the sum of the values in the data set divided by the number of values in the data set. It follows that the mean height, in centimeters, of these plants is the sum of the heights, in centimeters, of each plant, $6 + 10 + 13 + 2 + 15 + 22 + 10 + 4 + 4 + 4$, or 90, divided by the number of plants in the data set, 10. Therefore, the mean height, in centimeters,

of these plants is $\frac{90}{10}$, or 9.

QUESTION 4

Choice A is correct. The number of birds can be found by calculating the value of b when $r = 16$ in the given equation. Substituting 16 for r in the given equation yields $2.5b + 5(16) = 80$, or $2.5b + 80 = 80$. Subtracting 80 from both

sides of this equation yields $2.5b = 0$. Dividing both sides of this equation by 2.5 yields $b = 0$. Therefore, if the business cares for 16 reptiles on a given day, it can care for 0 birds on this day.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 5

Choice D is correct. The volume, V , of a cube can be found using the formula $V = s^3$, where s is the edge length of the cube. It's given that a cube has an edge length of 41 inches. Substituting 41 inches for s in this equation yields $V = 41^3$ cubic inches, or $V = 68,921$ cubic inches. Therefore, the volume of the cube is 68,921 cubic inches.

Choice A is incorrect. This is the perimeter, in inches, of the cube.

Choice B is incorrect. This is the area, in square inches, of a face of the cube.

Choice C is incorrect. This is the surface area, in square inches, of the cube.

QUESTION 6

The correct answer is 52. It's given that 13 is $p\%$ of 25. It follows that $\frac{13}{25} = \frac{p}{100}$.

Multiplying both sides of this equation by 100 gives $52 = p$. Therefore, the value of p is 52.

QUESTION 7

Choice D is correct. It's given that a model predicts the population of Springfield in 2005 was 15,000. The model also predicts that each year for the next 5 years, the population increased by 4% of the previous year's population. The predicted population in one of these years can be found by multiplying the predicted population from the previous year by 1.04. Since the predicted population in 2005 was 15,000, the predicted population 1 year later is $15,000(1.04)$. The predicted population 2 years later is this value times 1.04, which is $15,000(1.04)(1.04)$, or $15,000(1.04)^2$. The predicted population 3 years later is this value times 1.04, or $15,000(1.04)^3$. More generally, the predicted population, p , x years after 2005 is represented by the equation $p = 15,000(1.04)^x$.

Choice A is incorrect. Substituting 0 for x in this equation indicates the predicted population in 2005 was 0.96 rather than 15,000. *Choice B* is incorrect. Substituting 0 for x in this equation indicates the predicted population in 2005 was 1.04 rather than 15,000. *Choice C* is incorrect. This equation indicates the predicted population is decreasing, rather than increasing, by 4% each year.

QUESTION 8

Choice B is correct. Multiplying each side of the given equation by -16 yields $64x^2 + 112x = 576$. To complete the square, adding 49 to each side of this equation yields $64x^2 + 112x + 49 = 576 + 49$, or $(8x + 7)^2 = 625$. Taking the square root of each side of this equation yields two equations: $8x + 7 = 25$ and $8x + 7 = -25$. Subtracting 7 from each side of the equation $8x + 7 = 25$

yields $8x = 18$. Dividing each side of this equation by 8 yields $x = \frac{18}{8}$, or $x = \frac{9}{4}$.

Therefore, $\frac{9}{4}$ is a solution to the given equation. Subtracting 7 from each side of

the equation $8x + 7 = -25$ yields $8x = -32$. Dividing each side of this equation by 8 yields $x = -4$. Therefore, the given equation has two solutions, $\frac{9}{4}$ and -4 . Since $\frac{9}{4}$ is positive, it follows that $\frac{9}{4}$ is the positive solution to the given equation.

Alternate approach: Adding $4x^2$ and $7x$ to each side of the given equation yields $0 = 4x^2 + 7x - 36$. The right-hand side of this equation can be rewritten as $4x^2 + 16x - 9x - 36$. Factoring out the common factor of $4x$ from the first two terms of this expression and the common factor of -9 from the second two terms yields $4x(x + 4) - 9(x + 4)$. Factoring out the common factor of $(x + 4)$ from these two terms yields the expression $(4x - 9)(x + 4)$. Since this expression is equal to 0, it follows that either $4x - 9 = 0$ or $x + 4 = 0$. Adding 9 to each side of the equation $4x - 9 = 0$ yields $4x = 9$. Dividing each side of this equation

by 4 yields $x = \frac{9}{4}$. Therefore, $\frac{9}{4}$ is a positive solution to the given equation.

Subtracting 4 from each side of the equation $x + 4 = 0$ yields $x = -4$. Therefore, the given equation has two solutions, $\frac{9}{4}$ and -4 . Since $\frac{9}{4}$ is positive, it follows that $\frac{9}{4}$ is the positive solution to the given equation.

Choice A is incorrect. Substituting $\frac{7}{4}$ for x in the given equation yields $-\frac{49}{2} = -36$, which is false. Choice C is incorrect. Substituting 4 for x in the given equation yields $-92 = -36$, which is false. Choice D is incorrect. Substituting 7 for x in the given equation yields $-245 = -36$, which is false.

QUESTION 9

Choice B is correct. Standard deviation is a measure of the spread of a data set from its mean. The dot plot for class A and the dot plot for class B have the same shape. Thus, the frequency distributions for both class A and class B are the same. Since both class A and class B have the same frequency distribution of glue sticks brought in by each student, it follows that both class A and class B have the same spread of the number of glue sticks brought in by each student from their respective means. Therefore, the standard deviation of the number of glue sticks brought in by each student for class A is equal to the standard deviation of the number of glue sticks brought in by each student for class B.

Choice A is incorrect and may result from conceptual or calculation errors.
Choice C is incorrect and may result from conceptual or calculation errors.
Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 10

Choice C is correct. If a value of x satisfies $f(x) = 0$, the graph of $y = f(x)$ will contain a point $(x, 0)$ and thus touch the x -axis. Since there are 3 points at which this graph touches the x -axis, there are 3 values of x for which $f(x) = 0$.

Choice A is incorrect and may result from conceptual or calculation errors.
Choice B is incorrect and may result from conceptual or calculation errors.
Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 11

The correct answer is 11,875. It's given that the exponential function g is defined by $g(x) = 19 \cdot a^x$, where a is a positive constant, and $g(3) = 2,375$. It follows that when $x = 3$, $g(x) = 2,375$. Substituting 3 for x and 2,375 for $g(x)$ in

the given equation yields $2,375 = 19 \cdot a^3$. Dividing each side of this equation by 19 yields $125 = a^3$. Taking the cube root of both sides of this equation gives $a = 5$. Substituting 4 for x and 5 for a in the equation $g(x) = 19 \cdot a^x$ yields $g(4) = 19 \cdot 5^4$, or $g(4) = 11,875$. Therefore, the value of $g(4)$ is 11,875.

QUESTION 12

Choice C is correct. The second equation in the given system of equations is $y = 6x - 12$. Substituting $6x - 12$ for y in the first equation of the given system yields $6x - 12 = (x - 2)(x + 4)$. Factoring 6 out of the left-hand side of this equation yields $6(x - 2) = (x - 2)(x + 4)$. An expression with a factor of the form $(x - a)$ is equal to zero when $x = a$. Each side of this equation has a factor of $(x - 2)$, so each side of the equation is equal to zero when $x = 2$. Substituting 2 for x into the equation $6(x - 2) = (x - 2)(x + 4)$ yields $6(2 - 2) = (2 - 2)(2 + 4)$, or $0 = 0$, which is true. Substituting 2 for x into the second equation in the given system of equations yields $y = 6(2) - 12$, or $y = 0$. Therefore, the solution to the system of equations is the ordered pair $(2, 0)$.

Choice A is incorrect and may result from switching the order of the solutions for x and y . **Choice B** is incorrect and may result from conceptual or calculation errors. **Choice D** is incorrect and may result from conceptual or calculation errors.

QUESTION 13

Choice B is correct. If two triangles are similar, then their corresponding angles are congruent. It's given that right triangle FGH is similar to right triangle JKL and angle F corresponds to angle J . It follows that angle F is congruent to angle J and, therefore, the measure of angle F is equal to the measure of angle J . The sine ratios of angles of equal measure are equal. Since the measure of angle F is equal to the measure of angle J , $\sin(F) = \sin(J)$. It's given

that $\sin(F) = \frac{308}{317}$. Therefore, $\sin(J)$ is $\frac{308}{317}$.

Choice A is incorrect. This is the value of $\cos(J)$, not the value of $\sin(J)$. **Choice C** is incorrect. This is the reciprocal of the value of $\sin(J)$, not the value of $\sin(J)$. **Choice D** is incorrect. This is the reciprocal of the value of $\cos(J)$, not the value of $\sin(J)$.

QUESTION 14

The correct answer is 410. It's given that t minutes after an initial observation, the number of bacteria in a population is $60,000(2)^{\frac{t}{410}}$. This expression consists of the initial number of bacteria, 60,000, multiplied by the expression $2^{\frac{t}{410}}$. The time it takes for the number of bacteria to double is the increase in the value of t that causes the expression $2^{\frac{t}{410}}$ to double. Since the base of the expression $2^{\frac{t}{410}}$ is 2, the expression $2^{\frac{t}{410}}$ will double when the exponent increases by 1.

Since the exponent of the expression $2^{\frac{t}{410}}$ is $\frac{t}{410}$, the exponent will increase by 1 when t increases by 410. Therefore the time, in minutes, it takes for the number of bacteria in the population to double is 410.

QUESTION 15

Choice A is correct. To express $4j + 9$ in terms of p and k , the given equation must be solved for $4j + 9$. Since it's given that j is a positive number, $4j + 9$ is not equal to zero. Therefore, multiplying both sides of the given equation by $4j + 9$