

yields the equivalent equation $p(4j + 9) = k$. Since it's given that p is a positive number, p is not equal to zero. Therefore, dividing each side of the equation

$p(4j + 9) = k$ by p yields the equivalent equation $4j + 9 = \frac{k}{p}$.

Choice B is incorrect. This equation is equivalent to $p = \frac{4j + 9}{k}$.

Choice C is incorrect. This equation is equivalent to $p = k - 4j - 9$.

Choice D is incorrect. This equation is equivalent to $p = k(4j + 9)$.

QUESTION 16

The correct answer is $\frac{1}{2}$. For an equation in slope-intercept form $y = mx + b$,

m represents the slope of the line in the xy -plane defined by this equation. It's given that line p is defined by $4y + 8x = 6$. Subtracting $8x$ from both sides of this equation yields $4y = -8x + 6$. Dividing both sides of this equation by 4 yields

$y = -\frac{8}{4}x + \frac{6}{4}$, or $y = -2x + \frac{3}{2}$. Thus, the slope of line p is -2 . If line r is perpendicular

to line p , then the slope of line r is the negative reciprocal of the slope of line p .

The negative reciprocal of -2 is $-\frac{1}{(-2)} = \frac{1}{2}$. Note that $1/2$ and $.5$ are examples of ways to enter a correct answer.

QUESTION 17

The correct answer is 100. It's given that point O is the center of a circle and the measure of arc RS on the circle is 100° . It follows that points R and S lie on the circle. Therefore, OR and OS are radii of the circle. A central angle is an angle formed by two radii of a circle, with its vertex at the center of the circle. Therefore, $\angle ROS$ is a central angle. Because the degree measure of an arc is equal to the measure of its associated central angle, it follows that the measure, in degrees, of $\angle ROS$ is 100.

QUESTION 18

Choice B is correct. Each of the given choices is an equation of the form

$y = -\frac{1}{10}x(x - a)^m(x + b)^n$, where a , b , m , and n are positive constants. In the

xy -plane, the graph of an equation of this form has x -intercepts at $x = 0$, $x = a$, and $x = -b$. The graph shown has x -intercepts at $x = 0$, $x = 4$, and $x = -5$. Therefore, $a = 4$ and $b = 5$. Of the given choices, only choices A and B have

$a = 4$ and $b = 5$. For an equation in the form $y = -\frac{1}{10}x(x - a)^m(x + b)^n$, if all values

of x that are less than $-b$ or greater than a correspond to negative y -values, then the sum of all the exponents of the factors on the right-hand side of the equation is even. In the graph shown, all values of x less than -5 or greater than 4 correspond to negative y -values. Therefore, the sum of all the exponents of

the factors on the right-hand side of the equation $y = -\frac{1}{10}x(x - 4)^m(x + 5)^n$ must

be even. For choice A, the sum of these exponents is $1 + 1 + 1$, or 3, which is odd. For choice B, the sum of these exponents is $1 + 1 + 2$, or 4, which is even.

Therefore, $y = -\frac{1}{10}x(x - 4)(x + 5)^2$ could be the equation of the graph shown.

Choice A is incorrect. For the graph of this equation, all values of x less than -5 correspond to positive, not negative, y -values. *Choice C* is incorrect. The graph of this equation has x -intercepts at $x = -4$, $x = 0$, and $x = 5$, rather than x -intercepts at $x = -5$, $x = 0$, and $x = 4$. *Choice D* is incorrect. The graph of this equation has x -intercepts at $x = -4$, $x = 0$, and $x = 5$, rather than x -intercepts at $x = -5$, $x = 0$, and $x = 4$.

QUESTION 19

Choice D is correct. It's given that for $x > 0$, $f(x)$ is equal to 201% of x . This is equivalent to $f(x) = \frac{201}{100}x$, or $f(x) = 2.01x$, for $x > 0$. This function indicates that

as x increases, $f(x)$ also increases, which means f is an increasing function. Furthermore, $f(x)$ increases at a constant rate of 2.01 for each increase of x by 1. A function with a constant rate of change is linear. Thus, the function f can be described as an increasing linear function.

Choice A is incorrect and may result from conceptual errors. *Choice B* is incorrect and may result from conceptual errors. *Choice C* is incorrect. This could describe the function $f(x) = (2.1)^x$, where $f(x)$ is equal to 201% of $f(x - 1)$, not x , for $x > 0$.

QUESTION 20

Choice A is correct. It's given that $g(x) = f(x + 5)$. Since $f(x) = 4x^2 + 64x + 262$, it follows that $f(x + 5) = 4(x + 5)^2 + 64(x + 5) + 262$. Expanding the quantity $(x + 5)^2$ in this equation yields $f(x + 5) = 4(x^2 + 10x + 25) + 64(x + 5) + 262$. Distributing the 4 and the 64 yields $f(x + 5) = 4x^2 + 40x + 100 + 64x + 320 + 262$. Combining like terms yields $f(x + 5) = 4x^2 + 104x + 682$. Therefore, $g(x) = 4x^2 + 104x + 682$. For a quadratic function defined by an equation of the form $g(x) = a(x - h)^2 + k$, where a , h , and k are constants and a is positive, $g(x)$ reaches its minimum, k , when the value of x is h . The equation $g(x) = 4x^2 + 104x + 682$ can be rewritten in this form by completing the square. This equation is equivalent to $g(x) = 4(x^2 + 26x) + 682$, or $g(x) = 4(x^2 + 26x + 169 - 169) + 682$. This equation can be rewritten as $g(x) = 4((x + 13)^2 - 169) + 682$, or $g(x) = 4(x + 13)^2 - 4(169) + 682$, which is equivalent to $g(x) = 4(x + 13)^2 + 6$. This equation is in the form $g(x) = a(x - h)^2 + k$, where $a = 4$, $h = -13$, and $k = 6$. Therefore, $g(x)$ reaches its minimum when the value of x is -13 .

Choice B is incorrect. This is the value of x for which $f(x)$, rather than $g(x)$, reaches its minimum. *Choice C* is incorrect and may result from conceptual or calculation errors. *Choice D* is incorrect. This is the value of x for which $f(x - 5)$, rather than $f(x + 5)$, reaches its minimum.

QUESTION 21

Choice B is correct. It's given that 483 out of 803 voters responded that they would vote for Angel Cruz. Therefore, the proportion of voters from the poll

who responded they would vote for Angel Cruz is $\frac{483}{803}$. It's also given that

there are a total of 6,424 voters in the election. Therefore, the total number of people who would be expected to vote for Angel Cruz is $6,424 \left(\frac{483}{803} \right)$, or 3,864.

Since 3,864 of the 6,424 total voters would be expected to vote for Angel Cruz,

it follows that $6,424 - 3,864$, or 2,560 voters would be expected not to vote for Angel Cruz. The difference in the number of votes for and against Angel Cruz is $3,864 - 2,560$, or 1,304 votes. Therefore, if 6,424 people vote in the election, Angel Cruz would be expected to win by 1,304 votes.

Choice A is incorrect. This is the difference in the number of voters from the poll who responded that they would vote for and against Angel Cruz. *Choice C* is incorrect. This is the total number of people who would be expected to vote for Angel Cruz. *Choice D* is incorrect. This is the difference between the total number of people who vote in the election and the number of voters from the poll.

QUESTION 22

Choice C is correct. It's given that the graphs of the equations in the given system intersect at exactly one point, (x, y) , in the xy -plane. Therefore, (x, y) is the only solution to the given system of equations. The given system of equations can be solved by subtracting the second equation, $y = 3x + a$, from the first equation, $y = 2x^2 - 21x + 64$. This yields $y - y = (2x^2 - 21x + 64) - (3x + a)$, or $0 = 2x^2 - 24x + 64 - a$. Since the given system has only one solution, this equation has only one solution. A quadratic equation in the form $rx^2 + sx + t = 0$, where r , s , and t are constants, has one solution if and only if the discriminant, $s^2 - 4rt$, is equal to zero. Substituting 2 for r , -24 for s , and $-a + 64$ for t in the expression $s^2 - 4rt$ yields $(-24)^2 - (4)(2)(64 - a)$. Setting this expression equal to zero yields $(-24)^2 - (4)(2)(64 - a) = 0$, or $8a + 64 = 0$. Subtracting 64 from both sides of this equation yields $8a = -64$. Dividing both sides of this equation by 8 yields $a = -8$. Substituting -8 for a in the equation $0 = 2x^2 - 24x + 64 - a$ yields $0 = 2x^2 - 24x + 64 + 8$, or $0 = 2x^2 - 24x + 72$. Factoring 2 from the right-hand side of this equation yields $0 = 2(x^2 - 12x + 36)$. Dividing both sides of this equation by 2 yields $0 = x^2 - 12x + 36$, which is equivalent to $0 = (x - 6)(x - 6)$, or $0 = (x - 6)^2$. Taking the square root of both sides of this equation yields $0 = x - 6$. Adding 6 to both sides of this equation yields $x = 6$.

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

Math

Module 2

(22 questions)

QUESTION 1

Choice B is correct. Adding the second equation in the given system to the first equation in the given system yields $3x + (-3x + y) = 12 + (-6)$, which is equivalent to $y = 6$.

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 2

Choice B is correct. The given expression can be rewritten as $11x^3 + (-5)x^3$. Since the two terms of this expression are both constant multiples of x^3 , they are like terms and can, therefore, be combined through addition. Adding like terms in the expression $11x^3 + (-5)x^3$ yields $6x^3$.

Choice A is incorrect. This is equivalent to $11x^3 + 5x^3$, not $11x^3 - 5x^3$.

Choice C is incorrect. This is equivalent to $11x^6 - 5x^6$, not $11x^3 - 5x^3$.

Choice D is incorrect. This is equivalent to $11x^6 + 5x^6$, not $11x^3 - 5x^3$.

QUESTION 3

Choice C is correct. If the two sides of a linear equation are equivalent, then the equation is true for any value. If an equation is true for any value, it has infinitely many solutions. Since the two sides of the given linear equation $66x = 66x$ are equivalent, the given equation has infinitely many solutions.

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 4

Choice A is correct. It's given that a radio show stated that 3 times as many people voted in favor of the proposal as people who voted against it. Let x represent the number of people who voted against the proposal. It follows that $3x$ is the number of people who voted in favor of the proposal and $3x - x$, or $2x$, is how many more people voted in favor of the proposal than voted against it. It's also given that a social media post reported that 15,000 more

people voted in favor of the proposal than voted against it. Thus, $2x = 15,000$. Since $2x = 15,000$, the value of x must be half of 15,000, or 7,500. Therefore, 7,500 people voted against the proposal.

Choice B is incorrect. This is how many more people voted in favor of the proposal than voted against it, not the number of people who voted against the proposal. *Choice C* is incorrect. This is the number of people who voted in favor of the proposal, not the number of people who voted against the proposal. *Choice D* is incorrect and may result from conceptual or calculation errors.

QUESTION 5

Choice C is correct. An equation that defines a linear function f can be written in the form $f(x) = mx + b$, where m represents the slope and b represents the y -intercept, $(0, b)$, of the line of $y = f(x)$ in the xy -plane. The function $f(x) = -5x + 30$ is linear. Therefore, the graph of the given function $y = f(x)$ in the xy -plane has a y -intercept of $(0, 30)$. It's given that $f(x)$ gives the approximate volume, in fluid ounces, of juice Caleb had remaining after making x popsicles. It follows that the y -intercept of $(0, 30)$ means that Caleb had approximately 30 fluid ounces of juice remaining after making 0 popsicles. In other words, Caleb had approximately 30 fluid ounces of juice when he began to make the popsicles.

Choice A is incorrect. This is an interpretation of the slope, rather than the y -intercept, of the graph of $y = f(x)$ in the xy -plane. *Choice B* is incorrect and may result from conceptual errors. *Choice D* is incorrect and may result from conceptual errors.

QUESTION 6

The correct answer is 192. The measure of an angle, in degrees, can be found by multiplying its measure, in radians, by $\frac{180 \text{ degrees}}{\pi \text{ radians}}$. Multiplying the given angle measure, $\frac{16\pi}{15}$ radians, by $\frac{180 \text{ degrees}}{\pi \text{ radians}}$ yields $\left(\frac{16\pi}{15} \text{ radians}\right) \left(\frac{180 \text{ degrees}}{\pi \text{ radians}}\right)$, which simplifies to 192 degrees.

QUESTION 7

Choice D is correct. A point (x, y) is a solution to a system of inequalities in the xy -plane if substituting the x -coordinate and the y -coordinate of the point for x and y , respectively, in each inequality makes both of the inequalities true. Substituting the x -coordinate and the y -coordinate of choice D, 14 and 0, for x and y , respectively, in the first inequality in the given system, $y \leq x + 7$, yields $0 \leq 14 + 7$, or $0 \leq 21$, which is true. Substituting 14 for x and 0 for y in the second inequality in the given system, $y \geq -2x - 1$, yields $0 \geq -2(14) - 1$, or $0 \geq -29$, which is true. Therefore, the point $(14, 0)$ is a solution to the given system of inequalities in the xy -plane.

Choice A is incorrect. Substituting -14 for x and 0 for y in the inequality $y \leq x + 7$ yields $0 \leq -14 + 7$, or $0 \leq -7$, which is not true. *Choice B* is incorrect. Substituting 0 for x and -14 for y in the inequality $y \geq -2x - 1$ yields $-14 \geq -2(0) - 1$, or $-14 \geq -1$, which is not true. *Choice C* is incorrect. Substituting 0 for x and 14 for y in the inequality $y \leq x + 7$ yields $14 \leq 0 + 7$, or $14 \leq 7$, which is not true.

QUESTION 8

The correct answer is 113. It's given that the legs of a right triangle have lengths 24 centimeters and 21 centimeters. 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 two legs. It follows that if h represents the length, in centimeters, of the hypotenuse of the right triangle, $h^2 = 24^2 + 21^2$. This equation is equivalent to $h^2 = 1,017$. Taking the square root of each side of this equation yields $h = \sqrt{1,017}$. This equation can be rewritten as $h = \sqrt{9 \cdot 113}$, or $h = \sqrt{9} \cdot \sqrt{113}$. This equation is equivalent to $h = 3\sqrt{113}$. It's given that the length of the triangle's hypotenuse, in centimeters, can be written in the form $3\sqrt{d}$. It follows that the value of d is 113.

QUESTION 9

Choice A is correct. The mean value of a data set is the sum of the values of the data set divided by the number of values in the data set. When a data set is represented in a frequency table, the sum of the values in the data set is the sum of the products of each value and its frequency. For data set A, the sum of products of each value and its frequency is $30(2) + 34(4) + 38(5) + 42(7) + 46(9)$, or 1,094. It's given that there are 27 values in data set A. Therefore, the mean of

data set A is $\frac{1,094}{27}$, or approximately 40.52. Similarly, the mean of data B is $\frac{958}{27}$,

or approximately 35.48. Therefore, the mean of data set A is greater than the mean of data set B.

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 10

Choice C is correct. It's given that triangle XYZ is similar to triangle RST, such that X, Y, and Z correspond to R, S, and T, respectively. Since corresponding angles of similar triangles are congruent, it follows that the measure of $\angle Z$ is congruent to the measure of $\angle T$. It's given that the measure of $\angle Z$ is 20° . Therefore, the measure of $\angle T$ is 20° .

Choice A is incorrect and may result from a conceptual error.

Choice B is incorrect. This is half the measure of $\angle Z$.

Choice D is incorrect. This is twice the measure of $\angle Z$.

QUESTION 11

Choice C is correct. It's given that the equation $3x + 5y = 32$ represents the situation where Keenan filled x small jars and y large jars with all the vegetable broth he made, which was 32 cups. Therefore, $3x$ represents the total number of cups of vegetable broth in the small jars and $5y$ represents the total number of cups of vegetable broth in the large jars.

Choice A is incorrect. The number of large jars Keenan filled is represented by y , not $5y$. **Choice B** is incorrect. The number of small jars Keenan filled is represented by x , not $5y$. **Choice D** is incorrect. The total number of cups of vegetable broth in the small jars is represented by $3x$, not $5y$.

QUESTION 12

The correct answer is $\frac{29}{3}$. Applying the distributive property to the left-hand

side of the given equation, $x(x + 1) - 56$, yields $x^2 + x - 56$. Applying the distributive property to the right-hand side of the given equation, $4x(x - 7)$, yields $4x^2 - 28x$. Thus, the equation becomes $x^2 + x - 56 = 4x^2 - 28x$.

Combining like terms on the left- and right-hand sides of this equation yields $0 = (4x^2 - x^2) + (-28x - x) + 56$, or $3x^2 - 29x + 56 = 0$. For a quadratic equation in the form $ax^2 + bx + c = 0$, where a , b , and c are constants, the quadratic

formula gives the solutions to the equation in the form $x = \frac{(-b \pm \sqrt{b^2 - 4ac})}{2a}$.

Substituting 3 for a , -29 for b , and 56 for c from the equation $3x^2 - 29x + 56 = 0$

into the quadratic formula yields $x = \frac{(29 \pm \sqrt{(-29)^2 - 4(3)(56)})}{2(3)}$, or $x = \frac{29}{6} \pm \frac{13}{6}$. It

follows that the solutions to the given equation are $\frac{29}{6} + \frac{13}{6}$ and $\frac{29}{6} - \frac{13}{6}$. Adding

these two solutions gives the sum of the solutions: $\frac{29}{6} + \frac{13}{6} + \frac{29}{6} - \frac{13}{6}$, which is

equivalent to $\frac{29}{6} + \frac{29}{6}$, or $\frac{29}{3}$. Note that $29/3$, 9.666, and 9.667 are examples of ways to enter a correct answer.

QUESTION 13

Choice A is correct. The graph of a quadratic equation in the form $y = a(x - h)^2 + k$, where a , h , and k are positive constants, is a parabola that

opens upward with vertex (h, k) . The given function $f(x) = \frac{1}{9}(x - 7)^2 + 3$ is in the

form $y = a(x - h)^2 + k$, where $y = f(x)$, $a = \frac{1}{9}$, $h = 7$, and $k = 3$. Therefore, the graph

of $y = f(x)$ is a parabola that opens upward with vertex $(7, 3)$. Since the parabola opens upward, the vertex is the lowest point on the graph. It follows that the y -coordinate of the vertex of the graph of $y = f(x)$ is the minimum value of $f(x)$.

Therefore, the minimum value of $f(x)$ is 3. It's given that $f(x) = \frac{1}{9}(x - 7)^2 + 3$

represents the metal ball's height above the ground, in inches, x seconds after it started moving on a track. Therefore, the best interpretation of the vertex of the graph of $y = f(x)$ is that the metal ball's minimum height was 3 inches above the ground.

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 14

Choice A is correct. It's given that the function $F(x) = \frac{9}{5}(x - 273.15) + 32$ gives

the temperature, in degrees Fahrenheit, that corresponds to a temperature of x kelvins. A temperature that increased by 2.10 kelvins means that the value of x increased by 2.10 kelvins. It follows that an increase in x by 2.10 increases

$F(x)$ by $\frac{9}{5}(2.10)$, or 3.78. Therefore, if a temperature increased by 2.10 kelvins,

the temperature increased by 3.78 degrees Fahrenheit.

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 15

The correct answer is 33. It's given in the table that the coordinates of two points on a line in the xy -plane are $(k, 13)$ and $(k + 7, -15)$. The y -intercept is another point on the line. The slope computed using any pair of points from the line will be the same. The slope of a line, m , between any two points, (x_1, y_1)

and (x_2, y_2) , on the line can be calculated using the slope formula, $m = \frac{y_2 - y_1}{x_2 - x_1}$.

It follows that the slope of the line with the given points from the table, $(k, 13)$

and $(k + 7, -15)$, is $m = \frac{-15 - 13}{k + 7 - k}$, which is equivalent to $m = \frac{-28}{7}$, or $m = -4$. It's

given that the y -intercept of the line is $(k - 5, b)$. Substituting -4 for m and the

coordinates of the points $(k - 5, b)$ and $(k, 13)$ into the slope formula yields

$-4 = \frac{13 - b}{k - (k - 5)}$, which is equivalent to $-4 = \frac{13 - b}{k - k + 5}$, or $-4 = \frac{13 - b}{5}$. Multiplying

both sides of this equation by 5 yields $-20 = 13 - b$. Subtracting 13 from both sides of this equation yields $-33 = -b$. Dividing both sides of this equation by -1 yields $b = 33$. Therefore, the value of b is 33.

QUESTION 16

The correct answer is 8. Since each term of the given expression,

$2x^3 + 42x^2 + 208x$, has a factor of $2x$, the expression can be rewritten as $2x(x^2) + 2x(21x) + 2x(104)$, or $2x(x^2 + 21x + 104)$. Since the values 8 and 13 have a sum of 21 and a product of 104, the expression $x^2 + 21x + 104$ can be factored as $(x + 8)(x + 13)$. Therefore, the given expression can be factored as $2x(x + 8)(x + 13)$. It follows that the factors of the given expression are 2, x , $x + 8$, and $x + 13$. Of these factors, only $x + 8$ and $x + 13$ are of the form $x + b$, where b is a positive constant. Therefore, the possible values of b are 8 and 13. Thus, the smallest possible value of b is 8.

QUESTION 17

Choice D is correct. The given function f is a linear function. Therefore, the graph of $y = f(x)$ in the xy -plane has one x -intercept at the point $(k, 0)$, where k is a constant. Substituting 0 for $f(x)$ and k for x in the given function yields $0 = 7k - 84$. Adding 84 to both sides of this equation yields $84 = 7k$. Dividing both sides of this equation by 7 yields $12 = k$. Therefore, the x -intercept of the graph of $y = f(x)$ in the xy -plane is $(12, 0)$.

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

QUESTION 18

Choice B is correct. Since 1 mile is equal to 1,760 yards, 1 square mile is equal to $1,760^2$, or 3,097,600, square yards. It's given that the park has an area of 11,863,808 square yards. Therefore, the park has an area of $\left(\frac{11,863,808 \text{ square yards}}{3,097,600 \text{ square yards}}\right)$, or $\frac{11,863,808}{3,097,600}$ square miles. Thus, the area, in square miles, of the park is 3.83.

Choice A is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect. This is the square root of the area of the park in square yards, not the area of the park in square miles. *Choice D* is incorrect and may result from converting 11,863,808 yards to miles, rather than converting 11,863,808 square yards to square miles.

QUESTION 19

Choice A is correct. It's given that w represents the total wall area, in square feet. Since the walls of the room will be painted twice, the amount of paint, in gallons, needs to cover $2w$ square feet. It's also given that one gallon of paint will cover 220 square feet. Dividing the total area, in square feet, of the surface to be painted by the number of square feet covered by one gallon of paint gives the number of gallons of paint that will be needed. Dividing $2w$ by 220 yields

$\frac{2w}{220}$, or $\frac{w}{110}$. Therefore, the equation that represents the total amount of paint P , in gallons, needed to paint the walls of the room twice is $P = \frac{w}{110}$.

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

Choice C is incorrect and may result from finding the amount of paint needed to paint the walls once rather than twice. *Choice D* is incorrect and may result from conceptual or calculation errors.

QUESTION 20

The correct answer is -34 . A system of two linear equations in two variables, x and y , has no solution if the lines represented by the equations in the xy -plane are distinct and parallel. Two lines represented by equations in standard form $Ax + By = C$, where A , B , and C are constants, are parallel if the coefficients for x and y in one equation are proportional to the corresponding coefficients in the other equation. The first equation in the given system can be written in standard form by subtracting $30y$ from both sides of the equation to yield $48x - 102y = 24$. The second equation in the given system can be written in

standard form by adding $16x$ to both sides of the equation to yield $16x + ry = \frac{1}{6}$.

The coefficient of x in this second equation, 16 , is $\frac{1}{3}$ times the coefficient of x in the first equation, 48 . For the lines to be parallel the coefficient of y in the second equation, r , must also be $\frac{1}{3}$ times the coefficient of y in the first equation, -102 . Thus, $r = \frac{1}{3}(-102)$, or $r = -34$. Therefore, if the given system has no solution, the value of r is -34 .

QUESTION 21

Choice D is correct. If $x^2 - c^2 \leq 0$, then neither side of the given equation is defined and there can be no solution. Therefore, $x^2 - c^2 > 0$. Subtracting $\frac{c^2}{\sqrt{x^2 - c^2}}$ from both sides of the given equation yields $\frac{x^2}{\sqrt{x^2 - c^2}} - \frac{c^2}{\sqrt{x^2 - c^2}} = 39$, or $\frac{x^2 - c^2}{\sqrt{x^2 - c^2}} = 39$. Squaring both sides of this equation yields $\left(\frac{x^2 - c^2}{\sqrt{x^2 - c^2}}\right)^2 = 39^2$, or $\frac{(x^2 - c^2)(x^2 - c^2)}{x^2 - c^2} = 39^2$. Since $x^2 - c^2$ is positive and, therefore, nonzero, the expression $\frac{x^2 - c^2}{x^2 - c^2}$ is defined and equivalent to 1. It follows that the equation

$$\frac{(x^2 - c^2)(x^2 - c^2)}{x^2 - c^2} = 39^2 \text{ can be rewritten as } \left(\frac{x^2 - c^2}{x^2 - c^2}\right)(x^2 - c^2) = 39^2,$$

or $(1)(x^2 - c^2) = 39^2$, which is equivalent to $x^2 - c^2 = 39^2$. Adding c^2 to both sides of this equation yields $x^2 = c^2 + 39^2$. Taking the square root of both sides of this equation yields two solutions: $x = \sqrt{c^2 + 39^2}$ and $x = -\sqrt{c^2 + 39^2}$. Therefore, of the given choices, $-\sqrt{c^2 + 39^2}$ is one of the solutions to 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 C is incorrect and may result from conceptual or calculation errors.

QUESTION 22

Choice D is correct. It's given that the graph of $y = f(x)$ in the xy -plane is a parabola with vertex (h, k) . If $f(-9) = f(3)$, then for the graph of $y = f(x)$, the point with an x -coordinate of -9 and the point with an x -coordinate of 3 have the same y -coordinate. In the xy -plane, a parabola is a symmetric graph such that when two points have the same y -coordinate, these points are equidistant from the vertex, and the x -coordinate of the vertex is halfway between the x -coordinates of these two points. Therefore, for the graph of $y = f(x)$, the points with x -coordinates -9 and 3 are equidistant from the vertex, (h, k) , and h is halfway between -9 and 3 . The value that is halfway between -9

and 3 is $\frac{-9 + 3}{2}$, or -3 . Therefore, $h = -3$. The equation defining f can also be

written in vertex form, $f(x) = a(x - h)^2 + k$. Substituting -3 for h in this equation yields $f(x) = a(x - (-3))^2 + k$, or $f(x) = a(x + 3)^2 + k$. This equation is equivalent to $f(x) = a(x^2 + 6x + 9) + k$, or $f(x) = ax^2 + 6ax + 9a + k$. Since $f(x) = ax^2 + 4x + c$, it follows that $6a = 4$ and $9a + k = c$. Dividing both sides of the equation $6a = 4$ by

6 yields $a = \frac{4}{6}$, or $a = \frac{2}{3}$. Since $\frac{2}{3} < 1$, it's not true that $a \geq 1$. Therefore, statement II isn't true. Substituting $\frac{2}{3}$ for a in the equation $9a + k = c$ yields $9\left(\frac{2}{3}\right) + k = c$, or

$6 + k = c$. Subtracting 6 from both sides of this equation yields $k = c - 6$. If $k < 0$, then $c - 6 < 0$, or $c < 6$. Since c could be any value less than 6 , it's not necessarily true that $c < 0$. Therefore, statement I isn't necessarily true. Thus, neither I nor II must be true.

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.

**SAT**

Scoring Your Paper SAT Practice Test #2

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 470 and 471 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.

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

Conversion: Calculate Your Section and Total Scores

Use the section and total score conversion tables to convert your raw scores to section and total scores. Enter your raw scores in the boxes below, and then use the conversion tables to find your section and total scores. The section and total scores are listed in the boxes below.

Raw Score Conversion Table: Section Scores

Section	Raw Score Range	Section Score Range	Raw Score Range	Section Score Range
Reading and Writing	1-10	1-10	11-20	11-20
	11-20	21-30	21-30	31-40
	21-30	31-40	31-40	41-50
	31-40	41-50	41-50	51-60
	41-50	51-60	51-60	61-70
	51-60	61-70	61-70	71-80
	61-70	71-80	61-70	81-90
	71-80	81-90	71-80	91-100
	81-90	91-100	81-90	101-110
	91-100	101-110	91-100	111-120
Math	1-10	1-10	11-20	11-20
	11-20	21-30	21-30	31-40
	21-30	31-40	31-40	41-50
	31-40	41-50	41-50	51-60
	41-50	51-60	41-50	61-70
	51-60	61-70	41-50	71-80
	61-70	71-80	41-50	81-90
	71-80	81-90	41-50	91-100
	81-90	91-100	41-50	101-110
	91-100	101-110	41-50	111-120

**SAT Practice Test Worksheet:
Answer Key**

Use each of your correct answers below. Then use Part 1 to get your raw scores on each section.

Reading and Writing

Section 1

Question	Answer
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Section 2

Question	Answer
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Section 3

Question	Answer
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Section 4

Question	Answer
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Section 5

Question	Answer
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Section 6

Question	Answer
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Section 7

Question	Answer
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Section 8

Question	Answer
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Section 9

Question	Answer
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Section 10

Question	Answer
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Section 11

Question	Answer
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Section 12

Question	Answer
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Section 13

Question	Answer
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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 470 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 471 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 470 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 471 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 470 and 471 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	B	
4	C	
5	A	
6	B	
7	A	
8	D	
9	D	
10	A	
11	A	
12	B	
13	B	
14	A	
15	C	
16	B	
17	D	
18	A	
19	C	
20	D	
21	A	
22	B	
23	C	
24	C	
25	C	
26	D	
27	C	

Module 2

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

Math

Module 1

QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS
1	C	
2	D	
3	9	
4	A	
5	D	
6	52	
7	D	
8	B	
9	B	
10	C	
11	11875	
12	C	
13	B	
14	410	
15	A	
16	.5, 1/2	
17	100	
18	B	
19	D	
20	A	
21	B	
22	C	

Module 2

QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS
1	B	
2	B	
3	C	
4	A	
5	C	
6	192	
7	D	
8	113	
9	A	
10	C	
11	C	
12	9.666, 9.667, 29/3	
13	A	
14	A	
15	33	
16	8	
17	D	
18	B	
19	A	
20	-34	
21	D	
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)

→ CONVERT

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)

→ CONVERT

LOWER

UPPER

MATH SECTION
SCORE RANGE
(200-800)

READING AND WRITING
SECTION SCORE RANGE
(200-800)

+

TOTAL SAT
SCORE RANGE
(400-1600)

Raw Score Conversion Table: Section Scores

RAW SCORE (# OF CORRECT ANSWERS)	Reading and Writing Section Score Range		Math Section Score Range		RAW SCORE (# OF CORRECT ANSWERS)	Reading and Writing Section Score Range		Math Section Score Range	
	LOWER	UPPER	LOWER	UPPER		LOWER	UPPER	LOWER	UPPER
0	200	260	200	260	26	510	570	580	640
1	200	260	200	260	27	520	580	600	660
2	200	260	200	260	28	530	590	610	670
3	200	260	200	260	29	540	600	630	690
4	200	260	200	260	30	550	610	640	700
5	200	260	200	260	31	560	620	660	720
6	200	260	200	260	32	560	620	680	740
7	200	300	260	360	33	570	630	700	760
8	200	310	300	380	34	580	640	720	780
9	210	330	320	400	35	590	650	740	800
10	230	350	330	410	36	610	650	760	800
11	240	360	360	440	37	620	660	770	800
12	300	420	380	440	38	630	670	780	800
13	340	440	400	460	39	640	680	780	800
14	360	440	420	480	40	650	690	780	800
15	380	460	440	500	41	660	700		
16	400	460	460	520	42	670	710		
17	420	480	470	530	43	680	720		
18	430	490	490	550	44	690	730		
19	440	500	500	560	45	700	740		
20	450	510	510	570	46	720	760		
21	460	520	530	590	47	730	770		
22	470	530	540	600	48	740	780		
23	480	540	550	610	49	760	800		
24	490	550	560	620	50	780	800		
25	500	560	570	630					

The SAT[®]

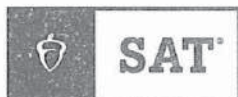
Practice Test #3

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.





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

Artist Marilyn Dingle's intricate, coiled baskets are _____ sweetgrass and palmetto palm. Following a Gullah technique that originated in West Africa, Dingle skillfully winds a thin palm frond around a bunch of sweetgrass with the help of a "sewing bone" to create the basket's signature look that no factory can reproduce.

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

- A) indicated by
- B) handmade from
- C) represented by
- D) collected with

2

Some researchers believe that the genes that enable groundhogs and certain other mammals to hibernate through the winter by slowing their breathing and heart rates and lowering their body temperature may be _____ in humans: present yet having essentially no effect on our bodily processes.

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

- A) decisive
- B) lacking
- C) variable
- D) dormant

3

Diego Velázquez was the leading artist in the court of King Philip IV of Spain during the seventeenth century, but his influence was hardly _____ Spain: realist and impressionist painters around the world employed his techniques and echoed elements of his style.

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

- A) derived from
- B) recognized in
- C) confined to
- D) repressed by

4

Although science fiction was dominated mostly by white male authors when Octavia Butler, a Black woman, began writing, she did not view the genre as _____. Butler broke into the field with the publication of several short stories and her 1976 novel *Patternmaster*, and she later became the first science fiction writer to win a prestigious MacArthur Fellowship.

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

- A) legitimate
- B) impenetrable
- C) compelling
- D) indecipherable

5

The following text is adapted from Nathaniel Hawthorne's 1844 short story "Drowne's Wooden Image." Drowne, a young man, is carving a wooden figure to decorate the front of a ship.

Day by day, the work assumed greater precision, and settled its irregular and misty outline into distincter grace and beauty. The general design was now obvious to the common eye.

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

- A) Acquired
- B) Acknowledged
- C) Imitated
- D) Speculated

6

The following text is from Walt Whitman's 1860 poem "Calamus 24."

I HEAR it is charged against me that I seek to
destroy institutions;
But really I am neither for nor against institutions
(What indeed have I in common with them?—
Or what with the destruction of them?),
Only I will establish in the Mannahatta
[Manhattan] and in every city of These States,
inland and seaboard,
And in the fields and woods, and above every
keel [ship] little or large, that dents the water,
Without edifices, or rules, or trustees,
or any argument,
The institution of the dear love of comrades.

Which choice best describes the overall structure of the text?

- A) The speaker questions an increasingly prevalent attitude, then summarizes his worldview.
- B) The speaker regrets his isolation from others, then predicts a profound change in society.
- C) The speaker concedes his personal shortcomings, then boasts of his many achievements.
- D) The speaker addresses a criticism leveled against him, then announces a grand ambition of his.

7

Utah is home to Pando, a colony of about 47,000 quaking aspen trees that all share a single root system. Pando is one of the largest single organisms by mass on Earth, but ecologists are worried that its growth is declining in part because of grazing by animals. The ecologists say that strong fences could prevent deer from eating young trees and help Pando start thriving again.

According to the text, why are ecologists worried about Pando?

- A) It isn't growing at the same rate it used to.
- B) It isn't producing young trees anymore.
- C) It can't grow into new areas because it is blocked by fences.
- D) Its root system can't support many more new trees.

8

Cats can judge unseen people's positions in space by the sound of their voices and thus react with surprise when the same person calls to them from two different locations in a short span of time. Saho Takagi and colleagues reached this conclusion by measuring cats' levels of surprise based on their ear and head movements while the cats heard recordings of their owners' voices from two speakers spaced far apart. Cats exhibited a low level of surprise when owners' voices were played twice from the same speaker, but they showed a high level of surprise when the voice was played once each from the two different speakers.

According to the text, how did the researchers determine the level of surprise displayed by the cats in the study?

- A) They watched how each cat moved its ears and head.
- B) They examined how each cat reacted to the voice of a stranger.
- C) They studied how each cat physically interacted with its owner.
- D) They tracked how each cat moved around the room.

9

Culinary anthropologist Vertamae Smart-Grosvenor may be known for her decades of work in national public television and radio, but her book *Vibration Cooking: or, the Travel Notes of a Geechee Girl* is likely her most influential project. The 1970 book, whose title refers to Smart-Grosvenor's roots in the Low Country of South Carolina, was unusual for its time. It combined memoir, recipes, travel writing, and social commentary and challenged notions about conventions of food and cooking. Long admired by many, the book and its author have shaped contemporary approaches to writing about cuisine.

Which choice best describes the main idea of the text?

- A) Smart-Grosvenor's unconventional book *Vibration Cooking: or, the Travel Notes of a Geechee Girl* is an important contribution to food writing.
- B) Smart-Grosvenor held many different positions over her life, including reporter and food writer.
- C) Smart-Grosvenor's groundbreaking book *Vibration Cooking: or, the Travel Notes of a Geechee Girl* didn't receive the praise it deserved when it was first published in 1970.
- D) Smart-Grosvenor was a talented chef whose work inspired many people to start cooking for themselves.

10

O Pioneers! is a 1913 novel by Willa Cather. In the novel, Cather depicts Alexandra Bergson as a person who takes comfort in understanding the world around her: _____

Which quotation from *O Pioneers!* most effectively illustrates the claim?

- A) "She looked fixedly up the bleak street as if she were gathering her strength to face something, as if she were trying with all her might to grasp a situation which, no matter how painful, must be met and dealt with somehow."
- B) "She had never known before how much the country meant to her. The chirping of the insects down in the long grass had been like the sweetest music. She had felt as if her heart were hiding down there, somewhere, with the quail and the plover and all the little wild things that crooned or buzzed in the sun. Under the long shaggy ridges, she felt the future stirring."
- C) "Alexandra drove off alone. The rattle of her wagon was lost in the howling of the wind, but her lantern, held firmly between her feet, made a moving point of light along the highway, going deeper and deeper into the dark country."
- D) "Alexandra drew her shawl closer about her and stood leaning against the frame of the mill, looking at the stars which glittered so keenly through the frosty autumn air. She always loved to watch them, to think of their vastness and distance, and of their ordered march. It fortified her to reflect upon the great operations of nature, and when she thought of the law that lay behind them, she felt a sense of personal security."

11

Several artworks found among the ruins of the ancient Roman city of Pompeii depict a female figure fishing with a cupid nearby. Some scholars have asserted that the figure is the goddess Venus, since she is known to have been linked with cupids in Roman culture, but University of Leicester archaeologist Carla Brain suggests that cupids may have also been associated with fishing generally. The fact that a cupid is shown near the female figure, therefore, _____

Which choice most logically completes the text?

- A) is not conclusive evidence that the figure is Venus.
- B) suggests that Venus was often depicted fishing.
- C) eliminates the possibility that the figure is Venus.
- D) would be difficult to account for if the figure is not Venus.

12

In documents called judicial opinions, judges explain the reasoning behind their legal rulings, and in those explanations they sometimes cite and discuss historical and contemporary philosophers. Legal scholar and philosopher Anita L. Allen argues that while judges are naturally inclined to mention philosophers whose views align with their own positions, the strongest judicial opinions consider and rebut potential objections; discussing philosophers whose views conflict with judges' views could therefore _____

Which choice most logically completes the text?

- A) allow judges to craft judicial opinions without needing to consult philosophical works.
- B) help judges improve the arguments they put forward in their judicial opinions.
- C) make judicial opinions more comprehensible to readers without legal or philosophical training.
- D) bring judicial opinions in line with views that are broadly held among philosophers.

13

Many of William Shakespeare's tragedies address broad themes that still appeal to today's audiences. For instance, *Romeo and Juliet*, which is set in the Italy of Shakespeare's time, tackles the themes of parents versus children and love versus hate, and the play continues to be read and produced widely around the world. But understanding Shakespeare's so-called history plays can require a knowledge of several centuries of English history.

Consequently, _____

Which choice most logically completes the text?

- A) many theatergoers and readers today are likely to find Shakespeare's history plays less engaging than the tragedies.
- B) some of Shakespeare's tragedies are more relevant to today's audiences than twentieth-century plays.
- C) *Romeo and Juliet* is the most thematically accessible of all Shakespeare's tragedies.
- D) experts in English history tend to prefer Shakespeare's history plays to his other works.

14

In her analysis of Edith Wharton's *The House of Mirth* (1905), scholar Candace Waid observes that the novel depicts the upper classes of New York society as "consumed by the appetite of a soulless _____ an apt assessment given that *The House of Mirth* is set during the Gilded Age, a period marked by rapid industrialization, economic greed, and widening wealth disparities.

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

- A) materialism"; and
- B) materialism" and
- C) materialism,"
- D) materialism"

15

Based on genetic evidence, archaeologists have generally agreed that reindeer domestication began in the eleventh century CE. However, since uncovering fragments of a 2,000-year-old reindeer training harness in northern Siberia, _____ may have begun much earlier.

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

- A) researcher Robert Losey has argued that domestication
- B) researcher Robert Losey's argument is that domestication
- C) domestication, researcher Robert Losey has argued,
- D) the argument researcher Robert Losey has made is that domestication

16

A conceptual artist and designer embraced by both the art world and the fashion _____ Mary Ping was chosen to curate the exhibition *Front Row: Chinese American Designers* for the Museum of Chinese in America.

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

- A) world
- B) world:
- C) world;
- D) world,

17

Professional American football player Fred Cox invented one of the world's most popular toys. In the 1970s, he came up with the idea for the Nerf football, which _____ of the harder and heavier regulation football.

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

- A) were a smaller, foam version
- B) are smaller, foam versions
- C) were smaller, foam versions
- D) is a smaller, foam version

18

Beatrix Potter is perhaps best known for writing and illustrating children's books such as *The Tale of Peter Rabbit* (1902), but she also dedicated herself to mycology, the study of _____ more than 350 paintings of the fungal species she observed in nature and submitting her research on spore germination to the Linnean Society of London.

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

- A) fungi; producing
- B) fungi. Producing
- C) fungi producing
- D) fungi, producing

19

African American Percy Julian was a scientist and entrepreneur whose work helped people around the world to see. Named in 1999 as one of the greatest achievements by a US chemist in the past hundred years, _____ led to the first mass-produced treatment for glaucoma.

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

- A) Julian synthesized the alkaloid physostigmine in 1935; it
- B) in 1935 Julian synthesized the alkaloid physostigmine, which
- C) Julian's 1935 synthesis of the alkaloid physostigmine
- D) the alkaloid physostigmine was synthesized by Julian in 1935 and

20

The first computerized spreadsheet, Dan Bricklin's *VisiCalc*, improved financial recordkeeping not only by providing users with an easy means of adjusting data in spreadsheets but also by automatically updating all calculations that were dependent on these _____ to VisiCalc's release, changing a paper spreadsheet often required redoing the entire sheet by hand, a process that could take days.

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

- A) adjustments prior
- B) adjustments, prior
- C) adjustments. Prior
- D) adjustments and prior

21

Neuroscientist Karen Konkoly wanted to determine whether individuals can understand and respond to questions during REM sleep. She first taught volunteers eye movements they would use to respond to basic math problems while asleep (a single left-right eye movement indicated the number one). _____ she attached electrodes to the volunteers' faces to record their eye movements during sleep.

Which choice completes the text with the most logical transition?

- A) Specifically,
- B) Next,
- C) For instance,
- D) In sum,

22

Archaeologist Sue Brunning explains why the seventh-century ship burial site at Sutton Hoo in England was likely the tomb of a king. First, the gold artifacts inside the ship suggest that the person buried with them was a wealthy and respected leader. _____ the massive effort required to bury the ship would likely only have been undertaken for a king.

Which choice completes the text with the most logical transition?

- A) Instead,
- B) Still,
- C) Specifically,
- D) Second,

23

Every chemical compound has a spectroscopic fingerprint, a pattern of reflected light unique to that compound. _____ upon analyzing the light reflected by the bright regions on the surface of the dwarf planet Ceres, Maria Cristina De Sanctis of Rome's National Institute of Astrophysics was able to determine that the regions contain large amounts of the compound sodium carbonate.

Which choice completes the text with the most logical transition?

- A) Regardless,
- B) Meanwhile,
- C) Thus,
- D) In comparison,

24

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

- Severo Ochoa discovered the enzyme PNPase in 1955.
- PNPase is involved in both the creation and degradation of mRNA.
- Ochoa incorrectly hypothesized that PNPase provides the genetic blueprints for mRNA.
- The discovery of PNPase proved critical to deciphering the human genetic code.
- Deciphering the genetic code has led to a better understanding of how genetic variations affect human health.

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

- A) Ochoa's 1955 discovery of PNPase proved critical to deciphering the human genetic code, leading to a better understanding of how genetic variations affect human health.
- B) Ochoa first discovered PNPase, an enzyme that he hypothesized contained the genetic blueprints for mRNA, in 1955.
- C) In 1955, Ochoa discovered the PNPase enzyme, which is involved in both the creation and degradation of mRNA.
- D) Though his discovery of PNPase was critical to deciphering the human genetic code, Ochoa incorrectly hypothesized that the enzyme was the source of mRNA's genetic blueprints.

25

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

- Physicist Muluneh Abebe was working on a garment suited for both warm and cold conditions.
- He analyzed the emissivity, or ability to emit heat, of the materials he planned to use.
- Abebe found that reflective metal fibers emitted almost no heat and had an emissivity of 0.02.
- He found that silicon carbide fibers absorbed large amounts of heat and had an emissivity of 0.74.
- The amount of heat a material absorbs is equal to the amount of heat it emits.

The student wants to contrast the emissivity of reflective metal fibers with that of silicon carbide fibers. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) The ability of reflective metal fibers and silicon carbide fibers to emit heat was determined by an analysis of each material's emissivity.
- B) The amount of heat a material absorbs is equal to the amount it emits, as evidenced in Abebe's analyses.
- C) Though the reflective metal fibers and silicon carbide fibers had different rates of emissivity, Abebe planned to use both in a garment.
- D) Whereas the reflective metal fibers had an emissivity of just 0.02, the silicon carbide fibers absorbed large amounts of heat, resulting in an emissivity of 0.74.

26

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

- In the early 1960s, the US had a strict national-origins quota system for immigrants.
- The number of new immigrants allowed from a country each year was based on how many people from that country lived in the US in 1890.
- This system favored immigrants from northern Europe.
- Almost 70% of slots were reserved for immigrants from Great Britain, Ireland, and Germany.
- The 1965 Hart-Celler Act abolished the national-origins quota system.

The student wants to present the significance of the Hart-Celler Act to an audience unfamiliar with the history of US immigration. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) Almost 70% of slots were reserved for immigrants from Great Britain, Ireland, and Germany at the time the Hart-Celler Act was proposed.
- B) Prior to the Hart-Celler Act, new immigration quotas were based on how many people from each country lived in the US in 1890.
- C) The quota system in place in the early 1960s was abolished by the 1965 Hart-Celler Act.
- D) The 1965 Hart-Celler Act abolished the national-origins quota system, which favored immigrants from northern Europe.

27

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

- In 2020, theater students at Radford and Virginia Tech chose an interactive, online format to present a play about woman suffrage activists.
- Their “Women and the Vote” website featured an interactive digital drawing of a Victorian-style house.
- Audiences were asked to focus on a room of their choice and select from that room an artifact related to the suffrage movement.
- One click took them to video clips, songs, artwork, and texts associated with the artifact.
- The play was popular with audiences because the format allowed them to control the experience.

The student wants to explain an advantage of the “Women and the Vote” format. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) “Women and the Vote” featured a drawing of a Victorian-style house with several rooms, each containing suffrage artifacts.
- B) To access video clips, songs, artwork, and texts, audiences had to first click on an artifact.
- C) The “Women and the Vote” format appealed to audiences because it allowed them to control the experience.
- D) Using an interactive format, theater students at Radford and Virginia Tech created “Women and the Vote,” a play about woman suffrage activists.

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

For painter Jacob Lawrence, being _____ was an important part of the artistic process. Because he paid close attention to all the details of his Harlem neighborhood, Lawrence's artwork captured nuances in the beauty and vitality of the Black experience during the Harlem Renaissance and the Great Migration.

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

- A) skeptical
- B) observant
- C) critical
- D) confident

3

Beginning in the 1950s, Navajo Nation legislator Annie Dodge Wauneka continuously worked to promote public health; this _____ effort involved traveling throughout the vast Navajo homeland and writing a medical dictionary for speakers of *Diné bizaad*, the Navajo language.

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

- A) impartial
- B) offhand
- C) persistent
- D) mandatory

2

Particle physicists like Ayana Holloway Arce and Aida El-Khadra spend much of their time _____ what is invisible to the naked eye: using sophisticated technology, they closely examine the behavior of subatomic particles, the smallest detectable parts of matter.

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

- A) selecting
- B) inspecting
- C) creating
- D) deciding

4

The process of mechanically recycling plastics is often considered _____ because of the environmental impact and the loss of material quality that often occurs. But chemist Takunda Chazovachii has helped develop a cleaner process of chemical recycling that converts superabsorbent polymers from diapers into a desirable reusable adhesive.

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

- A) resilient
- B) inadequate
- C) dynamic
- D) satisfactory

5

Novelist N. K. Jemisin declines to _____ the conventions of the science fiction genre in which she writes, and she has suggested that her readers appreciate her work precisely because of this willingness to thwart expectations and avoid formulaic plots and themes.

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

- A) question
- B) react to
- C) perceive
- D) conform to

6

In 1929 the *Atlantic Monthly* published several articles based on newly discovered letters allegedly exchanged between President Abraham Lincoln and a woman named Ann Rutledge. Historians were unable to _____ the authenticity of the letters, however, and quickly dismissed them as a hoax.

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

- A) validate
- B) interpret
- C) relate
- D) accommodate

7

The following text is from Georgia Douglas Johnson's 1922 poem "Benediction."

Go forth, my son,
Winged by my heart's desire!
Great reaches, yet unknown,
Await
For your possession.
I may not, if I would,
Retrace the way with you,
My pilgrimage is through,
But life is calling you!

Which choice best states the main purpose of the text?

- A) To express hope that a child will have the same accomplishments as his parent did
- B) To suggest that raising a child involves many struggles
- C) To warn a child that he will face many challenges throughout his life
- D) To encourage a child to embrace the experiences life will offer

8

In 2007, computer scientist Luis von Ahn was working on converting printed books into a digital format. He found that some words were distorted enough that digital scanners couldn't recognize them, but most humans could easily read them. Based on that finding, von Ahn invented a simple security test to keep automated "bots" out of websites. The first version of the reCAPTCHA test asked users to type one known word and one of the many words scanners couldn't recognize. Correct answers proved the users were humans and added data to the book-digitizing project.

Which choice best states the main purpose of the text?

- A) To discuss von Ahn's invention of reCAPTCHA
- B) To explain how digital scanners work
- C) To call attention to von Ahn's book-digitizing project
- D) To indicate how popular reCAPTCHA is

9

Text 1

A tiny, unusual fossil in a piece of 99-million-year-old amber is of the extinct species *Oculudentavis khaungraae*. The *O. khaungraae* fossil consists of a rounded skull with a thin snout and a large eye socket. Because these features look like they are avian, or related to birds, researchers initially thought that the fossil might be the smallest avian dinosaur ever found.

Text 2

Paleontologists were excited to discover a second small fossil that is similar to the strange *O. khaungraae* fossil but has part of the lower body along with a birdlike skull. Detailed studies of both fossils revealed several traits that are found in lizards but not in dinosaurs or birds. Therefore, paleontologists think the two creatures were probably unusual lizards, even though the skulls looked avian at first.

Based on the texts, what would the paleontologists in Text 2 most likely say about the researchers' initial thought in Text 1?

- A) It is understandable because the fossil does look like it could be related to birds, even though *O. khaungraae* is probably a lizard.
- B) It is confusing because it isn't clear what caused the researchers to think that *O. khaungraae* might be related to birds.
- C) It is flawed because the researchers mistakenly assumed that *O. khaungraae* must be a lizard.
- D) It is reasonable because the *O. khaungraae* skull is about the same size as the skull of the second fossil but is shaped differently.

10

The following text is from Ezra Pound's 1909 poem "Hymn III," based on the work of Marcantonio Flaminio.

As a fragile and lovely flower unfolds its gleaming foliage on the breast of the fostering earth, if the dew and the rain draw it forth;
So doth my tender mind flourish, if it be fed with the sweet dew of the fostering spirit,
Lacking this, it beginneth straightway to languish, even as a floweret born upon dry earth, if the dew and the rain tend it not.

Based on the text, in what way is the human mind like a flower?

- A) It becomes increasingly vigorous with the passage of time.
- B) It draws strength from changes in the weather.
- C) It requires proper nourishment in order to thrive.
- D) It perseveres despite challenging circumstances.

11

Maximum Height of Maple Trees
When Fully Grown

Tree type	Maximum height (feet)	Native to North America
Sugar maple	75	yes
Silver maple	70	yes
Red maple	60	yes
Japanese maple	25	no
Norway maple	50	no

For a school project, a forestry student needs to recommend a maple tree that is native to North America and won't grow more than 60 feet in height. Based on the characteristics of five common maple trees, she has decided to select a _____

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

- A) silver maple.
- B) sugar maple.
- C) red maple.
- D) Norway maple.

12

A student is examining a long, challenging poem that was initially published in a quarterly journal without explanatory notes, then later republished in a stand-alone volume containing only that poem and accompanying explanatory notes written by the poet. The student asserts that the explanatory notes were included in the republication primarily as a marketing device to help sell the stand-alone volume.

Which statement, if true, would most directly support the student's claim?

- A) The text of the poem as published in the quarterly journal is not identical to the text of the poem published in the stand-alone volume.
- B) Many critics believe that the poet's explanatory notes remove certain ambiguities of the poem and make it less interesting as a result.
- C) The publishers of the stand-alone volume requested the explanatory notes from the poet in order to make the book attractive to readers who already had a copy of the poem in a journal issue.
- D) Correspondence between the poet and the publisher reveals that the poet's explanatory notes went through several drafts.

13

The Post Office is a 1912 play by Rabindranath Tagore, originally written in Bengali. The character Amal is a young boy who imagines that the people he sees passing the window of his home are carefree even when engaged in work or chores, as is evident when he says to the daughter of a flower seller, _____

Which quotation from *The Post Office* most effectively illustrates the claim?

- A) "I see, you don't wish to stop; I don't care to stay on here either."
- B) "Oh, flower gathering? That is why your feet seem so glad and your anklets jingle so merrily as you walk."
- C) "I'll pay when I grow up—before I leave to look for work out on the other side of that stream there."
- D) "Wish I could be out too. Then I would pick some flowers for you from the very topmost branches right out of sight."

Characteristics of Five Recently Discovered Gas Exoplanets

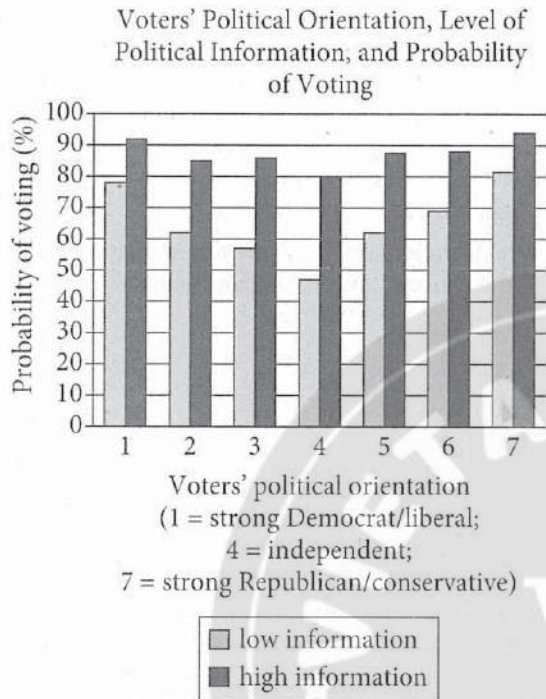
Exoplanet designation	Mass (Jupiters)	Radius (Jupiters)	Orbital period (days)	Distance from the Sun (parsecs)
TOI-640 b	0.88	1.771	5.003	340
TOI-1601 b	0.99	1.239	5.331	336
TOI-628 b	6.33	1.060	3.409	178
TOI-1478 b	0.85	1.060	10.180	153
TOI-1333 b	2.37	1.396	4.720	200

"Hot Jupiters" are gas planets that have a mass of at least 0.25 Jupiters (meaning that their mass is at least 25% of that of Jupiter) and an orbital period of less than 10 days (meaning that they complete one orbit around their star in less than 10 days), while "warm Jupiters" are gas planets that meet the same mass criterion but have orbital periods of more than 10 days. In 2021, Michigan State University astronomer Joseph Rodriguez and colleagues announced the discovery of five new gas exoplanets and asserted that four are hot Jupiters and one is a warm Jupiter.

Which choice best describes data from the table that support Rodriguez and colleagues' assertion?

- A) None of the planets have an orbital period of more than 10 days, and TOI-628 b has a mass of 6.33 Jupiters.
- B) TOI-1478 b has an orbital period of 153 days, and the masses of all the planets range from 0.85 to 6.33 Jupiters.
- C) All the planets have a radius between 1.060 and 1.771 Jupiters, and only TOI-1333 b has an orbital period of more than 10 days.
- D) Each of the planets has a mass greater than 0.25 Jupiters, and all except for TOI-1478 b have an orbital period of less than 10 days.

15



Economists Kerwin Kofi Charles and Melvin Stephens Jr. investigated a variety of factors that influence voter turnout in the United States. Using survey data that revealed whether respondents voted in national elections and how knowledgeable respondents are about politics, Charles and Stephens claim that the likelihood of voting is driven in part by potential voters' confidence in their assessments of candidates—essentially, the more informed voters are about politics, the more confident they are at evaluating whether candidates share their views, and thus the more likely they are to vote.

Which choice best describes data in the graph that support Charles and Stephens's claim?

- A) At each point on the political orientation scale, high-information voters were more likely than low-information voters to vote.
- B) Only low-information voters who identify as independents had a voting probability below 50%.
- C) The closer that low-information voters are to the ends of the political orientation scale, the more likely they were to vote.
- D) High-information voters were more likely to identify as strong Democrats or strong Republicans than low-information voters were.

16

In the "language nest" model of education, Indigenous children learn the language of their people by using it as the medium of instruction and socialization at pre-K or elementary levels. In their 2016 study of a school in an Anishinaabe community in Ontario, Canada, scholars Lindsay Morcom and Stephanie Roy (who are Anishinaabe themselves) found that the model not only imparted fluency in the Anishinaabe language but also enhanced students' pride in Anishinaabe culture overall. Given these positive effects, Morcom and Roy predict that the model increases the probability that as adults, former students of the school will transmit the language to younger generations in their community.

Which finding, if true, would most strongly support the researchers' prediction?

- A) Anishinaabe adults who didn't attend the school feel roughly the same degree of cultural pride as the former students of the school feel.
- B) After transferring to the school, new students experience an increase in both fluency and academic performance overall.
- C) As adults, former students of the school are just as likely to continue living in their community as individuals who didn't attend the school.
- D) As they complete secondary and higher education, former students of the school experience no loss of fluency or cultural pride.

17

Choctaw/Cherokee artist Jeffrey Gibson turns punching bags used by boxers into art by decorating them with beadwork and elements of Native dressmaking. These elements include leather fringe and jingles, the metal cones that cover the dresses worn in the jingle dance, a women's dance of the Ojibwe people. Thus, Gibson combines an object commonly associated with masculinity (a punching bag) with art forms traditionally practiced by women in most Native communities (beadwork and dressmaking). In this way, he rejects the division of male and female gender roles.

Which choice best describes Gibson's approach to art, as presented in the text?

- A) He draws from traditional Native art forms to create his original works.
- B) He finds inspiration from boxing in designing the dresses he makes.
- C) He rejects expectations about color and pattern when incorporating beadwork.
- D) He has been influenced by Native and non-Native artists equally.

18

For thousands of years, people in the Americas _____ the bottle gourd, a large bitter fruit with a thick rind, to make bottles, other types of containers, and even musical instruments. Oddly, there is no evidence that any type of bottle gourd is native to the Western Hemisphere; either the fruit or its seeds must have somehow been carried from Asia or Africa.

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

- A) to use
- B) have used
- C) having used
- D) using

19

The Alvarez theory, developed in 1980 by physicist Luis Walter Alvarez and his geologist son Walter Alvarez, maintained that the secondary effects of an asteroid impact caused many dinosaurs and other animals to die _____. It left unexplored the question of whether unrelated volcanic activity might have also contributed to the mass extinctions. Which choice completes the text so that it conforms to the conventions of Standard English?

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

20

To survive when water is scarce, embryos inside African turquoise killifish eggs _____ a dormant state known as diapause. In this state, embryonic development is paused for as long as two years—longer than the life span of an adult killifish.

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

- A) enter
- B) to enter
- C) having entered
- D) entering

21

In his 1963 exhibition *Exposition of Music—Electronic Television*, Korean American artist Nam June Paik showed how television images could be manipulated to express an artist's perspective. Today, Paik _____ considered the first video artist.

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

- A) will be
- B) had been
- C) was
- D) is

22

As British scientist Peter Whibberley has observed, “the Earth is not a very good timekeeper.” Earth’s slightly irregular rotation rate means that measurements of time must be periodically adjusted. Specifically, an extra “leap second” (the 86,401st second of the day) is _____ time based on the planet’s rotation lags a full nine-tenths of a second behind time kept by precise atomic clocks.

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

- A) added, whenever
- B) added; whenever
- C) added. Whenever
- D) added whenever

23

Like other amphibians, the wood frog (*Rana sylvatica*) is unable to generate its own heat, so during periods of subfreezing temperatures, it _____ by producing large amounts of glucose, a sugar that helps prevent damaging ice from forming inside its cells.

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

- A) had survived
- B) survived
- C) would survive
- D) survives

24

Chimamanda Ngozi Adichie’s 2013 novel *Americanah* chronicles the divergent experiences of Ifemelu and Obinze, a young Nigerian couple, after high school. Ifemelu moves to the United States to attend a prestigious university. _____ Obinze travels to London, hoping to start a career there. However, frustrated with the lack of opportunities, he soon returns to Nigeria.

Which choice completes the text with the most logical transition?

- A) Meanwhile,
- B) Nevertheless,
- C) Secondly,
- D) In fact,

25

Before California’s 1911 election to approve a proposition granting women the right to vote, activists across the state sold tea to promote the cause of suffrage. In San Francisco, the Woman’s Suffrage Party sold Equality Tea at local fairs. _____ in Los Angeles, activist Nancy Tuttle Craig, who ran one of California’s largest grocery store firms, distributed Votes for Women Tea.

Which choice completes the text with the most logical transition?

- A) For example,
- B) To conclude,
- C) Similarly,
- D) In other words,

26

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

- Some sandstone arches in Utah's Arches National Park have been defaced by tourists' carvings.
- Park rangers can smooth away some carvings using power grinders.
- For deep carvings, power grinding is not always feasible because it can greatly alter or damage the rock.
- Park rangers can use an infilling technique, which involves filling in carvings with ground sandstone and a bonding agent.
- This technique is minimally invasive.

The student wants to explain an advantage of the infilling technique. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) To remove carvings from sandstone arches in Utah's Arches National Park, power grinding is not always feasible.
- B) Filling in carvings with ground sandstone and a bonding agent is less invasive than smoothing them away with a power grinder, which can greatly alter or damage the sandstone arches.
- C) Park rangers can use a power grinding technique to smooth away carvings or fill them in with ground sandstone and a bonding agent.
- D) As methods for removing carvings from sandstone, power grinding and infilling differ in their level of invasiveness.

27

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

- Soo Sunny Park is a Korean American artist who uses light as her primary medium of expression.
- She created her work *Unwoven Light* in 2013.
- *Unwoven Light* featured a chain-link fence fitted with iridescent plexiglass tiles.
- When light passed through the fence, colorful prisms formed.

The student wants to describe *Unwoven Light* to an audience unfamiliar with Soo Sunny Park. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) Park's 2013 installation *Unwoven Light*, which included a chain-link fence and iridescent tiles made from plexiglass, featured light as its primary medium of expression.
- B) Korean American light artist Soo Sunny Park created *Unwoven Light* in 2013.
- C) The chain-link fence in Soo Sunny Park's *Unwoven Light* was fitted with tiles made from iridescent plexiglass.
- D) In *Unwoven Light*, a 2013 work by Korean American artist Soo Sunny Park, light formed colorful prisms as it passed through a fence Park had fitted with iridescent tiles.

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

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- All variables and expressions represent real numbers.
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- 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



$$A = \pi r^2$$

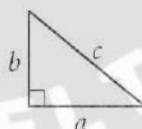
$$C = 2\pi r$$



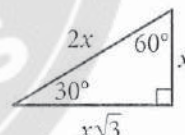
$$A = \ell w$$



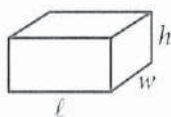
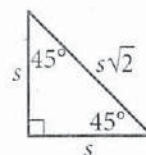
$$A = \frac{1}{2}bh$$



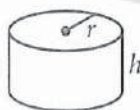
$$c^2 = a^2 + b^2$$



Special Right Triangles



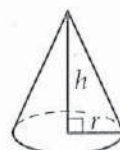
$$V = \ell wh$$



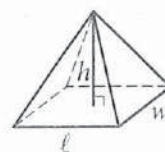
$$V = \pi r^2 h$$



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



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



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

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.

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1

A bus is traveling at a constant speed along a straight portion of road. The equation $d = 30t$ gives the distance d , in feet from a road marker, that the bus will be t seconds after passing the marker. How many feet from the marker will the bus be 2 seconds after passing the marker?

- A) 30
- B) 32
- C) 60
- D) 90

2

A line in the xy -plane has a slope of $\frac{1}{9}$ and passes through the point $(0, 14)$. Which equation represents this line?

- A) $y = -\frac{1}{9}x - 14$
- B) $y = -\frac{1}{9}x + 14$
- C) $y = \frac{1}{9}x - 14$
- D) $y = \frac{1}{9}x + 14$

3

If $\frac{x}{8} = 5$, what is the value of $\frac{8}{x}$?

4

Triangles ABC and DEF are congruent, where A corresponds to D , and B and E are right angles. The measure of angle A is 18° . What is the measure of angle F ?

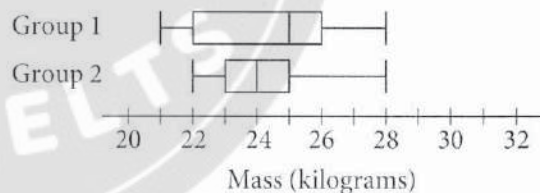
- A) 18°
- B) 72°
- C) 90°
- D) 162°

5

Which expression is equivalent to $(m^4q^4z^{-1})(mq^5z^3)$, where m , q , and z are positive?

- A) $m^4q^{20}z^{-3}$
- B) $m^5q^9z^2$
- C) $m^6q^8z^{-1}$
- D) $m^{20}q^{12}z^{-2}$

6



The box plots summarize the masses, in kilograms, of two groups of gazelles. Based on the box plots, which of the following statements must be true?

- A) The mean mass of group 1 is greater than the mean mass of group 2.
- B) The mean mass of group 1 is less than the mean mass of group 2.
- C) The median mass of group 1 is greater than the median mass of group 2.
- D) The median mass of group 1 is less than the median mass of group 2.

7

$$\begin{aligned}y &= 76 \\ y &= x^2 - 5\end{aligned}$$

The graphs of the given equations in the xy -plane intersect at the point (x, y) . What is a possible value of x ?

- A) $-\frac{76}{5}$
- B) -9
- C) 5
- D) 76

8

To estimate the proportion of a population that has a certain characteristic, a random sample was selected from the population. Based on the sample, it is estimated that the proportion of the population that has the characteristic is 0.49, with an associated margin of error of 0.04. Based on this estimate and margin of error, which of the following is the most appropriate conclusion about the proportion of the population that has the characteristic?

- A) It is plausible that the proportion is between 0.45 and 0.53.
- B) It is plausible that the proportion is less than 0.45.
- C) The proportion is exactly 0.49.
- D) It is plausible that the proportion is greater than 0.53.

9

$$\begin{aligned}y &= 2x + 10 \\ y &= 2x - 1\end{aligned}$$

At how many points do the graphs of the given equations intersect in the xy -plane?

- A) Zero
- B) Exactly one
- C) Exactly two
- D) Infinitely many

10

In the xy -plane, the graph of the linear function f contains the points $(0, 2)$ and $(8, 34)$. Which equation defines f , where $y = f(x)$?

- A) $f(x) = 2x + 42$
- B) $f(x) = 32x + 36$
- C) $f(x) = 4x + 2$
- D) $f(x) = 8x + 2$

11

If $\frac{x}{y} = 4$ and $\frac{24x}{ny} = 4$, what is the value of n ?

12

$$w(t) = 300 - 4t$$

The function w models the volume of liquid, in milliliters, in a container t seconds after it begins draining from a hole at the bottom. According to the model, what is the predicted volume, in milliliters, draining from the container each second?

- A) 300
- B) 296
- C) 75
- D) 4

13

Each year, the value of an investment increases by 0.49% of its value the previous year. Which of the following functions best models how the value of the investment changes over time?

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

14

$$\begin{aligned}24x + y &= 48 \\ 6x + y &= 72\end{aligned}$$

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

15

$$y = x^2 - 14x + 22$$

The given equation relates the variables x and y . For what value of x does the value of y reach its minimum?

16

The function h is defined by $h(x) = 4x + 28$. The graph of $y = h(x)$ 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 $a + b$?

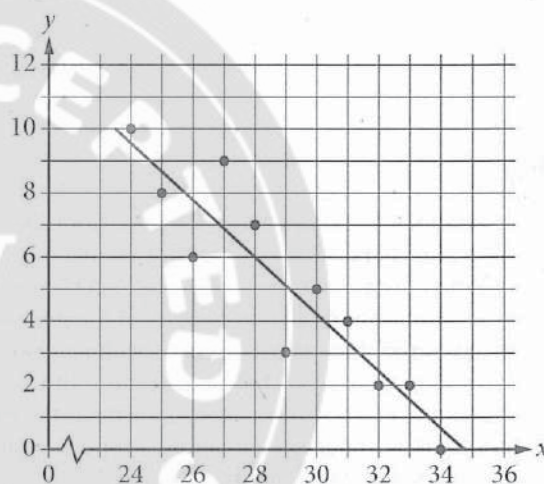
- A) 21
- B) 28
- C) 32
- D) 35

17

Square A has side lengths that are 166 times the side lengths of square B. The area of square A is k times the area of square B. What is the value of k ?

18

The scatterplot shows the relationship between two variables, x and y . A line of best fit for the data is also shown.



At $x = 25.5$, which of the following is closest to the y -value predicted by the line of best fit?

- A) 6.2
- B) 7.3
- C) 8.2
- D) 9.1

19

The measure of angle R is $\frac{2\pi}{3}$ radians. The measure of angle T is $\frac{5\pi}{12}$ radians greater than the measure of angle R . What is the measure of angle T , in degrees?

- A) 75
- B) 120
- C) 195
- D) 390

20

A scientist initially measures 12,000 bacteria in a growth medium. 4 hours later, the scientist measures 24,000 bacteria. Assuming exponential growth, the formula $P = C(2)^{rt}$ gives the number of bacteria in the growth medium, where r and C are constants and P is the number of bacteria t hours after the initial measurement. What is the value of r ?

- A) $\frac{1}{12,000}$
- B) $\frac{1}{4}$
- C) 4
- D) 12,000

21

$$\sqrt{(x-2)^2} = \sqrt{3x+34}$$

What is the smallest solution to the given equation?

22

$$x - 29 = (x - a)(x - 29)$$

Which of the following are solutions to the given equation, where a is a constant and $a > 30$?

- I. a
 - II. $a + 1$
 - III. 29
- A) I and II only
 - B) I and III only
 - C) II and III only
 - D) I, II, and III

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Math

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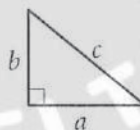
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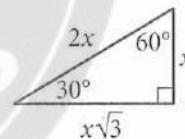
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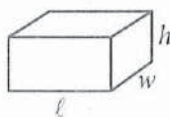
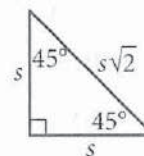
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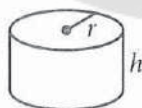
$$c^2 = a^2 + b^2$$



Special Right Triangles



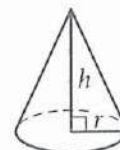
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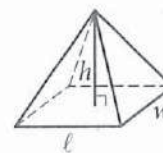
$$V = \pi r^2 h$$



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



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



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

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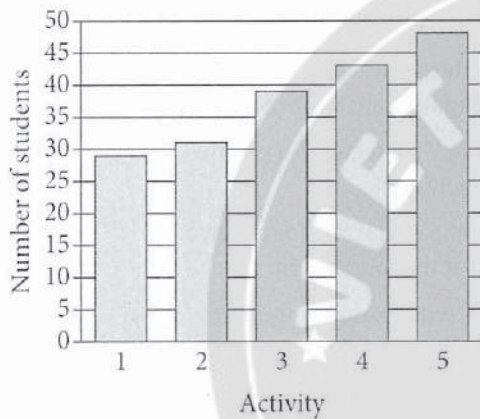
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1

What is 10% of 470?

- A) 37
- B) 47
- C) 423
- D) 460

2



A group of students voted on five after-school activities. The bar graph shows the number of students who voted for each of the five activities. How many students chose activity 3?

- A) 25
- B) 39
- C) 48
- D) 50

3

$$4x + 5 = 165$$

What is the solution to the given equation?

4

A customer spent \$27 to purchase oranges at \$3 per pound. How many pounds of oranges did the customer purchase?

5

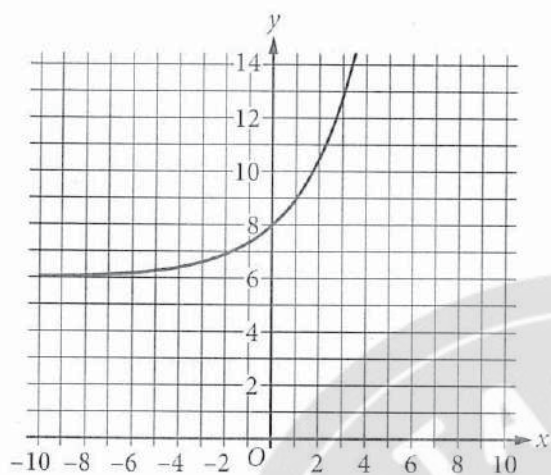
The function f is defined by $f(x) = 4x$. For what value of x does $f(x) = 8$?

6

The function g is defined by $g(x) = x^2 + 9$. For which value of x is $g(x) = 25$?

- A) 4
- B) 5
- C) 9
- D) 13

7



What is the y -intercept of the graph shown?

- A) $(-8, 0)$
- B) $(-6, 0)$
- C) $(0, 6)$
- D) $(0, 8)$

8

Sean rents a tent at a cost of \$11 per day plus a onetime insurance fee of \$10. Which equation represents the total cost c , in dollars, to rent the tent with insurance for d days?

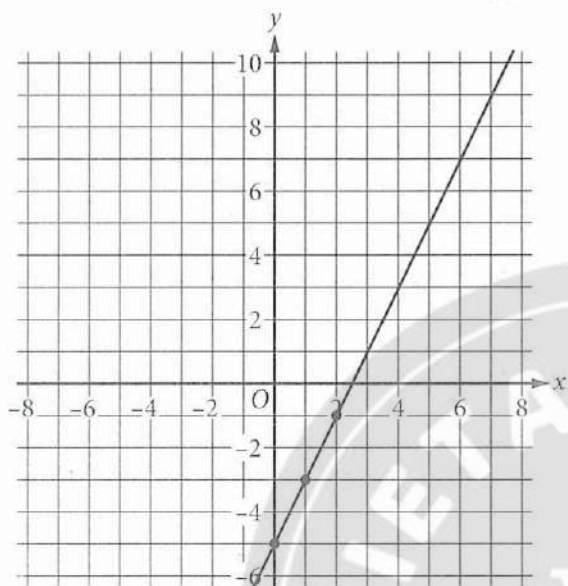
- A) $c = 11(d + 10)$
- B) $c = 10(d + 11)$
- C) $c = 11d + 10$
- D) $c = 10d + 11$

9

Which expression is equivalent to $\frac{4}{4x-5} - \frac{1}{x+1}$?

- A) $\frac{1}{(x+1)(4x-5)}$
- B) $\frac{3}{3x-6}$
- C) $-\frac{1}{(x+1)(4x-5)}$
- D) $\frac{9}{(x+1)(4x-5)}$

10



The graph shows the linear relationship between x and y . Which table gives three values of x and their corresponding values of y for this relationship?

A)

x	y
0	0
1	-7
2	-9

B)

x	y
0	0
1	-3
2	-1

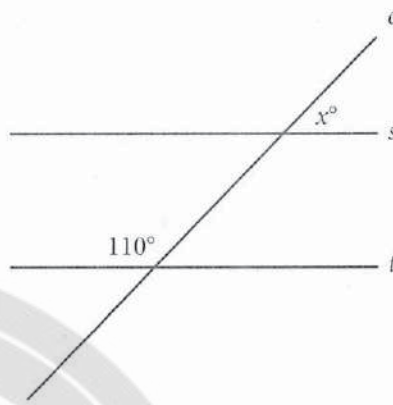
C)

x	y
0	-5
1	-7
2	-9

D)

x	y
0	-5
1	-3
2	-1

11



Note: Figure not drawn to scale.

In the figure shown, line c intersects parallel lines s and t . What is the value of x ?

12

What is the perimeter, in inches, of a rectangle with a length of 4 inches and a width of 9 inches?

- A) 13
B) 17
C) 22
D) 26

13

$$8j = k + 15m$$

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

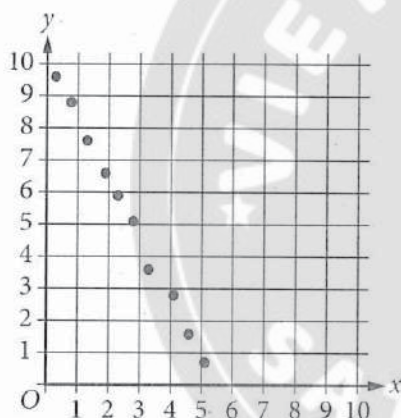
- A) $j = \frac{k}{8} + 15m$
B) $j = k + \frac{15m}{8}$
C) $j = 8(k + 15m)$
D) $j = \frac{k + 15m}{8}$

14

The point $(8, 2)$ in the xy -plane is a solution to which of the following systems of inequalities?

- A) $x > 0$
 $y > 0$
- B) $x > 0$
 $y < 0$
- C) $x < 0$
 $y > 0$
- D) $x < 0$
 $y < 0$

15



Which of the following equations is the most appropriate linear model for the data shown in the scatterplot?

- A) $y = -1.9x - 10.1$
- B) $y = -1.9x + 10.1$
- C) $y = 1.9x - 10.1$
- D) $y = 1.9x + 10.1$

16

A company opens an account with an initial balance of \$36,100.00. The account earns interest, and no additional deposits or withdrawals are made. The account balance is given by an exponential function A , where $A(t)$ is the account balance, in dollars, t years after the account is opened. The account balance after 13 years is \$68,071.93. Which equation could define A ?

- A) $A(t) = 36,100.00(1.05)^t$
- B) $A(t) = 31,971.93(1.05)^t$
- C) $A(t) = 31,971.93(0.05)^t$
- D) $A(t) = 36,100.00(0.05)^t$

17

$$2|4 - x| + 3|4 - x| = 25$$

What is the positive solution to the given equation?

18

The expression $90y^5 - 54y^4$ is equivalent to $ry^4(15y - 9)$, where r is a constant. What is the value of r ?

19

The area A , in square centimeters, of a rectangular cutting board can be represented by the expression $w(w + 9)$, where w is the width, in centimeters, of the cutting board. Which expression represents the length, in centimeters, of the cutting board?

- A) $w(w + 9)$
- B) w
- C) 9
- D) $(w + 9)$

20

$$y > 13x - 18$$

For which of the following tables are all the values of x and their corresponding values of y solutions to the given inequality?

A)

x	y
3	21
5	47
8	86

B)

x	y
3	26
5	42
8	86

C)

x	y
3	16
5	42
8	81

D)

x	y
3	26
5	52
8	91

21

Function f is defined by $f(x) = (x + 6)(x + 5)(x + 1)$. Function g is defined by $g(x) = f(x - 1)$. The graph of $y = g(x)$ in the xy -plane has x -intercepts at $(a, 0)$, $(b, 0)$, and $(c, 0)$, where a , b , and c are distinct constants. What is the value of $a + b + c$?

- A) -15
B) -9
C) 11
D) 15

22

A square is inscribed in a circle. The radius of the circle is $\frac{20\sqrt{2}}{2}$ inches. What is the side length, in inches, of the square?

- A) 20
B) $\frac{20\sqrt{2}}{2}$
C) $20\sqrt{2}$
D) 40

STOP

If you finish before time is called, you may check your work on this module only.
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The SAT[®]

Practice Test #3

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 B is the best answer because it most logically completes the text's discussion of Marilyn Dingle's baskets. In this context, to say that Dingle's baskets are "handmade from" particular plants means that Dingle creates baskets herself using those plants but without using machines. The text says that Dingle "skillfully winds" parts of palmetto palm plants around sweetgrass plants to make baskets with an appearance that "no factory can reproduce." This context suggests that Dingle's baskets are handmade from sweetgrass and palmetto palm.

Choice A is incorrect because the text describes how Dingle uses sweetgrass and palmetto palm to create her baskets, not how her baskets are "indicated by," or signified by, sweetgrass and palmetto palm. **Choice C** is incorrect. Although Dingle's baskets are described as being made using sweetgrass and palm, there's nothing in the text to suggest that the baskets are "represented by," or exemplified or portrayed by, sweetgrass and palmetto palm. Instead, the focus of the text is on Dingle's use of sweetgrass and palmetto palm and the impossibility of replicating the appearance of her baskets using machines. **Choice D** is incorrect because there's nothing in the text to suggest that Dingle's baskets are "collected with," or brought together in a group with, sweetgrass and palmetto palm. Instead, the text describes how Dingle uses those plants to make her baskets.

QUESTION 2

Choice D is the best answer because it logically completes the text's discussion about genes related to hibernation. In this context, "dormant" means inactive. The text explains that the same genes that enable certain nonhuman mammal species to hibernate during the winter by altering their bodily processes are also found in our species but have "essentially no effect" on humans' bodily processes. In other words, these genes don't function in humans.

Choice A is incorrect because in this context, "decisive" means has the power to affect the outcome of something, but the text states that genes related to hibernation are instead inactive in humans—that is, the genes don't affect humans' bodily processes, although they are present in their bodies. **Choice B** is incorrect because in this context, "lacking" means missing, but the text states that the genes are present in humans, though inactive. **Choice C** is incorrect because "variable" means characterized by the potential to change, but the text indicates that these genes don't change in their effect on humans' bodily processes; instead, the genes are consistently inactive in humans.

QUESTION 3

Choice C is the best answer because it most logically completes the discussion of the artist Diego Velázquez's influence outside Spain. As used in this context, "confined to" means restricted to. The text says that Velázquez was the leading artist in the Spanish court during the seventeenth century, but it also notes that other painters around the world were influenced by his techniques and style. Thus, Velázquez's influence was hardly (or almost not) confined to, or restricted to, Spain.

Choice A is incorrect because if Velázquez was a leading artist in Spain, it doesn't make logical sense to claim that his influence was hardly (or almost not) derived from, or obtained from, Spain. Moreover, the other painters around the world who employed Velázquez's techniques would by definition be influenced by Spanish style. **Choice B** is incorrect because if Velázquez was a leading artist in the court of King Philip IV of Spain, then his influence must have been widely recognized, or acknowledged, rather than being hardly (or almost not) recognized. **Choice D** is incorrect because the text gives no indication that deliberately limiting Velázquez's influence outside Spain was ever considered by anyone. Thus, even if it is true that his influence was not repressed, or restrained, it doesn't make logical sense to say so in this context.

QUESTION 4

Choice B is the best answer because it most logically completes the discussion of Octavia Butler's career. In this context, "impenetrable" means impossible to enter. The text indicates that the field of science fiction was dominated by white males when Butler, a Black woman, started writing, but she published several science fiction short stories and a novel and later won a prestigious award; that is, Butler pursued science fiction writing and had success. This context suggests that Butler didn't view the genre as impossible to enter.

Choice A is incorrect. In this context, "legitimate" would mean genuinely good or valid. Nothing in the text suggests that Butler didn't think the science fiction genre was good or valid; in fact, it indicates that she pursued and made a successful career of publishing work in that field. **Choice C** is incorrect. In this context, "compelling" would mean attracting or demanding attention. The text indicates that Butler chose to write science fiction, so it wouldn't make sense to say that she didn't see the field as drawing her attention. **Choice D** is incorrect. To say that Butler didn't consider science fiction "indecipherable," or impossible to understand, would suggest that Butler did understand it. However, the text doesn't address Butler's ability to interpret works in the genre; rather, it focuses on Butler's successful pursuit of writing science fiction.

QUESTION 5

Choice A is the best answer because as used in the text, "assumed" most nearly means acquired, or came to possess. The text portrays a character named Drowne carving a figure out of wood. At first "irregular and misty," or haphazard and indistinct, the figure's outline gradually showed "distincter grace and beauty" until the general design of the carved object "was now obvious to the common eye," or plainly recognizable to anyone. In other words, as Drowne continued to carve, the wooden object came to possess, or acquired, greater precision, changing from an indistinct outline or shape into a graceful, beautiful, and clearly recognizable form.

Choice B is incorrect. Although in some contexts "assumed" can mean acknowledged, or recognized, it doesn't have that meaning in this context because an inanimate object like the wooden figure can't acknowledge its own precision. **Choice C** is incorrect because there's nothing in the text to suggest

that the wooden figure merely imitated, or mimicked, precision. Rather, the text suggests that as Drowne carved his wooden figure, it gradually became more precise. *Choice D* is incorrect. Although in some contexts “assumed” can mean speculated, or supposed based on incomplete information, it doesn’t have that meaning in this context because an inanimate object like the wooden figure can’t speculate about its own precision.

QUESTION 6

Choice D is the best answer because it best describes the overall structure of the text. The speaker begins by stating that he has heard that others are accusing him of seeking to destroy institutions. The speaker then addresses this criticism by stating that he is “neither for nor against institutions.” Instead, the speaker states that his ultimate goal is to instill “the institution of the dear love of comrades” everywhere in the country. Therefore, the overall structure of the text is best described as an address of criticism followed by an announcement of a grand ambition.

Choice A is incorrect. While the speaker does address an opinion of him that he believes to be untrue, he doesn’t indicate that this attitude has become increasingly prevalent. The speaker also concludes by explaining his goal for the future rather than his current worldview. *Choice B* is incorrect because the text doesn’t portray the speaker as isolated or regretful, and the speaker gestures toward a hope for societal change but doesn’t offer an explicit prediction that it will happen. *Choice C* is incorrect because the speaker addresses a criticism of him that he believes to be false; he doesn’t admit any personal shortcomings. Moreover, the speaker concludes by stating a goal he has rather than showcasing his achievements.

QUESTION 7

Choice A is the best answer because it presents an explanation that is directly stated in the text for why ecologists are worried about Pando. The text states that Pando is a colony of about 47,000 quaking aspen trees that represents one of the largest organisms on Earth. According to the text, ecologists are worried that Pando’s growth is declining, partly because animals are feeding on the trees. In other words, the ecologists are worried that Pando isn’t growing at the same rate it used to.

Choice B is incorrect. Rather than indicating that Pando isn’t producing young trees anymore, the text reveals that Pando is indeed producing young trees, stating that those trees can be protected from grazing deer by strong fences. *Choice C* is incorrect because the text states that fences can be used to prevent deer from eating Pando’s young trees, not that Pando itself can’t grow in new areas because it’s blocked by fences. *Choice D* is incorrect because the text offers no evidence that Pando’s root system is incapable of supporting new trees or is otherwise a cause of worry for ecologists.

QUESTION 8

Choice A is the best answer because it explains how the researchers determined the level of surprise displayed by the cats in the study. The text states that Saho Takagi and colleagues played recordings of the voice of each cat’s owner and measured how surprised the cat was by the recording based on how it moved its ears and head.

Choice B is incorrect because, as the text explains, the recordings played for each cat in the study were of the voice of the cat’s owner, not a stranger’s voice. *Choice C* is incorrect because the text explains that during the study,

the cats didn't interact directly with their owners; instead, the cats listened to recordings of their owners' voices. **Choice D** is incorrect because the text doesn't indicate that the researchers monitored the cats' movement around the room in which the study was conducted.

QUESTION 9

Choice A is the best answer because it most accurately states the main idea of the text. The text describes the book *Vibration Cooking: or, the Travel Notes of a Geechee Girl* as Smart-Grosvenor's "most influential project" and as "unusual for its time." The text also notes that the book and author have influenced contemporary approaches to writing about food and cooking. Therefore, the text mainly conveys that *Vibration Cooking: or, the Travel Notes of a Geechee Girl* is an unconventional and important contribution to food writing.

Choice B is incorrect. Although the text mentions that Smart-Grosvenor worked in national public television and radio and was a food writer, these details aren't the main focus. Rather than focusing on Smart-Grosvenor's various jobs, the text focuses specifically on one specific book she wrote. **Choice C** is incorrect. Although the text suggests that *Vibration Cooking: or, the Travel Notes of a Geechee Girl* was groundbreaking, it doesn't suggest that the book didn't receive praise when it was published. In fact, the text states that the book is "long admired." **Choice D** is incorrect because the text states that Smart-Grosvenor was a culinary anthropologist and that her book influenced later approaches to food writing but doesn't indicate that Smart-Grosvenor or her book influenced people to begin cooking for themselves.

QUESTION 10

Choice D is the best answer because it most effectively uses a quotation from *O Pioneers!* to illustrate the claim that Alexandra Bergson takes comfort in understanding the world around her. In the quotation, Alexandra is described as enjoying looking at the stars and feeling a "sense of personal security" when she contemplates nature's order and its governing laws. This suggests that Alexandra takes comfort in understanding the world around her.

Choice A is incorrect because the quotation expresses how Alexandra Bergson attempts to meet difficult situations with determination, not how she takes comfort in understanding the world around her. **Choice B** is incorrect because the quotation expresses "how much the country meant to" Alexandra Bergson, not how she takes comfort in understanding the world around her. In detailing some of the wildlife surrounding Alexandra, the quotation conveys that nature is important to her but not necessarily that it gives her comfort. **Choice C** is incorrect because the quotation describes Alexandra driving her wagon down a highway at night; it doesn't describe how she takes comfort in understanding the world around her or address how she's feeling as she drives off.

QUESTION 11

Choice A is the best answer because it presents the conclusion that most logically completes the text's discussion about the significance of the cupid found at Pompeii. The text indicates that the cupid is near a statue of a female figure who is fishing, and it goes on to indicate that because Venus is associated with cupids, some scholars believe the female figure to be the goddess Venus. But the text then says that, according to archaeologist Carla Brain, cupids may have also been associated with the activity of fishing, which, if true, would suggest that the mere appearance of a cupid near a female figure engaged in fishing does not indicate with certainty that the figure is Venus (that is, the cupid might be associated with fishing, and the figure might be anyone at all).

Choice B is incorrect because the text says nothing about how often Venus was depicted fishing in Roman art: it only implies that in certain instances a female figure may or may not be Venus. *Choice C* is incorrect because Carla Brain's proposed explanation for the presence of the cupids makes no reference to the female figure, and so the possibility that the figure in the artworks is in fact Venus cannot be definitively eliminated. *Choice D* is incorrect because there is nothing in the text to suggest that the only reasonable way to interpret the figure is as Venus.

QUESTION 12

Choice B is the best answer because it most logically completes the text's discussion of Anita Allen's argument about judges citing philosophers in their judicial opinions. The text indicates that judges sometimes cite philosophers when writing their judicial opinions and that, according to Allen, judges tend to cite philosophers whose views are in agreement with those of the judges themselves. Allen claims, however, that the best judicial opinions consider potential objections and rebut them, which suggests that judges may be able to strengthen their opinions by including discussions of philosophers with views contrary to their own.

Choice A is incorrect because Allen's claim is that judges could improve their judicial opinions by citing philosophers who disagree with the views expressed in the opinions, which would necessarily require judges to consult philosophical works. *Choice C* is incorrect because there's no discussion in the text about making judicial opinions more easily understood by any particular group of readers. The focus of the text is on Allen's claim that judicial opinions could be strengthened by the inclusion of discussions of philosophers whose views disagree with those of the judges authoring the opinions. *Choice D* is incorrect because the text presents Allen's argument that discussing philosophers whose views judges disagree with could strengthen judicial opinions, not that doing so could bring those opinions into line with views that are popular among philosophers.

QUESTION 13

Choice A is the best answer because it most logically completes the text's discussion of the relative appeal of different kinds of plays by Shakespeare to today's audiences. According to the text, Shakespeare's tragedies address broad themes that continue to appeal to today's audiences. Indeed, the text suggests that these themes are timeless, as illustrated by the example of *Romeo and Juliet*, which the text states is still read and widely performed despite being set in the Italy of Shakespeare's time. In contrast, the text indicates that audiences and readers may need to be familiar with several centuries of English history in order to understand Shakespeare's history plays. Because many theatergoers and readers are unlikely to possess such extensive historical knowledge, it follows that they are likely to find Shakespeare's history plays less engaging than his more accessible tragedies.

Choice B is incorrect because the text never introduces a comparison between Shakespeare's tragedies and twentieth-century plays, only between Shakespeare's tragedies and his history plays. Since twentieth-century plays aren't mentioned, there's no basis in the text for the idea that some of Shakespeare's tragedies are more relevant than twentieth-century plays to today's audiences. *Choice C* is incorrect. Although the text indicates that *Romeo and Juliet* is thematically accessible to today's audiences, it doesn't suggest that *Romeo and Juliet* is more accessible than Shakespeare's other tragedies. Rather, the text presents *Romeo and Juliet* as an example

to support the idea that Shakespeare's tragedies hold continued appeal for today's readers and theatergoers. *Choice D* is incorrect. Although experts in English history would likely possess the knowledge needed to understand Shakespeare's history plays, the text never mentions such experts or suggests that they would enjoy the history plays more than Shakespeare's other works.

QUESTION 14

Choice C is the best answer. The convention being tested is punctuation between a main clause and a supplementary noun phrase. This choice correctly uses a comma to mark the boundary between the main clause ("scholar...materialism") and the supplementary noun phrase ("an apt assessment") that describes Waid's observation about how *The House of Mirth* depicts the upper classes of New York society.

Choice A is incorrect because a semicolon and the conjunction "and" can't be used in this way to mark the boundary between a main clause and a supplementary noun phrase. *Choice B* is incorrect. Joining the main clause ("scholar...materialism") and the following noun phrase with the conjunction "and" results in a confusing and illogical sentence that suggests that the novel depicts the upper classes of New York society as "an apt assessment," which doesn't make sense in this context. *Choice D* is incorrect because it fails to mark the boundary between the main clause and the supplementary noun phrase with appropriate punctuation.

QUESTION 15

Choice A is the best answer. The convention being tested is subject-modifier placement. This choice makes the noun phrase "researcher Robert Losey" the subject of the sentence and places it immediately after the modifying phrase "since...Siberia." In doing so, this choice clearly establishes that researcher Robert Losey—and not another noun in the sentence—is who uncovered fragments of a 2,000-year-old reindeer training harness in northern Siberia.

Choice B is incorrect because it results in a dangling modifier. The placement of the noun phrase "researcher Robert Losey's argument" immediately after the modifying phrase illogically suggests that the "argument" is what uncovered fragments of a 2,000-year-old reindeer training harness in northern Siberia. *Choice C* is incorrect because it results in a dangling modifier. The placement of the noun "domestication" immediately after the modifying phrase illogically suggests that "domestication" is what uncovered fragments of a 2,000-year-old reindeer training harness in northern Siberia. *Choice D* is incorrect because it results in a dangling modifier. The placement of the noun phrase "the argument" immediately after the modifying phrase illogically suggests that the "argument" is what uncovered fragments of a 2,000-year-old reindeer training harness in northern Siberia.

QUESTION 16

Choice D is the best answer. The convention being tested is punctuation between a supplementary phrase and a main clause. This choice correctly uses a comma to mark the boundary between the supplementary phrase ("A conceptual artist...world"), which describes Mary Ping, and the main clause ("Mary...America").

Choice A is incorrect because it fails to mark the boundary between the supplementary phrase ("A conceptual artist...world") and the main clause ("Mary...America") with appropriate punctuation. *Choice B* is incorrect because a colon can't be used in this way to join the supplementary phrase

("A conceptual artist...world") and the main clause ("Mary...America"). In this context, the colon incorrectly suggests that the information in the supplementary phrase is an explanation or amplification of the information in the main clause (Mary Ping being chosen to curate the exhibition), which isn't the case. *Choice C* is incorrect because a semicolon can't be used in this way to join the supplementary phrase ("A conceptual artist...world") and the main clause ("Mary...America"). Semicolons are conventionally used to separate two main clauses or to separate items in a complex series.

QUESTION 17

Choice D is the best answer. The convention being tested is subject-verb agreement and agreement between nouns. The singular verb "is" and the singular noun "version" both agree in number with the relative pronoun "which." In this context, "which" functions as a singular subject because it refers to the singular noun "the Nerf football."

Choice A is incorrect because the plural verb "were" doesn't agree in number with the singular noun phrase "the Nerf football" that it's modifying. *Choice B* is incorrect because the plural verb "are" and the plural noun "versions" don't agree in number with the singular noun phrase "the Nerf football" that they're modifying. *Choice C* is incorrect because the plural verb "were" and the plural noun "versions" don't agree in number with the singular noun phrase "the Nerf football" that they're modifying.

QUESTION 18

Choice D is the best answer. The convention being tested is punctuation use between two supplementary phrases following the coordinate clause ("but she...mycology"). This choice correctly uses a comma to mark the boundary between the supplementary noun phrase ("the study of fungi") that defines the term "mycology" and the supplementary participial phrase ("producing...London") that provides additional information about the extent to which Potter dedicated herself to mycology.

Choice A is incorrect because a semicolon can't be used in this way to join two supplementary phrases following a coordinate clause. *Choice B* is incorrect because it results in a rhetorically unacceptable sentence fragment beginning with "producing." *Choice C* is incorrect. The lack of punctuation results in a sentence that illogically suggests that the study of fungi is producing more than 350 paintings.

QUESTION 19

Choice C is the best answer. The convention being tested is subject-modifier placement. This choice makes the noun phrase "Julian's 1935 synthesis" the subject of the sentence and places it immediately after the modifying phrase "named...years." In doing so, this choice clearly establishes that Julian's 1935 synthesis of the alkaloid physostigmine—and not another noun in the sentence—was named in 1999 as one of the greatest achievements by a US chemist in the past hundred years.

Choice A is incorrect because it results in a dangling modifier. The placement of the noun "Julian" immediately after the modifying phrase illogically suggests that Julian himself was named as one of the greatest achievements by a US chemist in the past hundred years. *Choice B* is incorrect because it results in a dangling modifier. The placement of the prepositional phrase "in 1935" immediately after the modifying phrase illogically and confusingly suggests

that “in 1935” was named as one of the greatest achievements by a US chemist in the past hundred years. *Choice D* is incorrect because it results in a dangling modifier. The placement of the noun phrase “the alkaloid physostigmine” immediately after the modifying phrase illogically and confusingly suggests that the alkaloid physostigmine itself (not the synthesis of it) was named as one of the greatest achievements by a US chemist in the past hundred years.

QUESTION 20

Choice C is the best answer. The convention being tested is punctuation use between sentences. In this choice, the period is used correctly to mark the boundary between the first sentence (“The...adjustments”) and the second sentence (“Prior...days”). Because the adverbial phrase beginning with “prior” indicates when changing a spreadsheet required redoing the sheet by hand, that phrase belongs with the second sentence.

Choice A is incorrect because it results in a run-on sentence. Two sentences are fused without punctuation and/or a conjunction. *Choice B* 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 D* is incorrect. Without a comma preceding it, the conjunction “and” can’t be used in this way to join the sentences.

QUESTION 21

Choice B is the best answer. “Next” logically signals that the action described in this sentence—Konkoly recording participants’ eye movements—is the next step in Konkoly’s experiment.

Choice A is incorrect because “specifically” illogically signals that this sentence specifies or elaborates on an aspect of the action described in the previous sentence. Instead, it describes the next step in Konkoly’s experiment. *Choice C* is incorrect because “for instance” illogically signals that the action described in this sentence is an example of the action described in the previous sentence. Instead, it is the next step in Konkoly’s experiment. *Choice D* is incorrect because “in sum” illogically signals that this sentence summarizes or concludes the action described in the previous sentence. Instead, it describes the next step in Konkoly’s experiment.

QUESTION 22

Choice D is the best answer. “Second” logically signals that the information in this sentence—that the effort to bury the ship would likely only have been made for a king—joins the information in the previous sentence (“first...”) in supporting Brunning’s claim that the burial site was likely the tomb of a king.

Choice A is incorrect because “instead” illogically signals that the information in this sentence presents an alternative or substitute to the previous information about the gold artifacts inside the ship. Rather, this sentence presents a second piece of information that supports Brunning’s claim.

Choice B is incorrect because “still” illogically signals that the information in this sentence exists in contrast to or despite the previous information about the gold artifacts inside the ship. Instead, this sentence presents a second piece of information that supports Brunning’s claim. *Choice C* is incorrect because “specifically” illogically signals that the information in this sentence specifies or elaborates on the previous information about the gold artifacts inside the ship. Instead, this sentence presents a second piece of information that supports Brunning’s claim.

QUESTION 23

Choice C is the best answer. “Thus” logically signals that the action described in this sentence—the researcher being able to determine the chemical makeup of the planet’s bright regions based on how they reflect light—is a result or consequence of the previous information about spectroscopic fingerprints.

Choice A is incorrect because “regardless” illogically signals that the action described in this sentence occurs despite the previous information about spectroscopic fingerprints. Instead, the finding in this sentence is a result or consequence of that information. **Choice B** is incorrect because “meanwhile” illogically signals that the action described in this sentence either occurs at the same time as or offers an alternative to the previous information about spectroscopic fingerprints. Instead, the finding in this sentence is a result or consequence of that information. **Choice D** is incorrect because “in comparison” illogically signals that the action described in this sentence is being compared with the previous information about spectroscopic fingerprints. Instead, the finding in this sentence is a result or consequence of that information.

QUESTION 24

Choice A is the best answer. The sentence emphasizes the significance of Ochoa’s discovery, noting that it proved critical to deciphering the human genetic code, which resulted in a better understanding of how genetic variations affect human health.

Choice B is incorrect. While the sentence explains what Ochoa discovered, it doesn’t emphasize the significance of the discovery. **Choice C** is incorrect. While the sentence explains what Ochoa discovered, it doesn’t emphasize the significance of the discovery. **Choice D** is incorrect. While the sentence mentions that Ochoa’s discovery was crucial, it emphasizes Ochoa’s incorrect hypothesis, not the significance of the discovery.

QUESTION 25

Choice D is the best answer. The sentence uses “whereas” to contrast the emissivities of the two fibers, noting that the emissivity of the reflective metal fibers was just 0.02, far lower than that of the silicon carbide fibers (0.74).

Choice A is incorrect. The sentence emphasizes the ability of reflective metal fibers and silicon carbide fibers to emit heat; it doesn’t contrast the emissivities of the two fibers. **Choice B** is incorrect. The sentence states a law of thermodynamics: the amount of heat a material absorbs is equal to the amount it emits. The sentence doesn’t contrast the emissivity of reflective metal fibers with that of silicon carbide fibers. **Choice C** is incorrect. While the sentence includes a generalization about the emissivities of reflective metal fibers and silicon carbide fibers, it emphasizes Abebe’s plans for their use in a garment; it doesn’t contrast the emissivities of the two fibers.

QUESTION 26

Choice D is the best answer. The sentence presents the significance of the Hart-Celler Act to an audience unfamiliar with the history of US immigration, noting that the 1965 act abolished the national-origins quota system and explaining why that mattered, historically: because the old quota system had favored immigrants from northern Europe.

Choice A is incorrect. The sentence describes an aspect of immigration policy at the time the Hart-Celler Act was proposed; it doesn't present the significance of the Hart-Celler Act to an audience unfamiliar with the history of US immigration. *Choice B* is incorrect. The sentence describes an aspect of immigration policy before the Hart-Celler Act; it doesn't describe or present the significance of the act to an audience unfamiliar with the history of US immigration. *Choice C* is incorrect. While the sentence indicates that the Hart-Celler Act abolished the old quota system, it doesn't explain the act or the quota system to an audience unfamiliar with the history of US immigration.

QUESTION 27

Choice C is the best answer. The sentence explains an advantage of the "Women and the Vote" format, noting that the format appealed to audiences because it allowed them to control the experience.

Choice A is incorrect. The sentence describes a digital drawing on the "Women and the Vote" website; it doesn't explain an advantage of the play's format.

Choice B is incorrect. The sentence explains how audiences interacted with the "Women and the Vote" website; it doesn't explain an advantage of the play's format. *Choice D* is incorrect. While the sentence mentions that "Women and the Vote" had an interactive format, it doesn't explain what advantage this format might have.



Reading and Writing

Module 2

(27 questions)

QUESTION 1

Choice B is the best answer because it most logically completes the text's discussion of Jacob Lawrence's artistic process. In this context, "observant" means watchful and perceptive. The text emphasizes that the "close attention" Lawrence paid to "all the details" of his neighborhood allowed him to reflect subtle elements of "the beauty and vitality of the Black experience" in his artwork. This context indicates that being observant of his surroundings was an important part of Lawrence's work as an artist.

Choice A is incorrect because the text gives no indication that Lawrence was "skeptical," or had an attitude of doubt in general or about particular things, let alone that skepticism was important to him as an artist. Rather than indicating that he was skeptical, the text focuses on how Lawrence paid careful attention to everything around him and reflected his observations in his artwork.

Choice C is incorrect because the text gives no indication that Lawrence was "critical," which in this context would mean inclined to criticize harshly or unfairly. Rather than indicating that Lawrence found fault in things, the text suggests that he paid careful attention to everything around him and that his artwork reflects this careful attention. **Choice D** is incorrect because the text doesn't suggest that Lawrence was "confident," or self-assured. Rather than addressing how Lawrence felt about himself and how that feeling affected his artistic process, the text emphasizes the careful attention Lawrence paid to everything around him—attention that allowed him to capture subtle elements of a particular place and time in his artwork.

QUESTION 2

Choice B is the best answer because it most logically completes the text's discussion of the work of particle physicists. In this context, "inspecting" means viewing closely in order to examine. The text indicates that as particle physicists, Arce and El-Khadra's work involves using advanced technology to "closely examine" subatomic particles. In other words, they use technology to inspect small parts of matter that can't be seen by the naked eye.

Choice A is incorrect because nothing in the text suggests that Arce and El-Khadra spend time "selecting," or choosing, subatomic particles for some purpose; the text simply states that the particle physicists use advanced technology to see and study the behavior of those tiny parts of matter. **Choice C** is incorrect because nothing in the text suggests that Arce and El-Khadra

spend time “creating” subatomic particles, or bringing them into existence; the text simply states that the particle physicists use advanced technology to see and study the behavior of those tiny parts of matter. *Choice D* is incorrect. In this context, “deciding” would mean making a final choice or judgment about something. It wouldn’t make sense to say that particle physicists get to choose what is and isn’t visible to the naked eye, especially when the text presents it as fact that subatomic particles are “the smallest detectable parts of matter” and would therefore be invisible. The text focuses on Arce and El-Khadra’s close observation of those particles, not on any decisions they might make.

QUESTION 3

Choice C is the best answer because it most logically completes the text’s discussion of Annie Dodge Wauneka’s work as a Navajo Nation legislator. As used in this context, “persistent” means existing continuously. The text states that Wauneka “continuously worked to promote public health,” traveling extensively and authoring a medical dictionary; this indicates that Wauneka’s effort was persistent.

Choice A is incorrect because describing Wauneka’s effort related to public health as “impartial,” or not partial or biased and treating all things equally, wouldn’t make sense in context. The text suggests that Wauneka’s continuous work was partial in one way, as she focused specifically on promoting public health throughout the Navajo homeland and to speakers of the Navajo language. *Choice B* is incorrect because the text emphasizes that Wauneka’s effort to promote public health as a Navajo Nation legislator was continuous and extensive, involving wide travels and the authoring of a medical dictionary. Because this work clearly involved care and dedication, it wouldn’t make sense to describe it as “offhand,” or casual and informal. *Choice D* is incorrect because nothing in the text suggests that Wauneka’s effort to promote public health was “mandatory,” or required by law or rule, even though Wauneka was a Navajo Nation legislator. Rather than suggesting that Wauneka’s effort was required for any reason, the text emphasizes the continuous and extensive nature of her work.

QUESTION 4

Choice B is the best answer because it most logically completes the text’s discussion about recycling plastics. In this context, “inadequate” means not satisfactory. The text indicates that the mechanical plastic-recycling process affects the environment and causes “the loss of material quality.” The text contrasts that with Chazovachii’s chemical plastic-recycling process, which is cleaner and produces a desirable product. The text’s emphasis on the negative aspects of mechanical recycling suggests that it is inadequate in terms of environmental impact and the quality of the material the process yields.

Choice A is incorrect because in this context “resilient” would mean able to withstand difficulty and the text does not characterize the plastic-recycling process as having this quality or describe any difficulties that these processes might need to overcome. *Choice C* is incorrect because in this context “dynamic” would mean constantly changing. Although the text suggests that there have been changes in the field of recycling, as is the case with the advent of Chazovachii’s chemical recycling process, there is nothing to suggest that the mechanical process itself has changed or is prone to change. *Choice D* is incorrect because in this context “satisfactory” would mean acceptable but not perfect. The text mentions only shortcomings of the mechanical process (environmental effects and lower material quality), so the text more strongly supports a negative view of this process and provides no evidence that it would be considered satisfactory.

QUESTION 5

Choice D is the best answer because it most logically completes the text's discussion of Jemisin's writing. In this context, "conform to" means to act in accordance with something. The text suggests that in her science fiction writing, Jemisin's willingness to go against expectations and not use plots and themes that seem to follow a formula reflects how she treats the standard practices of the genre. This context conveys that Jemisin chooses not to act in accordance with those conventions.

Choice A is incorrect. In this context, "question" would mean doubt or object to. The text indicates that Jemisin is willing to go against expectations and not use formulaic plots and themes in her science fiction writing, suggesting that she may actually object to those conventions of the genre, not that she chooses not to question them. **Choice B** is incorrect because the text indicates that in her science fiction writing, Jemisin is willing to go against expectations and not use formulaic plots and themes. Rather than suggesting that Jemisin chooses not to "react to," or act in response to, the standard practices of the genre, this context suggests that she is acting in response to such conventions by deliberately avoiding them. **Choice C** is incorrect. In this context, "perceive" would mean become aware of or understand. The text indicates that in her science fiction writing, Jemisin is willing to go against expectations and not use formulaic plots and themes. This context conveys that Jemisin is aware of and deliberately avoids those conventions of the genre, not that she chooses not to be aware of them.

QUESTION 6

Choice A is the best answer because it most logically completes the text's discussion of letters allegedly exchanged between President Lincoln and Rutledge. In this context, "validate" means to confirm that something is real or correct. According to the text, it was alleged, or claimed, that the newly discovered letters had been written by Lincoln and Rutledge. The text also indicates that historians ultimately decided the letters were a hoax, or fraudulent. This context suggests that the historians couldn't confirm that the letters were authentic.

Choice B is incorrect. The text focuses on the authenticity of the letters, which were claimed to have been written by Lincoln and Rutledge and were then quickly dismissed as fraudulent by historians. Rather than conveying that the historians simply weren't able to "interpret," or explain in an understandable way, the letters' authenticity, the text suggests that the historians decided the letters lacked authenticity altogether. **Choice C** is incorrect. The text states that the historians quickly dismissed the letters claimed to have been written by Lincoln and Rutledge as fraudulent; this suggests that rather than being unable to "relate," or tell others about, the letters' authenticity, the historians were able to share what they'd decided about the letters. **Choice D** is incorrect because it wouldn't make sense to suggest that the historians couldn't "accommodate," or give consideration to, the authenticity of the letters claimed to have been written by Lincoln and Rutledge; the text states that the historians decided that the letters were fraudulent, which indicates that they *did* consider whether the letters were authentic.

QUESTION 7

Choice D is the best answer because it accurately states the text's main purpose. The poem begins with the speaker urging a child to "go forth" with her encouragement ("my heart's desire"). The speaker goes on to suggest that new experiences ("Great reaches, yet unknown") lie ahead for the son that "life is calling" him to seek out. Thus, the main purpose is to encourage a child to embrace the experiences available to him in his life.

Choice A is incorrect because the speaker encourages the child to pursue new experiences ("Great reaches") without knowing exactly what those experiences will be ("yet unknown") or suggesting that they should match the speaker's own accomplishments. *Choice B* is incorrect because the speaker focuses on positive possibilities for her son ("Great reaches, yet unknown") and her enthusiastic encouragement to embrace those possibilities ("life is calling you!"), while there is no mention of raising a child or associated struggles. *Choice C* is incorrect because the speaker frames the possibilities for her son in a positive light when she says that "great reaches, yet unknown" are waiting for him, and this positive outlook for the son is consistent throughout the text.

QUESTION 8

Choice A is the best answer because it most accurately states the main purpose of the text. After providing a brief introduction to computer scientist Luis von Ahn, the text focuses on discussing how von Ahn's digitization work led to the invention of a digital security test known as reCAPTCHA.

Choice B is incorrect because the text doesn't address how digital scanners work. *Choice C* is incorrect. Although the text mentions von Ahn's book-digitizing project, that information is provided as a detail, not as the main purpose of the text. *Choice D* is incorrect because the text doesn't provide any indication of reCAPTCHA's popularity; instead, it describes reCAPTCHA's origin.

QUESTION 9

Choice A is the best answer because it reflects what the paleontologists in Text 2 would most likely say about what the researchers in Text 1 initially thought. Text 1 focuses on the discovery of a strange fossil consisting of the skull of the extinct species *Oculudentavis khaungraae*. According to Text 1, the fossil has features that appear to be avian, or related to birds, which led researchers to initially think that the fossil might be a very small avian dinosaur. Text 2 begins by noting the discovery of a second fossil similar to the one discussed in Text 1, then explains that based on detailed studies of both fossils, paleontologists think that the two creatures were probably unusual lizards, even though the skulls appeared avian at first. This suggests that the paleontologists in Text 2 recognize that the fossils do indeed look like they could be related to birds. For this reason, the paleontologists in Text 2 would most likely say that the initial thought of the researchers in Text 1—that the fossil was avian—is understandable, even if the fossil is probably not avian but rather is from a lizard.

Choice B is incorrect because Text 2 indicates that the fossils initially looked avian, so the paleontologists described in Text 2 wouldn't be confused by the researchers in Text 1 initially thinking that *O. khaungraae* might be related to birds. The paleontologists would find that initial thought understandable, not confusing. *Choice C* is incorrect because Text 1 never mentions lizards, so it wouldn't make sense for the paleontologists in Text 2 to say that the researchers in Text 1 mistakenly assumed that *O. khaungraae* must be a lizard. *Choice D* is incorrect. Although the paleontologists in Text 2 might agree that the initial thought of the researchers in Text 1 was reasonable, nothing in Text 2 suggests that the two skulls were shaped differently.

QUESTION 10

Choice C is the best answer because it presents a description of how the human mind is like a flower that is directly supported by the text. The text compares the needs of a "fragile and lovely flower" to those of the speaker's "tender mind": both need to be fed if they're going to survive. Without such

feeding, they'll "beginneth straightway to languish," or weaken. Thus, the text suggests that the human mind is like a flower in that they both need proper nourishment in order to thrive.

Choice A is incorrect because the text doesn't address the passage of time or describe either the human mind or a flower as becoming increasingly vigorous. *Choice B* is incorrect because the text doesn't suggest that human minds or flowers draw strength from changes in weather. The references to rain in the text pertain to a flower's need for water rather than the general effects of changing weather. *Choice D* is incorrect because the text doesn't suggest that the human mind or a flower will persist regardless of challenging circumstances. In fact, the text indicates that they'll both languish right away if not given what they need.

QUESTION 11

Choice C is the best answer because it most effectively uses data from the table to complete the statement about the forestry student's project. The table shows five types of maple trees, each tree's maximum height, and whether each tree is native to North America. The text indicates that the student needs to recommend a maple tree that's native to North America and won't reach a height greater than 60 feet. The red maple is the only tree listed in the table that meets these criteria: its maximum height is 60 feet—meaning that it won't grow higher than 60 feet—and it's native to North America.

Choice A is incorrect because the text states that the student needs to recommend a tree that's native to North America and won't grow higher than 60 feet, but the table shows that the maximum height of the silver maple is 70 feet. *Choice B* is incorrect because the text states that the student needs to recommend a tree that's native to North America and won't grow higher than 60 feet, but the table shows that the maximum height of the sugar maple is 75 feet. *Choice D* is incorrect because the text states that the student needs to recommend a tree that's native to North America and won't grow higher than 60 feet, but the table shows that the Norway maple isn't native to North America.

QUESTION 12

Choice C is the best answer because it would most directly support the student's claim about the motivation for including explanatory notes with the stand-alone volume of the poem. The text explains that the poem had previously been published without the notes in a quarterly journal. It stands to reason that readers who had purchased the journal issue containing the poem would be unlikely to purchase an unchanged version of the poem in a stand-alone volume. However, the inclusion of notes in that volume would encourage the purchase of a stand-alone volume, since the later text would differ from the original by including the author's own explanation of the poem. Therefore, if it were true that the publishers of the stand-alone volume had requested the notes to make the book attractive to readers who already had a copy of the journal issue, this fact would support the student's claim that the notes were included primarily as a marketing device.

Choice A is incorrect because the student's claim is about the motivation for including the explanatory notes in the stand-alone volume, not about changes that might have been made to the poem itself for publication in that volume; moreover, the text never suggests that such changes were made. *Choice B* is incorrect because the student's claim is about why the explanatory notes were included in the stand-alone volume, not about how the notes affected readers' and critics' subsequent experience of the poem. *Choice D* is incorrect because the fact that the poet drafted multiple versions of the explanatory notes doesn't

directly address the issue of whether the notes were intended as a marketing device, as the student claims; the correspondence would support this claim only if it showed that the poet had revised the notes specifically to make them useful to the marketing of the stand-alone volume.

QUESTION 13

Choice B is the best answer because it most effectively illustrates the claim that Amal imagines the people he sees are carefree even when engaged in work. In the quotation, Amal observes that the flower seller's daughter is "flower gathering," or working, as the text indicates. Moreover, Amal notes that the daughter's feet "seem so glad" and her "anklets jingle so merrily," suggesting that Amal believes that the flower seller's daughter is cheerful.

Choice A is incorrect because the quotation makes no observation about the cheerful mood of the flower seller's daughter. **Choice C** is incorrect because the quotation discusses how Amal envisions his future, not the feelings of the flower seller's daughter. **Choice D** is incorrect because the quotation discusses Amal's wishes, not the feelings of the flower seller's daughter.

QUESTION 14

Choice D is the best answer because it accurately describes data from the table that support Rodriguez and colleagues' assertion about the classifications of the five new gas exoplanets. The text describes two categories of gas planets: hot Jupiters, which have a mass of at least 0.25 Jupiters and an orbital period of less than 10 days, and warm Jupiters, which have the same mass characteristic but have orbital periods of more than 10 days. According to the table, four of the gas exoplanets discovered by Rodriguez and colleagues have a mass of at least 0.25 Jupiters and an orbital period of less than 10 days, while one of the planets has a mass of at least 0.25 Jupiters and an orbital period of more than 10 days. These data therefore support Rodriguez and colleagues' assertion that four of the new exoplanets are hot Jupiters and one is a warm Jupiter.

Choice A is incorrect because it doesn't accurately describe the data from the table. Although the table shows that TOI-628 b has a mass equivalent to 6.33 Jupiters, the table also shows that one of the planets—TOI-1478 b—does indeed have an orbital period of more than 10 days. **Choice B** is incorrect because it doesn't accurately describe the data from the table. Although the table does show that the masses of the five planets range from 0.85 to 6.33 Jupiters, the table also shows that TOI-1478 b has an orbital period of 10.180 days, not 153 days. **Choice C** is incorrect. According to the table, TOI-1333 b has an orbital period of only 4.720 days, not more than 10 days. Additionally, although the table does show that all the planets have a radius between 1.060 and 1.771 Jupiters, the text indicates that a planet may be classified as a hot Jupiter or a warm Jupiter based on its mass and orbital period, not on its radius, making the information about the range of the five planets' radius values irrelevant.

QUESTION 15

Choice A is the best answer because it uses data from the graph to effectively support Charles and Stephens's claim about how level of information affects voters. The graph shows the probability of voting for both high- and low-information voters in seven categories of political orientation. Charles and Stephens claim that "the more informed voters are about politics...the more likely they are to vote." This statement correctly asserts that the graph shows a

higher probability of voting for high-information voters than for low-information voters at each of the seven political orientations. Thus, this statement accurately cites data from the graph that support Charles and Stephens's claim about how level of information affects voters.

Choice B is incorrect. Although this statement is correct that the only probability in the graph below 50% is for low-information voters categorized as independent (orientation 4), the claim in question is about the relative likelihood that low- and high-information voters will vote, and without some reference to high-information voters, this statement cannot help support such a comparison. *Choice C* is incorrect. Although this statement is correct that the highest probabilities of voting for low-information voters are at the ends of the orientation scale (1 and 7), the claim in question is about the relative likelihood that low- and high-information voters will vote, and without some reference to high-information voters, this statement cannot help support such a comparison. *Choice D* is incorrect because the graph does not give any information about how many people are represented in any of the categories, so this statement is not based on data from the graph. Furthermore, even if we did have this information, the claim is about how level of information affects voters' probability of voting, not whether they're likely to strongly identify with a particular political party.

QUESTION 16

Choice D is the best answer because it presents a finding that, if true, would support the researchers' prediction about the language nest model of education. The text states that Morcom and Roy studied the effects of the language nest model of education on students at an Anishinaabe school, and they found that the model—which is used with students during pre-K or elementary school—increased students' fluency in the Anishinaabe language and pride in Anishinaabe culture. The researchers predicted that the students' positive early experiences with the Anishinaabe language would lead them to be more likely to later share the language with younger generations. If former students maintain full fluency and cultural pride after finishing secondary and higher education, it follows that they would be both able and motivated to share what they know with others; this would likely result in a higher probability of transmitting the language to younger generations, as the researchers predict.

Choice A is incorrect because finding that Anishinaabe adults who didn't attend the school feel approximately the same degree of cultural pride as those adults who did attend wouldn't support the researchers' prediction that former students will be more likely to share their knowledge with younger generations. This finding would identify a similarity between the groups rather than a factor that might make former students more likely than other adults to transmit the language to younger people. *Choice B* is incorrect because finding that new students experience increased performance in language fluency and academics would suggest that the school has a positive effect on students when they attended but wouldn't reveal anything about those students' later actions as adults (such as their likelihood of sharing their knowledge with younger generations). *Choice C* is incorrect because finding that Anishinaabe adults who attended the school are equally likely to stay in the community as adults who didn't attend the school wouldn't support the researchers' prediction that former students will be more likely to share their knowledge with younger generations. This finding would identify a similarity between the groups rather than a factor that might make former students more likely than other adults to transmit the language to younger people.

QUESTION 17

Choice A is the best answer because it most accurately describes Gibson's approach to art. As the text explains, Gibson, who is Cherokee and Choctaw, transforms punching bags into art pieces by applying (or attaching) to them beadwork and elements of Native dressmaking, including leather fringe and the jingles of the jingle dress. The text goes on to say that in most Native communities, the art forms of beadwork and dressmaking are traditionally practiced by women. Therefore, Gibson's approach to art consists of creating original works by drawing from traditional Native art forms.

Choice B is incorrect because the text doesn't indicate that Gibson designs dresses influenced by boxing but instead that he turns punching bags, which are used in boxing, into works of art by applying elements of Native dressmaking to them. **Choice C** is incorrect. Although Gibson does incorporate beadwork into his art, the text never mentions the colors or patterns that he uses or suggests that his art defies the expectations that people might have about color and pattern in beadwork. **Choice D** is incorrect. Because Gibson incorporates Native art forms into his own original artwork, it can be inferred that he has been influenced by other Native artists, but the text never suggests that non-Native artists have influenced him.

QUESTION 18

Choice B 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, "people in the Americas"), and this choice supplies the finite past perfect tense verb "have used" to indicate what people in the Americas used the gourd for.

Choice A is incorrect because the nonfinite to-infinitive "to use" doesn't supply the main clause with a finite verb. **Choice C** is incorrect because the nonfinite participle "having used" doesn't supply the main clause with a finite verb. **Choice D** is incorrect because the nonfinite participle "using" doesn't supply the main clause with a finite verb.

QUESTION 19

Choice B is the best answer. The convention being tested is the coordination of main clauses within a sentence. This choice correctly uses a comma and the coordinating conjunction "but" to join the first main clause ("the Alvarez...out") and the second main clause ("it left...extinctions").

Choice A is incorrect because when coordinating two longer main clauses such as these, it's conventional to use a comma before the coordinating conjunction. **Choice C** is incorrect because it results in a run-on sentence. The two main clauses are fused without punctuation and/or a conjunction. **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.

QUESTION 20

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, "embryos"), and this choice supplies the clause with the finite present tense verb "enter" to indicate how the embryos achieve diapause.

Choice B is incorrect because the nonfinite to-infinitive “to enter” doesn’t supply the main clause with a finite verb. *Choice C* is incorrect because the nonfinite participle “having entered” doesn’t supply the main clause with a finite verb. *Choice D* is incorrect because the nonfinite participle “entering” doesn’t supply the main clause with a finite verb.

QUESTION 21

Choice D is the best answer. The convention being tested is the use of verbs to express tense. In this choice, the present tense verb “is,” used in conjunction with the word “today,” correctly indicates that Paik is currently considered the first video artist.

Choice A is incorrect because the future-indicating verb “will be” doesn’t indicate that Paik is currently considered the first video artist. *Choice B* is incorrect because the past perfect tense verb “had been” doesn’t indicate that Paik is currently considered the first video artist. *Choice C* is incorrect because the past tense verb “was” doesn’t indicate that Paik is currently considered the first video artist.

QUESTION 22

Choice D is the best answer. The convention being tested is punctuation between a verb and a preposition. When, as in this case, a verb (“is added”) is immediately followed by a preposition (“whenever”), no punctuation is needed.

Choice A is incorrect because no punctuation is needed between the verb and the preposition. *Choice B* is incorrect because no punctuation is needed between the verb and the preposition. *Choice C* is incorrect because no punctuation is needed between the verb and the preposition.

QUESTION 23

Choice D is the best answer. The convention being tested is the use of verbs to express tense. In this choice, the present tense verb “survives” correctly indicates that the wood frog regularly survives subfreezing temperatures by producing large amounts of glucose.

Choice A is incorrect because the past perfect verb “had survived” doesn’t indicate that the wood frog regularly survives subfreezing temperatures by producing large amounts of glucose. *Choice B* is incorrect because the past tense verb “survived” doesn’t indicate that the wood frog regularly survives subfreezing temperatures by producing large amounts of glucose. *Choice C* is incorrect because the conditional verb “would survive” doesn’t indicate that the wood frog regularly survives subfreezing temperatures by producing large amounts of glucose.

QUESTION 24

Choice A is the best answer. “Meanwhile” logically signals that the action described in this sentence (Obinze’s move to London to pursue a career) is simultaneous with the action described in the previous sentence (Ifemelu’s move to the United States). The first sentence establishes that the actions take place around the same time, referring to the characters’ “divergent experiences” following high school.

Choice B is incorrect because “nevertheless” illogically signals that the information in this sentence about Obinze’s move to London is true despite the previous information about Ifemelu’s move to the United States. Instead, as the first sentence establishes, Obinze’s move and Ifemelu’s move are related,

parallel experiences that occur around the same time. *Choice C* is incorrect because “secondly” illogically signals that the information in this sentence is a second point or reason separate from the previous information about Ifemelu’s move to the United States. Instead, as the first sentence establishes, Obinze’s move and Ifemelu’s move are related, parallel experiences that occur around the same time. *Choice D* is incorrect because “in fact” illogically signals that the information in this sentence emphasizes, modifies, or contradicts the previous information about Ifemelu’s move to the United States. Instead, as the first sentence establishes, Obinze’s move and Ifemelu’s move are related, parallel experiences that occur around the same time.

QUESTION 25

Choice C is the best answer. “Similarly” logically signals that the activity described in this sentence (Nancy Tuttle Craig distributing Votes for Women Tea in her Los Angeles grocery stores) is like the activity described in the previous sentence (the Woman’s Suffrage Party selling Equality Tea at fairs in San Francisco). Together, the two examples support the preceding claim that “activists across the state sold tea to promote the cause of suffrage.”

Choice A is incorrect because “for example” illogically signals that the activity described in this sentence exemplifies the activity described in the previous sentence. Instead, the two activities are similar, and both support the preceding claim about selling tea to promote women’s right to vote. *Choice B* is incorrect because “to conclude” illogically signals that the activity described in this sentence concludes or summarizes the information in the previous sentences. Instead, the activity is similar to the one described in the previous sentence, and both support the preceding claim about selling tea to promote women’s right to vote. *Choice D* is incorrect because “in other words” illogically signals that the activity described in this sentence paraphrases the activity described in the previous sentence. Instead, the two activities are similar, and both support the preceding claim about selling tea to promote women’s right to vote.

QUESTION 26

Choice B is the best answer. The sentence effectively explains an advantage of infilling: it’s less invasive than using a power grinder.

Choice A is incorrect. The sentence identifies a disadvantage of power grinding; it doesn’t explain an advantage of infilling. *Choice C* is incorrect. The sentence identifies the two techniques park rangers use; it doesn’t explain an advantage of infilling. *Choice D* is incorrect. The sentence indicates that power grinding and infilling are different in one aspect; it fails to explain an advantage of infilling.

QUESTION 27

Choice D is the best answer. The sentence effectively describes *Unwoven Light* to an audience unfamiliar with Park, noting that Soo Sunny Park is a Korean American artist and that the 2013 work consists of colorful prisms formed by light passing through iridescent tiles.

Choice A is incorrect. The sentence describes aspects of *Unwoven Light* but doesn’t mention who Park is; it thus doesn’t effectively describe the work to an audience unfamiliar with Park. *Choice B* is incorrect. Although the sentence indicates when the work was created and who Park is, it lacks descriptive details and thus doesn’t effectively describe *Unwoven Light*. *Choice C* is incorrect. The sentence mentions Park and describes an aspect of *Unwoven Light*—the chain-link fence—but doesn’t effectively describe the overall work to an audience unfamiliar with the artist.

Math

Module 1

(22 questions)

QUESTION 1

Choice C is correct. It's given that t represents the number of seconds after the bus passes the marker. Substituting 2 for t in the given equation $d = 30t$ yields $d = 30(2)$, or $d = 60$. Therefore, the bus will be 60 feet from the marker 2 seconds after passing it.

Choice A is incorrect. This is the distance, in feet, the bus will be from the marker 1 second, not 2 seconds, after passing it. **Choice B** is incorrect and may result from conceptual or calculation errors. **Choice D** is incorrect. This is the distance, in feet, the bus will be from the marker 3 seconds, not 2 seconds, after passing it.

QUESTION 2

Choice D is correct. The equation of a line in the xy -plane can be written as $y = mx + b$, where m represents the slope of the line and $(0, b)$ represents the y -intercept of the line. It's given that the slope of the line is $\frac{1}{9}$. It follows that $m = \frac{1}{9}$. It's also given that the line passes through the point $(0, 14)$. It follows that $b = 14$. Substituting $\frac{1}{9}$ for m and 14 for b in $y = mx + b$ yields $y = \frac{1}{9}x + 14$. Thus, the equation $y = \frac{1}{9}x + 14$ represents this line.

Choice A is incorrect. This equation represents a line with a slope of $-\frac{1}{9}$ and a y -intercept of $(0, -14)$. **Choice B** is incorrect. This equation represents a line with a slope of $-\frac{1}{9}$ and a y -intercept of $(0, 14)$. **Choice C** is incorrect. This equation represents a line with a slope of $\frac{1}{9}$ and a y -intercept of $(0, -14)$.

QUESTION 3

The correct answer is $\frac{1}{5}$. Since the number 5 can also be written as $\frac{5}{1}$, the given equation can also be written as $\frac{x}{8} = \frac{5}{1}$. This equation is equivalent to $\frac{8}{x} = \frac{1}{5}$. Therefore, the value of $\frac{8}{x}$ is $\frac{1}{5}$. Note that $1/5$ and $.2$ are examples of ways to enter a correct answer.

Alternate approach: Multiplying both sides of the equation $\frac{x}{8} = 5$ by 8 yields

$x = 40$. Substituting 40 for x into the expression $\frac{8}{x}$ yields $\frac{8}{40}$, or $\frac{1}{5}$.

QUESTION 4

Choice B is correct. It's given that triangle ABC is congruent to triangle DEF . Corresponding angles of congruent triangles are congruent and, therefore, have equal measure. It's given that angle A corresponds to angle D , and that the measure of angle A is 18° . It's also given that the measures of angles B and E are 90° . Since these angles have equal measure, they are corresponding angles. It follows that angle C corresponds to angle F . Let x° represent the measure of angle C . Since the sum of the measures of the interior angles of a triangle is 180° , it follows that $18^\circ + 90^\circ + x^\circ = 180^\circ$, or $108^\circ + x^\circ = 180^\circ$. Subtracting 108° from both sides of this equation yields $x^\circ = 72^\circ$. Therefore, the measure of angle C is 72° . Since angle C corresponds to angle F , it follows that the measure of angle F is also 72° .

Choice A is incorrect. This is the measure of angle D , not the measure of angle F . **Choice C** is incorrect. This is the measure of angle E , not the measure of angle F . **Choice D** is incorrect. This is the sum of the measures of angles E and F , not the measure of angle F .

QUESTION 5

Choice B is correct. Applying the commutative property of multiplication, the expression $(m^4q^4z^{-1})(mq^5z^3)$ can be rewritten as $(m^4m)(q^4q^5)(z^{-1}z^3)$. For positive values of x , $(x^a)(x^b) = x^{a+b}$. Therefore, the expression $(m^4m)(q^4q^5)(z^{-1}z^3)$ can be rewritten as $(m^{4+1})(q^{4+5})(z^{-1+3})$, or $m^5q^9z^2$.

Choice A is incorrect and may result from multiplying, not adding, the exponents. **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 6

Choice C is correct. The median of a data set represented in a box plot is represented by the vertical line within the box. It follows that the median mass of the gazelles in group 1 is 25 kilograms, and the median mass of the gazelles in group 2 is 24 kilograms. Since 25 kilograms is greater than 24 kilograms, the median mass of group 1 is greater than the median mass of group 2.

Choice A is incorrect. The mean mass of each of the two groups cannot be determined from the box plots. **Choice B** is incorrect. The mean mass of each of the two groups cannot be determined from the box plots. **Choice D** is incorrect and may result from conceptual or calculation errors.

QUESTION 7

Choice B is correct. Since the point (x, y) is an intersection point of the graphs of the given equations in the xy -plane, the pair (x, y) should satisfy both equations, and thus is a solution of the given system. According to the first equation, $y = 76$. Substituting 76 in place of y in the second equation yields $x^2 - 5 = 76$. Adding 5 to both sides of this equation yields $x^2 = 81$. Taking the square root of both sides of this equation yields two solutions: $x = 9$ and $x = -9$. Of these two solutions, only -9 is given as a choice.

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. This is the value of coordinate y , rather than x , of the intersection point (x, y) .

QUESTION 8

Choice A is correct. It's given that the estimate for the proportion of the population that has the characteristic is 0.49 with an associated margin of error of 0.04. Subtracting the margin of error from the estimate and adding the margin of error to the estimate gives an interval of plausible values for the true proportion of the population that has the characteristic. Therefore, it's plausible that the proportion of the population that has this characteristic is between 0.45 and 0.53.

Choice B is incorrect. A value less than 0.45 is outside the interval of plausible values for the proportion of the population that has the characteristic. *Choice C* is incorrect. The value 0.49 is an estimate for the proportion based on this sample. However, since the margin of error for this estimate is known, the most appropriate conclusion is not that the proportion is exactly one value but instead lies in an interval of plausible values. *Choice D* is incorrect. A value greater than 0.53 is outside the interval of plausible values for the proportion of the population that has the characteristic.

QUESTION 9

Choice A is correct. A system of two linear equations in two variables, x and y , has zero points of intersection if the lines represented by the equations in the xy -plane are distinct and parallel. The graphs of two lines in the xy -plane represented by equations in slope-intercept form, $y = mx + b$, are distinct if the y -coordinates of their y -intercepts, b , are different and are parallel if their slopes, m , are the same. For the two equations in the given system, $y = 2x + 10$ and $y = 2x - 1$, the values of b are 10 and -1 , respectively, and the values of m are both 2. Since the values of b are different, the graphs of these lines have different y -coordinates of the y -intercept and are distinct. Since the values of m are the same, the graphs of these lines have the same slope and are parallel. Therefore, the graphs of the given equations are lines that intersect at zero points in the xy -plane.

Choice B is incorrect. The graphs of a system of two linear equations have exactly one point of intersection if the lines represented by the equations have different slopes. Since the given equations represent lines with the same slope, there is not exactly one intersection point. *Choice C* is incorrect. The graphs of a system of two linear equations can never have exactly two intersection points. *Choice D* is incorrect. The graphs of a system of two linear equations have infinitely many intersection points when the lines represented by the equations have the same slope and the same y -coordinate of the y -intercept. Since the given equations represent lines with different y -coordinates of their y -intercepts, there are not infinitely many intersection points.

QUESTION 10

Choice C is correct. In the xy -plane, the graph of a linear function can be written in the form $f(x) = mx + b$, where m represents the slope and $(0, b)$ represents the y -intercept of the graph of $y = f(x)$. It's given that the graph of the linear function f , where $y = f(x)$, in the xy -plane contains the point $(0, 2)$. Thus, $b = 2$. The slope of the graph of a line containing any two points (x_1, y_1) and (x_2, y_2) can be found using the slope formula, $m = \frac{y_2 - y_1}{x_2 - x_1}$. Since it's given that

the graph of the linear function f contains the points $(0, 2)$ and $(8, 34)$, it follows that the slope of the graph of the line containing these points is $m = \frac{34 - 2}{8 - 0}$, or $m = 4$. Substituting 4 for m and 2 for b in $f(x) = mx + b$ yields $f(x) = 4x + 2$.

Choice A is incorrect. This function represents a graph with a slope of 2 and a y -intercept of $(0, 42)$. *Choice B* is incorrect. This function represents a graph with a slope of 32 and a y -intercept of $(0, 36)$. *Choice D* is incorrect. This function represents a graph with a slope of 8 and a y -intercept of $(0, 2)$.

QUESTION 11

The correct answer is 24. The equation $\frac{24x}{ny} = 4$ can be rewritten as

$\left(\frac{24}{n}\right)\left(\frac{x}{y}\right) = 4$. It's given that $\frac{x}{y} = 4$. Substituting 4 for $\frac{x}{y}$ in the equation

$\left(\frac{24}{n}\right)\left(\frac{x}{y}\right) = 4$ yields $\left(\frac{24}{n}\right)(4) = 4$. Multiplying both sides of this equation by

n yields $(24)(4) = 4n$. Dividing both sides of this equation by 4 yields $24 = n$. Therefore, the value of n is 24.

QUESTION 12

Choice D is correct. It's given that the function w models the volume of liquid, in milliliters, in a container t seconds after it begins draining from a hole at the bottom. The given function $w(t) = 300 - 4t$ can be rewritten as $w(t) = -4t + 300$. Thus, for each increase of t by 1, the value of $w(t)$ decreases by $4(1)$, or 4. Therefore, the predicted volume, in milliliters, draining from the container each second is 4 milliliters.

Choice A is incorrect. This is the amount of liquid, in milliliters, in the container before the liquid begins draining. *Choice B* is incorrect and may result from conceptual errors. *Choice C* is incorrect and may result from conceptual errors.

QUESTION 13

Choice C is correct. Because the value of the investment increases each year, the function that best models how the value of the investment changes over time is an increasing function. It's given that each year, the value of the investment increases by 0.49% of its value the previous year. Since the value of the investment changes by a fixed percentage each year, the function that best models how the value of the investment changes over time is an exponential function. Therefore, the function that best models how the value of the investment changes over time is an increasing exponential function.

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

QUESTION 14

The correct answer is 80. Subtracting the second equation in the given system from the first equation yields $(24x + y) - (6x + y) = 48 - 72$, which is equivalent to $24x - 6x + y - y = -24$, or $18x = -24$. Dividing each side of this equation by 3 yields $6x = -8$. Substituting -8 for $6x$ in the second equation yields $-8 + y = 72$. Adding 8 to both sides of this equation yields $y = 80$.

Alternate approach: Multiplying each side of the second equation in the given system by 4 yields $24x + 4y = 288$. Subtracting the first equation in the given system from this equation yields $(24x + 4y) - (24x + y) = 288 - 48$, which is equivalent to $24x - 24x + 4y - y = 240$, or $3y = 240$. Dividing each side of this equation by 3 yields $y = 80$.

QUESTION 15

The correct answer is 7. When an equation is of the form $y = ax^2 + bx + c$, where a , b , and c are constants, the value of y reaches its minimum when

$x = -\frac{b}{2a}$. Since the given equation is of the form $y = ax^2 + bx + c$, it follows that $a = 1$, $b = -14$, and $c = 22$. Therefore, the value of y reaches its minimum when $x = -\frac{(-14)}{2(1)}$, or $x = 7$.

QUESTION 16

Choice A is correct. The x -intercept of a graph in the xy -plane is the point on the graph where $y = 0$. It's given that function h is defined by $h(x) = 4x + 28$. Therefore, the equation representing the graph of $y = h(x)$ is $y = 4x + 28$. Substituting 0 for y in the equation $y = 4x + 28$ yields $0 = 4x + 28$. Subtracting 28 from both sides of this equation yields $-28 = 4x$. Dividing both sides of this equation by 4 yields $-7 = x$. Therefore, the x -intercept of the graph of $y = h(x)$ in the xy -plane is $(-7, 0)$. It's given that the x -intercept of the graph of $y = h(x)$ is $(a, 0)$. Therefore, $a = -7$. The y -intercept of a graph in the xy -plane is the point on the graph where $x = 0$. Substituting 0 for x in the equation $y = 4x + 28$ yields $y = 4(0) + 28$, or $y = 28$. Therefore, the y -intercept of the graph of $y = h(x)$ in the xy -plane is $(0, 28)$. It's given that the y -intercept of the graph of $y = h(x)$ is $(0, b)$. Therefore, $b = 28$. If $a = -7$ and $b = 28$, then the value of $a + b$ is $-7 + 28$, or 21.

Choice B is incorrect. This is the value of b , not $a + b$. **Choice C** is incorrect and may result from conceptual or calculation errors. **Choice D** is incorrect. This is the value of $-a + b$, not $a + b$.

QUESTION 17

The correct answer is 27,556. The area of a square is s^2 , where s is the side length of the square. Let x represent the length of each side of square B. Substituting x for s in s^2 yields x^2 . It follows that the area of square B is x^2 . It's given that square A has side lengths that are 166 times the side lengths of square B. Since x represents the length of each side of square B, the length of each side of square A can be represented by the expression $166x$. It follows that the area of square A is $(166x)^2$, or $27,556x^2$. It's given that the area of square A is k times the area of square B. Since the area of square A is equal to $27,556x^2$, and the area of square B is equal to x^2 , an equation representing the given statement is $27,556x^2 = kx^2$. Since x represents the length of each side of square B, the value of x must be positive. Therefore, the value of x^2 is also positive, so it does not equal 0. Dividing by x^2 on both sides of the equation $27,556x^2 = kx^2$ yields $27,556 = k$. Therefore, the value of k is 27,556.

QUESTION 18

Choice C is correct. On the line of best fit, an x -value of 25.5 corresponds to a y -value between 8 and 8.5. Therefore, at $x = 25.5$, 8.2 is closest to the y -value predicted by the line of best fit.

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

QUESTION 19

Choice C is correct. It's given that the measure of angle R is $\frac{2\pi}{3}$ radians, and the measure of angle T is $\frac{5\pi}{12}$ radians greater than the measure of angle R . Therefore, the measure of angle T is equal to $\frac{2\pi}{3} + \frac{5\pi}{12}$ radians. Multiplying $\frac{2\pi}{3}$ by $\frac{4}{4}$ to get a common denominator with $\frac{5\pi}{12}$ yields $\frac{8\pi}{12}$. Therefore, $\frac{2\pi}{3} + \frac{5\pi}{12}$ is equivalent to $\frac{8\pi}{12} + \frac{5\pi}{12}$, or $\frac{13\pi}{12}$. Therefore, the measure of angle T is $\frac{13\pi}{12}$ radians.

The measure of angle T , in degrees, can be found by multiplying its measure, in radians, by $\frac{180}{\pi}$. This yields $\frac{13\pi}{12} \times \frac{180}{\pi}$, which is equivalent to 195 degrees. Therefore, the measure of angle T is 195 degrees.

Choice A is incorrect. This is the number of degrees that the measure of angle T is greater than the measure of angle R . Choice B is incorrect. This is the measure of angle R , in degrees. Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 20

Choice B is correct. It's given that the formula $P = C(2)^{rt}$ gives the number of bacteria in a growth medium, where r and C are constants and P is the number of bacteria t hours after the initial measurement. It's also given that a scientist initially measures 12,000 bacteria in the growth medium. Since the initial measurement is 0 hours after the initial measurement, it follows that when $t = 0$, $P = 12,000$. Substituting 0 for t and 12,000 for P in the given equation yields $12,000 = C(2)^{(0)}$, or $12,000 = C(2)^0$, which is equivalent to $12,000 = C$. It's given that 4 hours later, the scientist measures 24,000 bacteria, or when $t = 4$, $P = 24,000$. Substituting 4 for t , 24,000 for P , and 12,000 for C in the given equation yields $24,000 = 12,000(2)^{4r}$. Dividing each side of this equation by 12,000 yields $2 = 2^{4r}$, or $2^1 = 2^{4r}$, which is equivalent to $1 = 4r$. Dividing both sides of this equation by 4 yields $\frac{1}{4} = r$. Therefore, the value of r is $\frac{1}{4}$.

Choice A is incorrect. This is the value of the reciprocal of C . Choice C is incorrect. This is the value of the reciprocal of r . Choice D is incorrect. This is the value of C .

QUESTION 21

The correct answer is -3. Squaring both sides of the given equation yields $(x - 2)^2 = 3x + 34$, which can be rewritten as $x^2 - 4x + 4 = 3x + 34$. Subtracting $3x$ and 34 from both sides of this equation yields $x^2 - 7x - 30 = 0$. This quadratic equation can be rewritten as $(x - 10)(x + 3) = 0$. According to the zero product property, $(x - 10)(x + 3)$ equals zero when either $x - 10 = 0$ or $x + 3 = 0$. Solving each of these equations for x yields $x = 10$ or $x = -3$. Therefore, the given equation has two solutions, 10 and -3. Of these two solutions, -3 is the smallest solution to the given equation.

QUESTION 22

Choice C is correct. Subtracting the expression $(x - 29)$ from both sides of the given equation yields $0 = (x - a)(x - 29) - (x - 29)$, which can be rewritten as $0 = (x - a)(x - 29) + (-1)(x - 29)$. Since the two terms on the right-hand side of this equation have a common factor of $(x - 29)$, it can be rewritten as $0 = (x - 29)(x - a + (-1))$, or $0 = (x - 29)(x - a - 1)$. Since $x - a - 1$ is equivalent to $x - (a + 1)$, the equation $0 = (x - 29)(x - a - 1)$ can be rewritten as $0 = (x - 29)(x - (a + 1))$. By the zero product property, it follows that $x - 29 = 0$ or $x - (a + 1) = 0$. Adding 29 to both sides of the equation $x - 29 = 0$ yields $x = 29$. Adding $a + 1$ to both sides of the equation $x - (a + 1) = 0$ yields $x = a + 1$. Therefore, the two solutions to the given equation are 29 and $a + 1$. Thus, only $a + 1$ and 29, not a , are solutions to 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.



Math

Module 2

(22 questions)

QUESTION 1

Choice B is correct. 10% of a quantity means $\frac{10}{100}$ times the quantity. Therefore, 10% of 470 can be represented as $\frac{10}{100}(470)$, which is equivalent to $0.10(470)$, or 47. Therefore, 10% of 470 is 47.

Choice A is incorrect. This is 10% of 370, not 10% of 470. **Choice C** is incorrect. This is 90% of 470, not 10% of 470. **Choice D** is incorrect. This is $470 - 10$, not 10% of 470.

QUESTION 2

Choice B is correct. The height of each bar in the bar graph given represents the number of students that voted for the activity specified at the bottom of the bar. The bar for activity 3 has a height that is between 35 and 40. In other words, the number of students that chose activity 3 is between 35 students and 40 students. Of the given choices, 39 is the only value between 35 and 40. Therefore, 39 students chose activity 3.

Choice A is incorrect and may result from conceptual errors. **Choice C** is incorrect. This is the number of students that chose activity 5, not activity 3. **Choice D** is incorrect and may result from conceptual errors.

QUESTION 3

The correct answer is 40. Subtracting 5 from both sides of the given equation yields $4x = 160$. Dividing both sides of this equation by 4 yields $x = 40$. Therefore, the solution to the given equation is 40.

QUESTION 4

The correct answer is 9. It's given that the customer spent \$27 to purchase oranges at \$3 per pound. Therefore, the number of pounds of oranges the customer purchased is $\$27 \left(\frac{1 \text{ pound}}{\$3} \right)$, or 9 pounds.

QUESTION 5

The correct answer is 2. Substituting 8 for $f(x)$ in the given equation yields $8 = 4x$. Dividing the left- and right-hand sides of this equation by 4 yields $x = 2$. Therefore, the value of x is 2 when $f(x) = 8$.

QUESTION 6

Choice A is correct. It's given that $g(x) = x^2 + 9$. Substituting 25 for $g(x)$ in this equation yields $25 = x^2 + 9$. Subtracting 9 from both sides of this equation yields $16 = x^2$. Taking the square root of each side of this equation yields $x = \pm 4$. It follows that $g(x) = 25$ when the value of x is 4 or -4 . Only 4 is listed among the choices.

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

Choice D is correct. The y -intercept of a graph in the xy -plane is the point at which the graph crosses the y -axis. The graph shown crosses the y -axis at the point $(0, 8)$. Therefore, the y -intercept of the graph shown is $(0, 8)$.

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 8

Choice C is correct. It's given that the cost of renting a tent is \$11 per day for d days. Multiplying the rental cost by the number of days yields $\$11d$, which represents the cost of renting the tent for d days before the insurance is added. Adding the onetime insurance fee of \$10 to the rental cost of $\$11d$ gives the total cost c , in dollars, which can be represented by the equation $c = 11d + 10$.

Choice A is incorrect. This equation represents the total cost to rent the tent if the insurance fee was charged every day. **Choice B** is incorrect. This equation represents the total cost to rent the tent if the daily fee was $\$(d + 11)$ for 10 days. **Choice D** is incorrect. This equation represents the total cost to rent the tent if the daily fee was \$10 and the onetime fee was \$11.

QUESTION 9

Choice D is correct. The expression $\frac{4}{4x-5} - \frac{1}{x+1}$ can be rewritten as $\frac{4}{4x-5} + \frac{(-1)}{x+1}$. To add the two terms of this expression, the terms can be rewritten with a common denominator. Since $\frac{x+1}{x+1} = 1$, the expression $\frac{4}{4x-5}$ can be rewritten as $\frac{(x+1)(4)}{(x+1)(4x-5)}$. Since $\frac{4x-5}{4x-5} = 1$, the expression $\frac{-1}{x+1}$ can be rewritten as $\frac{(4x-5)(-1)}{(4x-5)(x+1)}$. Therefore, the expression $\frac{4}{4x-5} + \frac{(-1)}{x+1}$ can be written as $\frac{(x+1)(4)}{(x+1)(4x-5)} + \frac{(4x-5)(-1)}{(4x-5)(x+1)}$, which is equivalent to $\frac{(x+1)(4) + (4x-5)(-1)}{(x+1)(4x-5)}$. Applying the distributive property to each term of the numerator yields $\frac{(4x+4) + (-4x+5)}{(x+1)(4x-5)}$, or $\frac{(4x+(-4x)) + (4+5)}{(x+1)(4x-5)}$. Adding like terms in the numerator yields $\frac{9}{(x+1)(4x-5)}$.

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 10

Choice D is correct. It's given that the graph shows the linear relationship between x and y . The given graph passes through the points $(0, -5)$, $(1, -3)$, and $(2, -1)$. It follows that when $x = 0$, the corresponding value of y is -5 , when $x = 1$, the corresponding value of y is -3 , and when $x = 2$, the corresponding value of y is -1 . Of the given choices, only the table in choice D gives these three values of x and their corresponding values of y for the relationship shown in the graph.

Choice A is incorrect. This table represents a relationship between x and y such that the graph passes through the points $(0, 0)$, $(1, -7)$, and $(2, -9)$. *Choice B* is incorrect. This table represents a relationship between x and y such that the graph passes through the points $(0, 0)$, $(1, -3)$, and $(2, -1)$. *Choice C* is incorrect. This table represents a linear relationship between x and y such that the graph passes through the points $(0, -5)$, $(1, -7)$, and $(2, -9)$.

QUESTION 11

The correct answer is 70. Based on the figure, the angle with measure 110° and the angle vertical to the angle with measure x° are same side interior angles. Since vertical angles are congruent, the angle vertical to the angle with measure x° also has measure x° . It's given that lines s and t are parallel. Therefore, same side interior angles between lines s and t are supplementary. It follows that $x + 110 = 180$. Subtracting 110 from both sides of this equation yields $x = 70$.

QUESTION 12

Choice D is correct. The perimeter of a figure is equal to the sum of the measurements of the sides of the figure. It's given that the rectangle has a length of 4 inches and a width of 9 inches. Since a rectangle has 4 sides, of which opposite sides are parallel and equal, it follows that the rectangle has two sides with a length of 4 inches and two sides with a width of 9 inches. Therefore, the perimeter of this rectangle is $4 + 4 + 9 + 9$, or 26 inches.

Choice A is incorrect. This is the sum, in inches, of the length and the width of the rectangle. *Choice B* is incorrect. This is the sum, in inches, of the two lengths and the width of the rectangle. *Choice C* is incorrect. This is the sum, in inches, of the length and the two widths of the rectangle.

QUESTION 13

Choice D is correct. To express j in terms of k and m , the given equation must be solved for j . Dividing each side of the given equation by 8 yields $j = \frac{k + 15m}{8}$.

Choice A is incorrect. This is equivalent to $8j = k + 120m$. *Choice B* is incorrect. This is equivalent to $8j = 8k + 15m$. *Choice C* is incorrect. This is equivalent

to $\frac{j}{8} = k + 15m$.

QUESTION 14

Choice A is correct. The given point, $(8, 2)$, is located in the first quadrant in the xy -plane. The system of inequalities in choice A represents all the points in the first quadrant in the xy -plane. Therefore, $(8, 2)$ is a solution to the system of inequalities in choice A.

Alternate approach: Substituting 8 for x in the first inequality in choice A, $x > 0$, yields $8 > 0$, which is true. Substituting 2 for y in the second inequality in choice A, $y > 0$, yields $2 > 0$, which is true. Since the coordinates of the point (8, 2) make the inequalities $x > 0$ and $y > 0$ true, the point (8, 2) is a solution to the system of inequalities consisting of $x > 0$ and $y > 0$.

Choice B is incorrect. This system of inequalities represents all the points in the fourth quadrant, not the first quadrant, in the xy -plane. *Choice C* is incorrect. This system of inequalities represents all the points in the second quadrant, not the first quadrant, in the xy -plane. *Choice D* is incorrect. This system of inequalities represents all the points in the third quadrant, not the first quadrant, in the xy -plane.

QUESTION 15

Choice B is correct. The equation representing a linear model can be written in the form $y = a + bx$, or $y = bx + a$, where b is the slope of the graph of the model and $(0, a)$ is the y -intercept of the graph of the model. The scatterplot shows that as the x -values of the data points increase, the y -values of the data points decrease, which means the graph of an appropriate linear model has a negative slope. Therefore, $b < 0$. The scatterplot also shows that the data points are close to the y -axis at a positive value of y . Therefore, the y -intercept of the graph of an appropriate linear model has a positive y -coordinate, which means $a > 0$. Of the given choices, only choice B, $y = -1.9x + 10.1$, has a negative value for b , the slope, and a positive value for a , the y -coordinate of the y -intercept.

Choice A is incorrect. The graph of this model has a y -intercept with a negative y -coordinate, not a positive y -coordinate. *Choice C* is incorrect. The graph of this model has a positive slope, not a negative slope, and a y -intercept with a negative y -coordinate, not a positive y -coordinate. *Choice D* is incorrect. The graph of this model has a positive slope, not a negative slope.

QUESTION 16

Choice A is correct. Since it's given that the account balance, $A(t)$, in dollars, after t years can be modeled by an exponential function, it follows that function A can be written in the form $A(t) = Nr^t$, where N is the initial value of the function and r is a constant related to the growth of the function. It's given that the initial balance of the account is \$36,100.00, so it follows that the initial value of the function, or N , must be 36,100.00. Substituting 36,100.00 for N in the equation $A(t) = Nr^t$ yields $A(t) = 36,100.00r^t$. It's given that the account balance after 13 years, or when $t = 13$, is \$68,071.93. It follows that $A(13) = 68,071.93$, or $36,100.00r^{13} = 68,071.93$. Dividing each side of the equation $36,100.00r^{13} = 68,071.93$ by 36,100.00 yields $r^{13} = \frac{68,071.93}{36,100.00}$. Taking

the 13th root of both sides of this equation yields $r = \sqrt[13]{\frac{68,071.93}{36,100.00}}$, or

r is approximately equal to 1.05. Substituting 1.05 for r in the equation $A(t) = 36,100.00r^t$ yields $A(t) = 36,100.00(1.05)^t$, so the equation $A(t) = 36,100.00(1.05)^t$ could define A .

Choice B is incorrect. Substituting 0 for t in this function indicates an initial balance of \$31,971.93, rather than \$36,100.00. *Choice C* is incorrect. Substituting 0 for t in this function indicates an initial balance of \$31,971.93, rather than \$36,100.00. Additionally, this function indicates the account balance is decreasing, rather than increasing, over time. *Choice D* is incorrect. This function indicates the account balance is decreasing, rather than increasing, over time.

QUESTION 17

The correct answer is 9. The given equation can be rewritten as $5|4 - x| = 25$. Dividing each side of this equation by 5 yields $|4 - x| = 5$. By the definition of absolute value, if $|4 - x| = 5$, then $4 - x = 5$ or $4 - x = -5$. Subtracting 4 from each side of the equation $4 - x = 5$ yields $-x = 1$. Dividing each side of this equation by -1 yields $x = -1$. Similarly, subtracting 4 from each side of the equation $4 - x = -5$ yields $-x = -9$. Dividing each side of this equation by -1 yields $x = 9$. Therefore, since the two solutions to the given equation are -1 and 9 , the positive solution to the given equation is 9 .

QUESTION 18

The correct answer is 6. Applying the distributive property to the expression $ry^4(15y - 9)$ yields $15ry^5 - 9ry^4$. Since $90y^5 - 54y^4$ is equivalent to $ry^4(15y - 9)$, it follows that $90y^5 - 54y^4$ is also equivalent to $15ry^5 - 9ry^4$. Since these expressions are equivalent, it follows that corresponding coefficients are equivalent. Therefore, $90 = 15r$ and $-54 = -9r$. Solving either of these equations for r will yield the value of r . Dividing both sides of $90 = 15r$ by 15 yields $6 = r$. Therefore, the value of r is 6 .

QUESTION 19

Choice D is correct. It's given that the expression $w(w + 9)$ represents the area, in square centimeters, of a rectangular cutting board, where w is the width, in centimeters, of the cutting board. The area of a rectangle can be calculated by multiplying its length by its width. It follows that the length, in centimeters, of the cutting board is represented by the expression $(w + 9)$.

Choice A is incorrect. This expression represents the area, in square centimeters, of the cutting board, not its length, in centimeters. **Choice B** is incorrect. This expression represents the width, in centimeters, of the cutting board, not its length. **Choice C** is incorrect. This is the difference between the length, in centimeters, and the width, in centimeters, of the cutting board, not its length, in centimeters.

QUESTION 20

Choice D is correct. All the tables in the choices have the same three values of x , so each of the three values of x can be substituted in the given inequality to compare the corresponding values of y in each of the tables. Substituting 3 for x in the given inequality yields $y > 13(3) - 18$, or $y > 21$. Therefore, when $x = 3$, the corresponding value of y is greater than 21 . Substituting 5 for x in the given inequality yields $y > 13(5) - 18$, or $y > 47$. Therefore, when $x = 5$, the corresponding value of y is greater than 47 . Substituting 8 for x in the given inequality yields $y > 13(8) - 18$, or $y > 86$. Therefore, when $x = 8$, the corresponding value of y is greater than 86 . For the table in choice D, when $x = 3$, the corresponding value of y is 26 , which is greater than 21 ; when $x = 5$, the corresponding value of y is 52 , which is greater than 47 ; when $x = 8$, the corresponding value of y is 91 , which is greater than 86 . Therefore, the table in choice D gives values of x and their corresponding values of y that are all solutions to the given inequality.

Choice A is incorrect. In the table for choice A, when $x = 3$, the corresponding value of y is 21 , which is not greater than 21 ; when $x = 5$, the corresponding value of y is 47 , which is not greater than 47 ; when $x = 8$, the corresponding value of y is 86 , which is not greater than 86 . **Choice B** is incorrect. In the table for choice B, when $x = 5$, the corresponding value of y is 42 , which is not greater than 47 ; when $x = 8$, the corresponding value of y is 86 , which is not greater than 86 .

Choice C is incorrect. In the table for choice C, when $x = 3$, the corresponding value of y is 16, which is not greater than 21; when $x = 5$, the corresponding value of y is 42, which is not greater than 47; when $x = 8$, the corresponding value of y is 81, which is not greater than 86.

QUESTION 21

Choice B is correct. It's given that $g(x) = f(x - 1)$. Since $f(x) = (x + 6)(x + 5)(x + 1)$, it follows that $f(x - 1) = (x - 1 + 6)(x - 1 + 5)(x - 1 + 1)$. Combining like terms yields $f(x - 1) = (x + 5)(x + 4)(x)$. Therefore, $g(x) = x(x + 5)(x + 4)$. The x -intercepts of a graph in the xy -plane are the points where $y = 0$. The x -coordinates of the x -intercepts of the graph of $y = g(x)$ in the xy -plane can be found by solving the equation $0 = x(x + 5)(x + 4)$. Applying the zero product property to this equation yields three equations: $x = 0$, $x + 5 = 0$, and $x + 4 = 0$. Solving each of these equations for x yields $x = 0$, $x = -5$, and $x = -4$, respectively. Therefore, the x -intercepts of the graph of $y = g(x)$ are $(0, 0)$, $(-5, 0)$, and $(-4, 0)$. It follows that the values of a , b , and c are 0, -5 , and -4 . Thus, the value of $a + b + c$ is $0 + (-5) + (-4)$, which is equal to -9 .

Choice A is incorrect. This is the value of $a + b + c$ if $g(x) = f(x + 1)$.

Choice C is incorrect. This is the value of $a + b + c - 1$ if $g(x) = (x - 6)(x - 5)(x - 1)$.

Choice D is incorrect. This is the value of $a + b + c$ if $f(x) = (x - 6)(x - 5)(x - 1)$.

QUESTION 22

Choice A is correct. When a square is inscribed in a circle, a diagonal of the square is a diameter of the circle. It's given that a square is inscribed in a circle and the length of a radius of the circle is $\frac{20\sqrt{2}}{2}$ inches. Therefore, the length of a diameter of the circle is $2\left(\frac{20\sqrt{2}}{2}\right)$ inches, or $20\sqrt{2}$ inches. It follows that the length of a diagonal of the square is $20\sqrt{2}$ inches. A diagonal of a square separates the square into two right triangles in which the legs are the sides of the square and the hypotenuse is a diagonal. Since a square has 4 congruent sides, each of these two right triangles has congruent legs and a hypotenuse of length $20\sqrt{2}$ inches. Since each of these two right triangles has congruent legs, they are both 45-45-90 triangles. In a 45-45-90 triangle, the length of the hypotenuse is $\sqrt{2}$ times the length of a leg. Let s represent the length of a leg of one of these 45-45-90 triangles. It follows that $20\sqrt{2} = \sqrt{2}(s)$. Dividing both sides of this equation by $\sqrt{2}$ yields $20 = s$. Therefore, the length of a leg of one of these 45-45-90 triangles is 20 inches. Since the legs of these two 45-45-90 triangles are the sides of the square, it follows that the side length of the square is 20 inches.

Choice B is incorrect. This is the length of a radius, in inches, of the circle.

Choice C is incorrect. This is the length of a diameter, in inches, of the circle.

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

**SAT**

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1 Total Score 400–1600 Scale	Total Score	
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How to Calculate Your Practice Test Scores

The worksheets on pages 544 and 545 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 544, 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 545 to get your section and test scores.

SAT Practice Test Worksheet:
Section and Total Scores

Conversion: Calculate Your Section and Total Scores

Step 1: Count the number of correct answers for each section. Write the number of correct answers in the boxes below. Then, use the conversion tables to find the section scores. Write the section scores in the boxes below. Finally, add the section scores to find the total score. Write the total score in the box below.

Section Scores: Reading and Writing: _____ Math: _____

Section Scores: Science: _____ Total Score: _____

Raw Score Conversion Table: Section Scores

Raw Score	Reading and Writing	Math	Science	Total Score
1	10	10	10	30
2	11	11	11	33
3	12	12	12	36
4	13	13	13	39
5	14	14	14	42
6	15	15	15	45
7	16	16	16	48
8	17	17	17	51
9	18	18	18	54
10	19	19	19	57
11	20	20	20	60
12	21	21	21	63
13	22	22	22	66
14	23	23	23	69
15	24	24	24	72
16	25	25	25	75
17	26	26	26	78
18	27	27	27	81
19	28	28	28	84
20	29	29	29	87
21	30	30	30	90
22	31	31	31	93
23	32	32	32	96
24	33	33	33	99
25	34	34	34	102
26	35	35	35	105
27	36	36	36	108
28	37	37	37	111
29	38	38	38	114
30	39	39	39	117
31	40	40	40	120
32	41	41	41	123
33	42	42	42	126
34	43	43	43	129
35	44	44	44	132
36	45	45	45	135
37	46	46	46	138
38	47	47	47	141
39	48	48	48	144
40	49	49	49	147
41	50	50	50	150

SAT Practice Test Worksheet:
Answer Key

Step 1: Count the number of correct answers for each section. Write the number of correct answers in the boxes below. Then, use the conversion tables to find the section scores. Write the section scores in the boxes below. Finally, add the section scores to find the total score. Write the total score in the box below.

Section Scores: Reading and Writing: _____ Math: _____

Section Scores: Science: _____ Total Score: _____

Raw Score Conversion Table: Section Scores

Raw Score	Reading and Writing	Math	Science	Total Score
1	10	10	10	30
2	11	11	11	33
3	12	12	12	36
4	13	13	13	39
5	14	14	14	42
6	15	15	15	45
7	16	16	16	48
8	17	17	17	51
9	18	18	18	54
10	19	19	19	57
11	20	20	20	60
12	21	21	21	63
13	22	22	22	66
14	23	23	23	69
15	24	24	24	72
16	25	25	25	75
17	26	26	26	78
18	27	27	27	81
19	28	28	28	84
20	29	29	29	87
21	30	30	30	90
22	31	31	31	93
23	32	32	32	96
24	33	33	33	99
25	34	34	34	102
26	35	35	35	105
27	36	36	36	108
28	37	37	37	111
29	38	38	38	114
30	39	39	39	117
31	40	40	40	120
32	41	41	41	123
33	42	42	42	126
34	43	43	43	129
35	44	44	44	132
36	45	45	45	135
37	46	46	46	138
38	47	47	47	141
39	48	48	48	144
40	49	49	49	147
41	50	50	50	150

SAT Practice Test Worksheet:
Section and Total Scores

Conversion: Calculate Your Section and Total Scores

Step 1: Count the number of correct answers for each section. Write the number of correct answers in the boxes below. Then, use the conversion tables to find the section scores. Write the section scores in the boxes below. Finally, add the section scores to find the total score. Write the total score in the box below.

Section Scores: Reading and Writing: _____ Math: _____

Section Scores: Science: _____ Total Score: _____

Raw Score Conversion Table: Section Scores

Raw Score	Reading and Writing	Math	Science	Total Score
1	10	10	10	30
2	11	11	11	33
3	12	12	12	36
4	13	13	13	39
5	14	14	14	42
6	15	15	15	45
7	16	16	16	48
8	17	17	17	51
9	18	18	18	54
10	19	19	19	57
11	20	20	20	60
12	21	21	21	63
13	22	22	22	66
14	23	23	23	69
15	24	24	24	72
16	25	25	25	75
17	26	26	26	78
18	27	27	27	81
19	28	28	28	84
20	29	29	29	87
21	30	30	30	90
22	31	31	31	93
23	32	32	32	96
24	33	33	33	99
25	34	34	34	102
26	35	35	35	105
27	36	36	36	108
28	37	37	37	111
29	38	38	38	114
30	39	39	39	117
31	40	40	40	120
32	41	41	41	123
33	42	42	42	126
34	43	43	43	129
35	44	44	44	132
36	45	45	45	135
37	46	46	46	138
38	47	47	47	141
39	48	48	48	144
40	49	49	49	147
41	50	50	50	150

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 544 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 545 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 544 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 545 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 Modules 1 & 2	Math 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 544 and 545 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

Module 2

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

Math

Module 1

Module 2

QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS	QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS
1	C		1	B	
2	D		2	B	
3	2, 1/5		3	40	
4	B		4	9	
5	B		5	2	
6	C		6	A	
7	B		7	D	
8	A		8	C	
9	A		9	D	
10	C		10	D	
11	24		11	70	
12	D		12	D	
13	C		13	D	
14	80		14	A	
15	7		15	B	
16	A		16	A	
17	27556		17	9	
18	C		18	6	
19	C		19	D	
20	B		20	D	
21	-3		21	B	
22	C		22	A	

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)

→ CONVERT

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)

→ CONVERT

LOWER

UPPER

MATH SECTION
SCORE RANGE
(200-800)

+

LOWER

UPPER

READING AND WRITING
SECTION SCORE RANGE
(200-800)

=

LOWER

UPPER

TOTAL SAT
SCORE RANGE
(400-1600)

Raw Score Conversion Table: Section Scores

RAW SCORE (# OF CORRECT ANSWERS)	Reading and Writing Section Score Range		Math Section Score Range		RAW SCORE (# OF CORRECT ANSWERS)	Reading and Writing Section Score Range		Math Section Score Range	
	LOWER	UPPER	LOWER	UPPER		LOWER	UPPER	LOWER	UPPER
0	200	250	200	250	26	440	480	460	520
1	200	250	200	250	27	450	490	470	530
2	200	250	200	250	28	450	490	490	550
3	200	250	200	250	29	460	500	500	560
4	200	250	200	250	30	470	510	510	570
5	200	250	200	250	31	480	520	530	590
6	200	260	200	250	32	480	520	530	610
7	200	270	200	270	33	490	530	550	630
8	200	290	250	310	34	490	550	570	650
9	200	300	280	320	35	500	560	590	670
10	220	320	300	340	36	510	570	620	700
11	230	330	310	350	37	520	580	640	740
12	270	370	320	360	38	530	590	680	780
13	300	380	330	370	39	540	600	730	800
14	330	390	340	380	40	550	610	750	800
15	340	400	350	390	41	560	620		
16	360	400	350	390	42	580	640		
17	360	400	360	400	43	590	650		
18	370	410	370	410	44	600	660		
19	380	420	380	420	45	620	680		
20	390	430	390	430	46	630	710		
21	400	440	400	440	47	650	730		
22	400	440	410	450	48	680	760		
23	410	450	410	470	49	710	790		
24	420	460	430	490	50	750	800		
25	430	470	440	500					

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at bluebook.app.collegeboard.org to take the practice test in
the digital format.



SAT[®]



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

Although critics believed that customers would never agree to pay to pick their own produce on farms, such concerns didn't _____ Booker T. Whatley's efforts to promote the practice. Thanks in part to Whatley's determined advocacy, farms that allow visitors to pick their own apples, pumpkins, and other produce can be found throughout the United States.

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

- A) enhance
- B) hinder
- C) misrepresent
- D) aggravate

2

The artisans of the Igun Eronmwon guild in Benin City, Nigeria, typically _____ the bronze- and brasscasting techniques that have been passed down through their families since the thirteenth century, but they don't strictly observe every tradition; for example, guild members now use air-conditioning motors instead of handheld bellows to help heat their forges.

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

- A) experiment with
- B) adhere to
- C) improve on
- D) grapple with

3

Set in a world where science fiction tropes exist as everyday realities, Charles Yu's 2010 novel *How to Live Safely in a Science Fictional Universe* traces a time traveler's quest to find his father. Because the journey at the novel's center is so _____, with the protagonist ricocheting chaotically across time, the reader often wonders whether the pair will ever be reunited.

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

- A) haphazard
- B) premeditated
- C) inspirational
- D) fruitless

4

In a 2019 study, Jeremy Gunawardena and colleagues found that the single-celled protozoan *Stentor roeseli* not only uses strategies to escape irritating stimuli but also switches strategies when one fails. This evidence of protozoans sophisticatedly "changing their minds" demonstrates that single-celled organisms may not be limited to _____ behaviors.

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

- A) aggressive
- B) rudimentary
- C) evolving
- D) advantageous

5

Some economic historians _____ that late nineteenth- and early twentieth-century households in the United States experienced an economy of scale when it came to food purchases—they assumed that large households spent less on food per person than did small households. Economist Trevon Logan showed, however, that a close look at the available data disproves this supposition.

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

- A) surmised
- B) contrived
- C) questioned
- D) regretted

6

The following text is adapted from Karel Čapek's 1920 play *R.U.R. (Rossum's Universal Robots)*, translated by Paul Selver and Nigel Playfair in 1923. Fabry and Busman are telling Miss Glory why their company manufactures robots.

FABRY: One Robot can replace two and a half workmen. The human machine, Miss Glory, was terribly *imperfect*. It had to be removed sooner or later.

BUSMAN: It was too expensive.

FABRY: It was not *effective*. It no longer answers the requirements of *modern engineering*. Nature has no idea of keeping pace with *modern labor*.

As used in the text, what does the word “answers” most nearly mean?

- A) Explains
- B) Rebuts
- C) Defends
- D) Fulfills

7

In 2014, Amelia Quon and her team at NASA set out to build a helicopter capable of flying on Mars. Because Mars's atmosphere is only one percent as dense as Earth's, the air of Mars would not provide enough resistance to the rotating blades of a standard helicopter for the aircraft to stay aloft. For five years, Quon's team tested designs in a lab that mimicked Mars's atmospheric conditions. The craft the team ultimately designed can fly on Mars because its blades are longer and rotate faster than those of a helicopter of the same size built for Earth.

According to the text, why would a helicopter built for Earth be unable to fly on Mars?

- A) Because Mars and Earth have different atmospheric conditions
- B) Because the blades of helicopters built for Earth are too large to work on Mars
- C) Because the gravity of Mars is much weaker than the gravity of Earth
- D) Because helicopters built for Earth are too small to handle the conditions on Mars

8

In West Africa, jalis have traditionally been keepers of information about family histories and records of important events. They have often served as teachers and advisers, too. New technologies may have changed some aspects of the role today, but jalis continue to be valued for knowing and protecting their peoples' stories.

Which choice best states the main idea of the text?

- A) Even though there have been some changes in their role, jalis continue to preserve their communities' histories.
- B) Although jalis have many roles, many of them like teaching best.
- C) Jalis have been entertaining the people within their communities for centuries.
- D) Technology can now do some of the things jalis used to be responsible for.

9

The following text is adapted from Jack London's 1903 novel *The Call of the Wild*. Buck is a sled dog living with John Thornton in Yukon, Canada.

Thornton alone held [Buck]. The rest of mankind was as nothing. Chance travellers might praise or pet him; but he was cold under it all, and from a too demonstrative man he would get up and walk away. When Thornton's partners, Hans and Pete, arrived on the long-expected raft, Buck refused to notice them till he learned they were close to Thornton; after that he tolerated them in a passive sort of way, accepting favors from them as though he favored them by accepting.

Which choice best states the main idea of the text?

- A) Buck has become less social since he began living with Thornton.
- B) Buck mistrusts humans and does his best to avoid them.
- C) Buck has been especially well liked by most of Thornton's friends.
- D) Buck holds Thornton in higher regard than any other person.

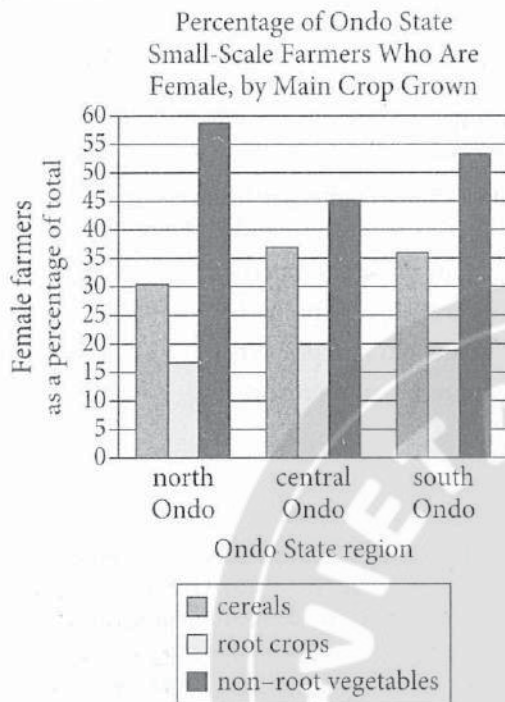
10

The Souls of Black Folk is a 1903 book by W.E.B. Du Bois. In the book, Du Bois suggests that upon hearing Black folk songs, he felt an intuitive and sometimes unexpected sense of cultural recognition: _____

Which quotation from *The Souls of Black Folk* most effectively illustrates the claim?

- A) "[Black folk music] still remains as the singular spiritual heritage of the nation and the greatest gift of the Negro people."
- B) "Ever since I was a child these songs have stirred me strangely. They came out of the South unknown to me, one by one, and yet at once I knew them as of me and of mine."
- C) "Caricature has sought again to spoil the quaint beauty of the music, and has filled the air with many debased melodies which vulgar ears scarce know from the real. But the true Negro folk-song still lives in the hearts of those who have heard them truly sung and in the hearts of the Negro people."
- D) "The songs are indeed the siftings of centuries; the music is far more ancient than the words, and in it we can trace here and there signs of development."

11



Geographer Adebayo Oluwale Eludoyin and his colleagues surveyed small-scale farmers in three locations in Ondo State, Nigeria—which has mountainous terrain in the north, an urbanized center, and coastal terrain in the south—to learn more about their practices, like the types of crops they mainly cultivated. In some regions, female farmers were found to be especially prominent in the cultivation of specific types of crops and even constituted the majority of farmers who cultivated those crops; for instance, _____

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

- A) most of the farmers who mainly cultivated cereals and most of the farmers who mainly cultivated non-root vegetables in south Ondo were women.
- B) more women in central Ondo mainly cultivated root crops than mainly cultivated cereals.
- C) most of the farmers who mainly cultivated non-root vegetables in north and south Ondo were women.
- D) a relatively equal proportion of women across the three regions of Ondo mainly cultivated cereals.

12

Scholars have noted that F. Scott Fitzgerald's writings were likely influenced in part by his marriage to Zelda Fitzgerald, but many don't recognize Zelda as a writer in her own right. Indeed, Zelda authored several works herself, such as the novel *Save Me the Waltz* and numerous short stories. Thus, those who primarily view Zelda as an inspiration for F. Scott's writings _____

Which choice most logically completes the text?

- A) overlook the many other factors that motivated F. Scott to write.
- B) risk misrepresenting the full range of Zelda's contributions to literature.
- C) may draw inaccurate conclusions about how F. Scott and Zelda viewed each other's works.
- D) tend to read the works of F. Scott and Zelda in an overly autobiographical light.

13

Herbivorous sauropod dinosaurs could grow more than 100 feet long and weigh up to 80 tons, and some researchers have attributed the evolution of sauropods to such massive sizes to increased plant production resulting from high levels of atmospheric carbon dioxide during the Mesozoic era. However, there is no evidence of significant spikes in carbon dioxide levels coinciding with relevant periods in sauropod evolution, such as when the first large sauropods appeared, when several sauropod lineages underwent further evolution toward gigantism, or when sauropods reached their maximum known sizes, suggesting that _____

Which choice most logically completes the text?

- A) fluctuations in atmospheric carbon dioxide affected different sauropod lineages differently.
- B) the evolution of larger body sizes in sauropods did not depend on increased atmospheric carbon dioxide.
- C) atmospheric carbon dioxide was higher when the largest known sauropods lived than it was when the first sauropods appeared.
- D) sauropods probably would not have evolved to such immense sizes if atmospheric carbon dioxide had been even slightly higher.

14

Known for her massive photorealistic paintings of African American figures floating or swimming in pools, Calida Garcia _____ was the logical choice to design the book cover for Ta-Nehisi Coates's *The Water Dancer*, a novel about an African American man who can travel great distances through water.

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

- A) Rawles—
- B) Rawles:
- C) Rawles,
- D) Rawles

15

In 2010, archaeologist Noel Hidalgo Tan was visiting the twelfth-century temple of Angkor Wat in Cambodia when he noticed markings of red paint on the temple _____. the help of digital imaging techniques, he discovered the markings to be part of an elaborate mural containing over 200 paintings.

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

- A) walls, with
- B) walls with
- C) walls so with
- D) walls. With

16

Cheng Dang and her colleagues at the University of Washington recently ran simulations to determine the extent to which individual snow _____ affect the amount of light reflecting off a snowy surface.

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

- A) grain's physical properties'
- B) grains' physical properties
- C) grains' physical property's
- D) grains physical properties

17

The Mission 66 initiative, which was approved by Congress in 1956, represented a major investment in the infrastructure of overburdened national _____. it prioritized physical improvements to the parks' roads, utilities, employee housing, and visitor facilities while also establishing educational programming for the public.

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

- A) parks and
- B) parks
- C) parks;
- D) parks,

18

The Progressive Era in the United States witnessed the rise of numerous Black women's clubs, local organizations that advocated for racial and gender equality. Among the clubs' leaders _____ Josephine St. Pierre Ruffin, founder of the Women's Era Club of Boston.

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

- A) was
- B) were
- C) are
- D) have been

19

Eli Eisenberg, a genetics expert at Tel Aviv University in Israel, recently discovered that _____ have a special genetic ability called RNA editing that confers evolutionary advantages.

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

- A) cephalopods, ocean dwellers that include the squid, the octopus, and the cuttlefish
- B) cephalopods—ocean dwellers—that include the squid, the octopus, and the cuttlefish,
- C) cephalopods, ocean dwellers that include: the squid, the octopus, and the cuttlefish,
- D) cephalopods—ocean dwellers that include the squid, the octopus, and the cuttlefish—

20

A model created by biologist Luis Valente predicts that the rate of speciation—the rate at which new species form—on an isolated island located approximately 5,000 kilometers from the nearest mainland _____ triple the rate of speciation on an island only 500 kilometers from the mainland.

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

- A) being
- B) to be
- C) to have been
- D) will be

21

Award-winning travel writer Linda Watanabe McFerrin considers the background research she conducts on destinations featured in her travel books to be its own reward. _____ McFerrin admits to finding the research phase of her work just as fascinating and engaging as exploring a location in person.

Which choice completes the text with the most logical transition?

- A) By contrast,
- B) Likewise,
- C) Besides,
- D) In fact,

22

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

- Bharati Mukherjee was an Indian-born author of novels and short stories.
- She published the novel *The Holder of the World* in 1993.
- A central character in the novel is a woman living in twentieth-century United States.
- Another central character is a woman living in seventeenth-century India.

The student wants to introduce the novel *The Holder of the World* to an audience already familiar with Bharati Mukherjee. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) Bharati Mukherjee's settings include both twentieth-century United States and seventeenth-century India.
- B) In addition to her novel *The Holder of the World*, which was published in 1993, Indian-born author Bharati Mukherjee wrote other novels and short stories.
- C) Bharati Mukherjee's novel *The Holder of the World* centers around two women, one living in twentieth-century United States and the other in seventeenth-century India.
- D) *The Holder of the World* was not the only novel written by Indian-born author Bharati Mukherjee.

23

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

- Pterosaurs were flying reptiles that existed millions of years ago.
- In a 2021 study, Anusuya Chinsamy-Turan analyzed fragments of pterosaur jawbones located in the Sahara Desert.
- She was initially unsure if the bones belonged to juvenile or adult pterosaurs.
- She used advanced microscope techniques to determine that the bones had few growth lines relative to the bones of fully grown pterosaurs.
- She concluded that the bones belonged to juveniles.

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

- A) In 2021, Chinsamy-Turan studied pterosaur jawbones and was initially unsure if the bones belonged to juveniles or adults.
- B) Pterosaur jawbones located in the Sahara Desert were the focus of a 2021 study.
- C) In a 2021 study, Chinsamy-Turan used advanced microscope techniques to analyze the jawbones of pterosaurs, flying reptiles that existed millions of years ago.
- D) In a 2021 study, Chinsamy-Turan determined that pterosaur jawbones located in the Sahara Desert had few growth lines relative to the bones of fully grown pterosaurs and thus belonged to juveniles.

24

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

- Samuel Selvon was a Trinidadian author.
- *The Lonely Londoners* is one of his most celebrated novels.
- Selvon published the novel in 1956.
- It is about a group of men who emigrate from the Caribbean to Great Britain after World War II.
- Some of *The Lonely Londoners*' characters also appear in Selvon's later novel *Moses Ascending*.

The student wants to introduce Samuel Selvon and his novel *The Lonely Londoners* to a new audience. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) In 1956, Trinidadian author Samuel Selvon published one of his most celebrated novels, *The Lonely Londoners*, which is about a group of men who emigrate from the Caribbean to Great Britain after World War II.
- B) Samuel Selvon wrote the novel *Moses Ascending* after he wrote *The Lonely Londoners*.
- C) *The Lonely Londoners*, a celebrated novel that was published in 1956, depicts post-World War II Caribbean migration from the perspective of a Trinidadian author.
- D) Some of the characters who appear in Samuel Selvon's *Moses Ascending* also appear in *The Lonely Londoners*.

25

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

- Seven species of sea turtle exist today.
- Five sea turtle species can be found in the Atlantic Ocean.
- One of those species is the Kemp's ridley sea turtle.
- Its scientific name is *Lepidochelys kempii*.
- Another of those species is the olive ridley sea turtle.
- Its scientific name is *Lepidochelys olivacea*.

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

- A) Among the seven species of sea turtle is the olive ridley sea turtle, which can be found in the Atlantic Ocean.
- B) The Kemp's ridley sea turtle is referred to as *Lepidochelys kempii*, while the olive ridley sea turtle is referred to as *Lepidochelys olivacea*.
- C) Both the Kemp's ridley sea turtle and the olive ridley sea turtle can be found in the Atlantic Ocean.
- D) The Kemp's ridley sea turtle (*Lepidochelys kempii*) and the olive ridley sea turtle (*Lepidochelys olivacea*) are different species.

26

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

- In 2019, Emily Shepard and colleagues in the UK and Germany studied the effect of wind on auks' success in landing at cliffside nesting sites.
- They found as wind conditions intensified, the birds needed more attempts in order to make a successful landing.
- When the wind was still, almost 100% of landing attempts were successful.
- In a strong breeze, approximately 40% of attempts were successful.
- In near-gale conditions, only around 20% of attempts were successful.

The student wants to summarize the study. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) For a 2019 study, researchers from the UK and Germany collected data on auks' attempts to land at cliffside nesting sites in different wind conditions.
- B) Emily Shepard and her colleagues wanted to know the extent to which wind affected auks' success in landing at cliffside nesting sites, so they conducted a study.
- C) Knowing that auks often need multiple attempts to land at their cliffside nesting sites, Emily Shepard studied the birds' success rate, which was only around 20% in some conditions.
- D) Emily Shepard's 2019 study of auks' success in landing at cliffside nesting sites showed that as wind conditions intensified, the birds' success rate decreased.

27

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

- Abdulrazak Gurnah was awarded the 2021 Nobel Prize in Literature.
- Gurnah was born in Zanzibar in East Africa and currently lives in the United Kingdom.
- Many readers have singled out Gurnah's 1994 book *Paradise* for praise.
- *Paradise* is a historical novel about events that occurred in colonial East Africa.

The student wants to introduce *Paradise* to an audience unfamiliar with the novel and its author. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) Abdulrazak Gurnah, who wrote *Paradise* and later was awarded the Nobel Prize in Literature, was born in Zanzibar in East Africa and currently lives in the United Kingdom.
- B) Many readers have singled out Abdulrazak Gurnah's 1994 book *Paradise*, a historical novel about colonial East Africa, for praise.
- C) A much-praised historical novel about colonial East Africa, *Paradise* (1994) was written by Abdulrazak Gurnah, winner of the 2021 Nobel Prize in Literature.
- D) *Paradise* is a historical novel about events that occurred in colonial East Africa, Abdulrazak Gurnah's homeland.

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.

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 studying the use of external stimuli to reduce the itching sensation caused by an allergic histamine response, Louise Ward and colleagues found that while harmless applications of vibration or warming can provide a temporary distraction, such _____ stimuli actually offer less relief than a stimulus that seems less benign, like a mild electric shock.

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

- A) deceptive
- B) innocuous
- C) novel
- D) impractical

2

New and interesting research conducted by Suleiman A. Al-Sweedan and Moath Alhaj is inspired by their observation that though there have been many studies of the effect of high altitude on blood chemistry, there is a _____ studies of the effect on blood chemistry of living in locations below sea level, such as the California towns of Salton City and Seeley.

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

- A) quarrel about
- B) paucity of
- C) profusion of
- D) verisimilitude in

3

Whether the reign of a French monarch such as Hugh Capet or Henry I was historically consequential or relatively uneventful, its trajectory was shaped by questions of legitimacy and therefore cannot be understood without a corollary understanding of the factors that allowed the monarch to _____ his right to hold the throne.

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

- A) reciprocate
- B) annotate
- C) buttress
- D) disengage

4

Researcher Haesung Jung led a 2020 study showing that individual acts of kindness can _____ prosocial behavior across a larger group. Jung and her team found that bystanders who witness a helpful act become more likely to offer help to someone else, and in doing so, can inspire still others to act.

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

- A) require
- B) remember
- C) foster
- D) discourage

5

The following text is adapted from *Indian Boyhood*, a 1902 memoir by Ohiyesa (Charles A. Eastman), a Santee Dakota writer. In the text, Ohiyesa recalls how the women in his tribe harvested maple syrup during his childhood.

Now the women began to test the trees—moving leisurely among them, axe in hand, and striking a single quick blow, to see if the sap would appear. The trees, like people, have their individual characters; some were ready to yield up their life-blood, while others were more reluctant. Now one of the birchen basins was set under each tree, and a hardwood chip driven deep into the cut which the axe had made. From the corners of this chip—at first drop by drop, then more freely—the sap trickled into the little dishes.

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

- A) It portrays the range of personality traits displayed by the women as they work.
- B) It foregrounds the beneficial relationship between humans and maple trees.
- C) It demonstrates how human behavior can be influenced by the natural environment.
- D) It elaborates on an aspect of the maple trees that the women evaluate.

6

The following text is from Charlotte Brontë's 1847 novel *Jane Eyre*. Jane, the narrator, works as a governess at Thornfield Hall.

I went on with my day's business tranquilly; but ever and anon vague suggestions kept wandering across my brain of reasons why I should quit Thornfield; and I kept involuntarily framing advertisements and pondering conjectures about new situations: these thoughts I did not think to check; they might germinate and bear fruit if they could.

Which choice best states the main purpose of the text?

- A) To convey a contrast between Jane's outward calmness and internal restlessness
- B) To emphasize Jane's loyalty to the people she works for at Thornfield Hall
- C) To demonstrate that Jane finds her situation both challenging and deeply fulfilling
- D) To describe Jane's determination to secure employment outside of Thornfield Hall

7

Musician Joni Mitchell, who is also a painter, uses images she creates for her album covers to emphasize ideas expressed in her music. For the cover of her album *Turbulent Indigo* (1994), Mitchell painted a striking self-portrait that closely resembles Vincent van Gogh's *Self-Portrait with Bandaged Ear* (1889). The image calls attention to the album's title song, in which Mitchell sings about the legacy of the postimpressionist painter. In that song, Mitchell also hints that she feels a strong artistic connection to Van Gogh—an idea that is reinforced by her imagery on the cover.

Which choice best describes the overall structure of the text?

- A) It presents a claim about Mitchell, then gives an example supporting that claim.
- B) It discusses Van Gogh's influence on Mitchell, then considers Mitchell's influence on other artists.
- C) It describes a similarity between two artists, then notes a difference between them.
- D) It describes the songs on *Turbulent Indigo*, then explains how they relate to the album's cover.

8

A study by a team including finance professor Madhu Veeraraghavan suggests that exposure to sunshine during the workday can lead to overly optimistic behavior. Using data spanning from 1994 to 2010 for a set of US companies, the team compared over 29,000 annual earnings forecasts to the actual earnings later reported by those companies. The team found that the greater the exposure to sunshine at work in the two weeks before a manager submitted an earnings forecast, the more the manager's forecast exceeded what the company actually earned that year.

Which choice best states the function of the underlined sentence in the overall structure of the text?

- A) To summarize the results of the team's analysis
- B) To present a specific example that illustrates the study's findings
- C) To explain part of the methodology used in the team's study
- D) To call out a challenge the team faced in conducting its analysis

9

Text 1

Most animals can regenerate some parts of their bodies, such as skin. But when a three-banded panther worm is cut into three pieces, each piece grows into a new worm. Researchers are investigating this feat partly to learn more about humans' comparatively limited abilities to regenerate, and they're making exciting progress. An especially promising discovery is that both humans and panther worms have a gene for early growth response (EGR) linked to regeneration.

Text 2

When Mansi Srivastava and her team reported that panther worms, like humans, possess a gene for EGR, it caused excitement. However, as the team pointed out, the gene likely functions very differently in humans than it does in panther worms. Srivastava has likened EGR to a switch that activates other genes involved in regeneration in panther worms, but how this switch operates in humans remains unclear.

Based on the texts, what would the author of Text 2 most likely say about Text 1's characterization of the discovery involving EGR?

- A) It is reasonable given that Srivastava and her team have identified how EGR functions in both humans and panther worms.
- B) It is overly optimistic given additional observations from Srivastava and her team.
- C) It is unexpected given that Srivastava and her team's findings were generally met with enthusiasm.
- D) It is unfairly dismissive given the progress that Srivastava and her team have reported.

10

Credited Film Output of James Young Deer,
Dark Cloud, Edwin Carewe, and Lillian St. Cyr

Individual	Years active	Number of films known and commonly credited
James Young Deer	1909–1924	33 (actor), 35 (director), 10 (writer)
Dark Cloud	1910–1920	35 (actor), 1 (writer)
Edwin Carewe	1912–1934	47 (actor), 58 (director), 20 (producer), 4 (writer)
Lillian St. Cyr (Red Wing)	1908–1921	66 (actor)

Some researchers studying Indigenous actors and filmmakers in the United States have turned their attention to the early days of cinema, particularly the 1910s and 1920s, when people like James Young Deer, Dark Cloud, Edwin Carewe, and Lillian St. Cyr (known professionally as Red Wing) were involved in one way or another with numerous films. In fact, so many films and associated records for this era have been lost that counts of those four figures' output should be taken as bare minimums rather than totals; it's entirely possible, for example, that _____

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

- A) Dark Cloud acted in significantly fewer films than did Lillian St. Cyr, who is credited with 66 performances.
- B) Edwin Carewe's 47 credited acting roles includes only films made after 1934.
- C) Lillian St. Cyr acted in far more than 66 films and Edwin Carewe directed more than 58.
- D) James Young Deer actually directed 33 films and acted in only 10.

11

Mosasaurs were large marine reptiles that lived in the Late Cretaceous period, approximately 100 million to 66 million years ago. Celina Suarez, Alberto Pérez-Huerta, and T. Lynn Harrell Jr. examined oxygen-18 isotopes in mosasaur tooth enamel in order to calculate likely mosasaur body temperatures and determined that mosasaurs were endothermic—that is, they used internal metabolic processes to maintain a stable body temperature in a variety of ambient temperatures. Suarez, Pérez-Huerta, and Harrell claim that endothermy would have enabled mosasaurs to include relatively cold polar waters in their range.

Which finding, if true, would most directly support Suarez, Pérez-Huerta, and Harrell's claim?

- A) Mosasaurs' likely body temperatures are easier to determine from tooth enamel oxygen-18 isotope data than the body temperatures of nonendothermic Late Cretaceous marine reptiles are.
- B) Fossils of both mosasaurs and nonendothermic marine reptiles have been found in roughly equal numbers in regions known to be near the poles during the Late Cretaceous, though in lower concentrations than elsewhere.
- C) Several mosasaur fossils have been found in regions known to be near the poles during the Late Cretaceous, while relatively few fossils of nonendothermic marine reptiles have been found in those locations.
- D) During the Late Cretaceous, seawater temperatures were likely higher throughout mosasaurs' range, including near the poles, than seawater temperatures at those same latitudes are today.

12



Considering a large sample of companies, economics experts Maria Guadalupe, Julie Wulf, and Raghuram Rajan assessed the number of managers and leaders from different departments who reported directly to a chief executive officer (CEO). According to the researchers, the findings suggest that across the years analyzed, there was a growing interest among CEOs in connecting with more departments in their companies.

Which choice best describes data from the graph that support the researchers' conclusion?

- A) The average numbers of managers and department leaders reporting directly to their CEO didn't fluctuate from the 1991-1995 period to the 2001-2008 period.
- B) The average number of managers reporting directly to their CEO was highest in the 1996-2001 period.
- C) The average number of department leaders reporting directly to their CEO was greater than the average number of managers reporting directly to their CEO in each of the three periods studied.
- D) The average number of department leaders reporting directly to their CEO rose over the three periods studied.

13

Given that stars and planets initially form from the same gas and dust in space, some astronomers have posited that host stars (such as the Sun) and their planets (such as those in our solar system) are composed of the same materials, with the planets containing equal or smaller quantities of the materials that make up the host star. This idea is also supported by evidence that rocky planets in our solar system are composed of some of the same materials as the Sun.

Which finding, if true, would most directly weaken the astronomers' claim?

- A) Most stars are made of hydrogen and helium, but when cooled they are revealed to contain small amounts of iron and silicate.
- B) A nearby host star is observed to contain the same proportion of hydrogen and helium as that of the Sun.
- C) Evidence emerges that the amount of iron in some rocky planets is considerably higher than the amount in their host star.
- D) The method for determining the composition of rocky planets is discovered to be less effective when used to analyze other kinds of planets.

14

While attending school in New York City in the 1980s, Okwui Enwezor encountered few works by African artists in exhibitions, despite New York's reputation as one of the best places to view contemporary art from around the world. According to an arts journalist, later in his career as a renowned curator and art historian, Enwezor sought to remedy this deficiency, not by focusing solely on modern African artists, but by showing how their work fits into the larger context of global modern art and art history.

Which finding, if true, would most directly support the journalist's claim?

- A) As curator of the Haus der Kunst in Munich, Germany, Enwezor organized a retrospective of Ghanaian sculptor El Anatsui's work entitled *El Anatsui: Triumphant Scale*, one of the largest art exhibitions devoted to a Black artist in Europe's history.
- B) In the exhibition *Postwar: Art Between the Pacific and the Atlantic, 1945–1965*, Enwezor and cocurator Katy Siegel brought works by African artists such as Malangatana Ngwenya together with pieces by major figures from other countries, like US artist Andy Warhol and Mexico's David Siqueiros.
- C) Enwezor's work as curator of the 2001 exhibition *The Short Century: Independence and Liberation Movements in Africa, 1945–1994* showed how African movements for independence from European colonial powers following the Second World War profoundly influenced work by African artists of the period, such as Kamala Ibrahim Ishaq and Thomas Mukarobgwa.
- D) Enwezor organized the exhibition *In/sight: African Photographers, 1940 to the Present* not to emphasize a particular aesthetic trend but to demonstrate the broad range of ways in which African artists have approached the medium of photography.

15

One challenge when researching whether holding elected office changes a person's behavior is the problem of ensuring that the experiment has an appropriate control group. To reveal the effect of holding office, researchers must compare people who hold elected office with people who do not hold office but who are otherwise similar to the office-holders. Since researchers are unable to control which politicians win elections, they therefore _____

Which choice most logically completes the text?

- A) struggle to find valid data about the behavior of politicians who do not currently hold office.
- B) can only conduct valid studies with people who have previously held office rather than people who presently hold office.
- C) should select a control group of people who differ from office holders in several significant ways.
- D) will find it difficult to identify a group of people who can function as an appropriate control group for their studies.

16

Compiled in the late 1500s largely through the efforts of Indigenous scribes, *Cantares Mexicanos* is the most important collection of poetry in Classical Nahuatl, the principal language of the Aztec Empire. The poems portray Aztec society before the occupation of the empire by the army of Spain, and marginal notes in *Cantares Mexicanos* indicate that much of the collection's content predates the initial invasion. Nonetheless, some of the poems contain inarguable references to beliefs and customs common in Spain during this era. Thus, some scholars have concluded that _____

Which choice most logically completes the text?

- A) while its content largely predates the invasion, *Cantares Mexicanos* also contains additions made after the invasion.
- B) although those who compiled *Cantares Mexicanos* were fluent in Nahuatl, they had limited knowledge of the Spanish language.
- C) before the invasion by Spain, the poets of the Aztec Empire borrowed from the literary traditions of other societies.
- D) the references to beliefs and customs in Spain should be attributed to a coincidental resemblance between the societies of Spain and the Aztec Empire.

17

To humans, it does not appear that the golden orb-weaver spider uses camouflage to capture its _____ the brightly colored arachnid seems to wait conspicuously in the center of its large circular web for insects to approach. Researcher Po Peng of the University of Melbourne has explained that the spider's distinctive coloration may in fact be part of its appeal.

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

- A) prey, rather,
- B) prey rather,
- C) prey, rather;
- D) prey; rather,

18

Bonnie Buratti of NASA's Jet Propulsion Laboratory _____ data about Saturn's rings collected by the *Cassini* spacecraft when she made an interesting discovery: the tiny moons embedded between and within Saturn's rings are shaped by the buildup of ring material on the moons' surfaces.

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

- A) studies
- B) has been studying
- C) will study
- D) was studying

19

On July 23, 1854, a clipper ship called the *Flying Cloud* entered San Francisco _____ left New York Harbor under the guidance of Captain Josiah Perkins Creesy and his wife, navigator Eleanor Creesy, a mere 89 days and 8 hours earlier, the celebrated ship set a record that would stand for 135 years.

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

- A) Bay and having
- B) Bay. Having
- C) Bay, having
- D) Bay having

20

Bengali author Toru Dutt's *A Sheaf Gleaned in French Fields* (1876), a volume of English translations of French poems, _____ scholars' understanding of the transnational and multilingual contexts in which Dutt lived and worked.

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

- A) has enhanced
- B) are enhancing
- C) have enhanced
- D) enhance

21

Hegra is an archaeological site in present-day Saudi Arabia and was the second largest city of the Nabataean Kingdom (fourth century BCE to first century CE). Archaeologist Laila Nehmé recently traveled to Hegra to study its ancient _____ into the rocky outcrops of a vast desert, these burial chambers seem to blend seamlessly with nature.

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

- A) tombs. Built
- B) tombs, built
- C) tombs and built
- D) tombs built

22

In 1937, Chinese American screen actor Anna May Wong, who had portrayed numerous villains and secondary characters but never a heroine, finally got a starring role in Paramount Pictures' *Daughter of Shanghai*, a film that _____ "expanded the range of possibilities for Asian images on screen."

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

- A) critic, Stina Chyn, claims
- B) critic, Stina Chyn, claims,
- C) critic Stina Chyn claims
- D) critic Stina Chyn, claims,

23

The Arctic-Alpine Botanic Garden in Norway and the Jardim Botânico of Rio de Janeiro in Brazil are two of many botanical gardens around the world dedicated to growing diverse plant _____ fostering scientific research; and educating the public about plant conservation.

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

- A) species, both native and nonnative,
- B) species, both native and nonnative;
- C) species; both native and nonnative,
- D) species both native and nonnative,

24

The Babylonian king Hammurabi achieved much during his forty-year reign. He conquered all of Mesopotamia and built Babylon into one of the most powerful cities of the ancient world. Today, _____ he is mainly remembered for a code of laws inscribed on a seven-foot-tall block of stone: the Code of Hammurabi.

Which choice completes the text with the most logical transition?

- A) therefore,
- B) likewise,
- C) however,
- D) for instance,

25

In her poetry collection *Thomas and Beulah*, Rita Dove interweaves the titular characters' personal stories with broader historical narratives. She places Thomas's journey from the American South to the Midwest in the early 1900s within the larger context of the Great Migration. _____ Dove sets events from Beulah's personal life against the backdrop of the US Civil Rights Movement.

Which choice completes the text with the most logical transition?

- A) Specifically,
- B) Thus,
- C) Regardless,
- D) Similarly,

26

When designing costumes for film, American artist Suttirat Larlarb typically custom fits the garments to each actor. _____ for the film *Sunshine*, in which astronauts must reignite a dying Sun, she designed a golden spacesuit and had a factory reproduce it in a few standard sizes; lacking a tailor-made quality, the final creations reflected the ungainliness of actual spacesuits.

Which choice completes the text with the most logical transition?

- A) Nevertheless,
- B) Thus,
- C) Likewise,
- D) Moreover,

27

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

- Astronomers estimate that the number of comets orbiting the Sun is in the billions.
- 81P/Wild is one of many comets whose orbit has changed over time.
- 81P/Wild's orbit once lay between the orbits of Uranus and Jupiter.
- The comet's orbit is now positioned between the orbits of Jupiter and Mars.

The student wants to make and support a generalization about the orbits of comets. Which choice most effectively uses relevant information from the notes to accomplish these goals?

- A) Astronomers estimate that the number of comets orbiting the Sun is in the billions; the comets' orbits may change over time.
- B) Like Uranus, Jupiter, and Mars, billions of comets orbit the Sun.
- C) One example of a comet is 81P/Wild, whose orbit around the Sun once lay between Uranus's and Jupiter's orbits but is now positioned between those of Jupiter and Mars.
- D) A comet's orbit around the Sun may change over time: the orbit of comet 81P/Wild once lay between the orbits of Uranus and Jupiter but is now positioned between those of Jupiter and Mars.

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



$$A = \pi r^2$$

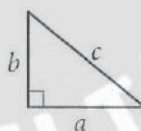
$$C = 2\pi r$$



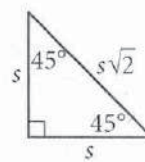
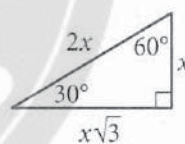
$$A = \ell w$$



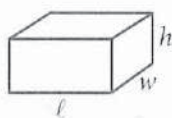
$$A = \frac{1}{2}bh$$



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



Special Right Triangles



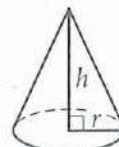
$$V = \ell wh$$



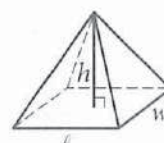
$$V = \pi r^2 h$$



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



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



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

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

If $x = 7$, what is the value of $x + 20$?

- A) 13
- B) 20
- C) 27
- D) 34

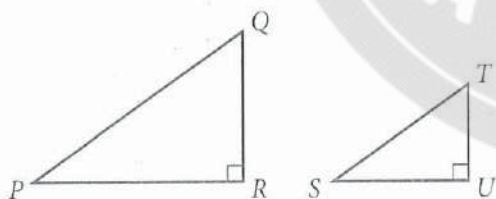
2

Data set X: 5, 9, 9, 13
Data set Y: 5, 9, 9, 13, 27

The lists give the values in data sets X and Y. Which statement correctly compares the mean of data set X and the mean of data set Y?

- A) The mean of data set X is greater than the mean of data set Y.
- B) The mean of data set X is less than the mean of data set Y.
- C) The means of data set X and data set Y are equal.
- D) There is not enough information to compare the means.

3



Note: Figures not drawn to scale.

Right triangles PQR and STU are similar, where P corresponds to S . If the measure of angle Q is 18° , what is the measure of angle S ?

- A) 18°
- B) 72°
- C) 82°
- D) 162°

4

A rocket contained 467,000 kilograms (kg) of propellant before launch. Exactly 21 seconds after launch, 362,105 kg of this propellant remained. On average, approximately how much propellant, in kg, did the rocket burn each second after launch?

- A) 4,995
- B) 17,243
- C) 39,481
- D) 104,895

5

$$\begin{aligned} 4x &= 20 \\ -3x + y &= -7 \end{aligned}$$

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

- A) -27
- B) -13
- C) 13
- D) 27

6

A certain apprentice has enrolled in 85 hours of training courses. The equation $10x + 15y = 85$ represents this situation, where x is the number of on-site training courses and y is the number of online training courses this apprentice has enrolled in. How many more hours does each online training course take than each on-site training course?

7

Square X has a side length of 12 centimeters. The perimeter of square Y is 2 times the perimeter of square X. What is the length, in centimeters, of one side of square Y?

- A) 6
- B) 10
- C) 14
- D) 24

8

$$g(m) = -0.05m + 12.1$$

The given function g models the number of gallons of gasoline that remains from a full gas tank in a car after driving m miles. According to the model, about how many gallons of gasoline are used to drive each mile?

- A) 0.05
- B) 12.1
- C) 20
- D) 242.0

9

If $|4x - 4| = 112$, what is the positive value of $x - 1$?

10

$$\frac{1}{7b} = \frac{11x}{y}$$

The given equation relates the positive numbers b , x , and y . Which equation correctly expresses x in terms of b and y ?

- A) $x = \frac{7by}{11}$
- B) $x = y - 77b$
- C) $x = \frac{y}{77b}$
- D) $x = 77by$

11

x	10	15	20	25
$f(x)$	82	137	192	247

The table shows four values of x and their corresponding values of $f(x)$. There is a linear relationship between x and $f(x)$ that is defined by the equation $f(x) = mx - 28$, where m is a constant. What is the value of m ?

12

$$(5x^3 - 3) - (-4x^3 + 8)$$

The given expression is equivalent to $bx^3 - 11$, where b is a constant. What is the value of b ?

13

$$\begin{aligned} y &> 14 \\ 4x + y &< 18 \end{aligned}$$

The point $(x, 53)$ is a solution to the system of inequalities in the xy -plane. Which of the following could be the value of x ?

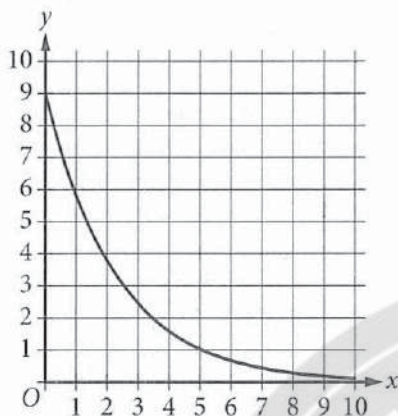
- A) -9
- B) -5
- C) 5
- D) 9

14

Bacteria are growing in a liquid growth medium. There were 300,000 cells per milliliter during an initial observation. The number of cells per milliliter doubles every 3 hours. How many cells per milliliter will there be 15 hours after the initial observation?

- A) 1,500,000
- B) 2,400,000
- C) 4,500,000
- D) 9,600,000

15



The graph gives the estimated number of catalogs y , in thousands, a company sent to its customers at the end of each year, where x represents the number of years since the end of 1992, where $0 \leq x \leq 10$. Which statement is the best interpretation of the y -intercept in this context?

- A) The estimated total number of catalogs the company sent to its customers during the first 10 years was 9,000.
- B) The estimated total number of catalogs the company sent to its customers from the end of 1992 to the end of 2002 was 90.
- C) The estimated number of catalogs the company sent to its customers at the end of 1992 was 9.
- D) The estimated number of catalogs the company sent to its customers at the end of 1992 was 9,000.

16

Which expression is equivalent to $\sqrt[7]{x^9 y^9}$, where x and y are positive?

- A) $(xy)^{\frac{7}{9}}$
- B) $(xy)^{\frac{9}{7}}$
- C) $(xy)^{16}$
- D) $(xy)^{63}$

17

The population of City A increased by 7% from 2015 to 2016. If the 2016 population is k times the 2015 population, what is the value of k ?

- A) 0.07
- B) 0.7
- C) 1.07
- D) 1.7

18

Which of the following systems of linear equations has no solution?

- A) $x = 3$
 $y = 5$
- B) $y = 6x + 6$
 $y = 5x + 6$
- C) $y = 16x + 3$
 $y = 16x + 19$
- D) $y = 5$
 $y = 5x + 5$

19

The first term of a sequence is 9. Each term after the first is 4 times the preceding term. If w represents the n th term of the sequence, which equation gives w in terms of n ?

- A) $w = 4(9^n)$
- B) $w = 4(9^{n-1})$
- C) $w = 9(4^n)$
- D) $w = 9(4^{n-1})$

20

The minimum value of x is 12 less than 6 times another number n . Which inequality shows the possible values of x ?

- A) $x \leq 6n - 12$
- B) $x \geq 6n - 12$
- C) $x \leq 12 - 6n$
- D) $x \geq 12 - 6n$

21

$$RS = 20$$

$$ST = 48$$

$$TR = 52$$

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) $\frac{5}{13}$
- B) $\frac{5}{12}$
- C) $\frac{12}{13}$
- D) $\frac{12}{5}$

22

The graph of $9x - 10y = 19$ is translated down 4 units in the xy -plane. What is the x -coordinate of the x -intercept of the resulting graph?

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



$$A = \pi r^2$$

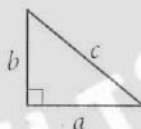
$$C = 2\pi r$$



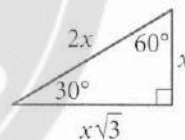
$$A = \ell w$$



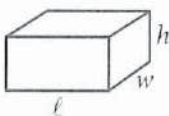
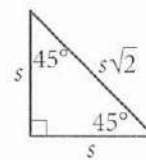
$$A = \frac{1}{2}bh$$



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



Special Right Triangles



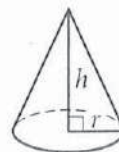
$$V = \ell wh$$



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



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



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



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

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

There are 55 students in Spanish club. A sample of the Spanish club students was selected at random and asked whether they intend to enroll in a new study program. Of those surveyed, 20% responded that they intend to enroll in the study program. Based on this survey, which of the following is the best estimate of the total number of Spanish club students who intend to enroll in the study program?

- A) 11
- B) 20
- C) 44
- D) 55

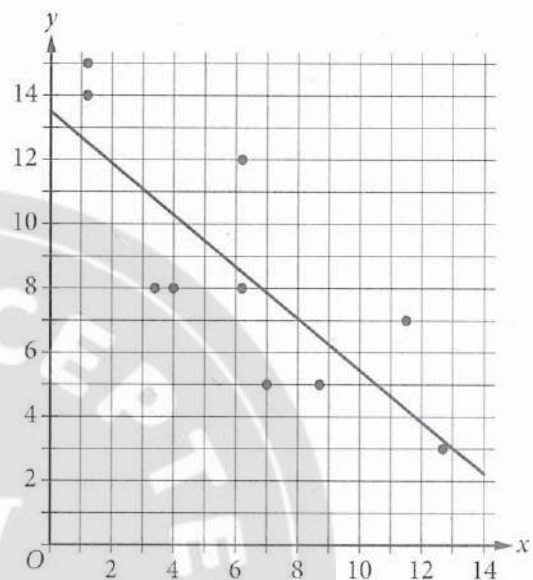
2

A machine makes large boxes or small boxes, one at a time, for a total of 700 minutes each day. It takes the machine 10 minutes to make a large box or 5 minutes to make a small box. Which equation represents the possible number of large boxes, x , and small boxes, y , the machine can make each day?

- A) $5x + 10y = 700$
- B) $10x + 5y = 700$
- C) $(x + y)(10 + 5) = 700$
- D) $(10 + x)(5 + y) = 700$

3

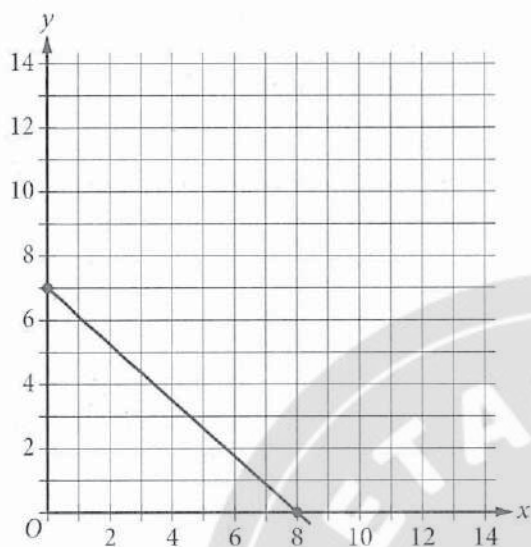
The scatterplot shows the relationship between two variables, x and y . A line of best fit is also shown.



Which of the following equations best represents the line of best fit shown?

- A) $y = 13.5 + 0.8x$
- B) $y = 13.5 - 0.8x$
- C) $y = -13.5 + 0.8x$
- D) $y = -13.5 - 0.8x$

4



The point with coordinates $(d, 4)$ lies on the line shown. What is the value of d ?

- A) $\frac{7}{2}$
- B) $\frac{26}{7}$
- C) $\frac{24}{7}$
- D) $\frac{27}{8}$

5

x	$f(x)$
-1	10
0	14
1	20

For the quadratic function f , the table shows three values of x and their corresponding values of $f(x)$. Which equation defines f ?

- A) $f(x) = 3x^2 + 3x + 14$
- B) $f(x) = 5x^2 + x + 14$
- C) $f(x) = 9x^2 - x + 14$
- D) $f(x) = x^2 + 5x + 14$

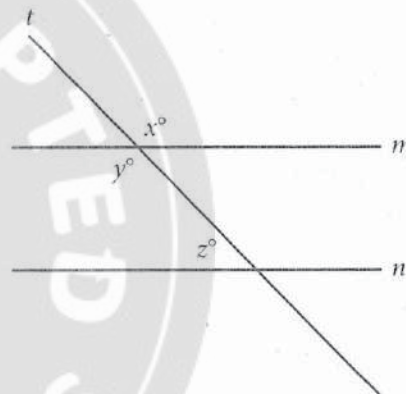
6

The function f is defined by $f(x) = \frac{x+15}{5}$, and

$f(a) = 10$, where a is a constant. What is the value of a ?

- A) 5
- B) 10
- C) 35
- D) 65

7



Note: Figure not drawn to scale.

In the figure, lines m and n are parallel. If $x = 6k + 13$ and $y = 8k - 29$, what is the value of z ?

- A) 3
- B) 21
- C) 41
- D) 139

8

Line p is defined by $2y + 18x = 9$. Line r is perpendicular to line p in the xy -plane. What is the slope of line r ?

- A) -9
- B) $-\frac{1}{9}$
- C) $\frac{1}{9}$
- D) 9

9

A sample of oak has a density of 807 kilograms per cubic meter. The sample is in the shape of a cube, where each edge has a length of 0.90 meters. To the nearest whole number, what is the mass, in kilograms, of this sample?

- A) 588
- B) 726
- C) 897
- D) 1,107

10

$$P(t) = 290(1.04)^{\left(\frac{t}{6}\right)}$$

The function P models the population, in thousands, of a certain city t years after 2005. According to the model, the population is predicted to increase by $n\%$ every 18 months. What is the value of n ?

- A) 0.38
- B) 1.04
- C) 4
- D) 6

11

$$2(kx - n) = -\frac{28}{15}x - \frac{36}{19}$$

In the given equation, k and n are constants and $n > 1$. The equation has no solution. What is the value of k ?

12

A gift shop buys souvenirs at a wholesale price of 7.00 dollars each and resells them each at a retail price that is 290% of the wholesale price. At the end of the season, any remaining souvenirs are marked at a discounted price that is 80% off the retail price. What is the discounted price of each remaining souvenir, in dollars?

13

$$x^2 - 34x + c = 0$$

In the given equation, c is a constant. The equation has no real solutions if $c > n$. What is the least possible value of n ?

14

Data set A consists of the heights of 75 buildings and has a mean of 32 meters. Data set B consists of the heights of 50 buildings and has a mean of 62 meters. Data set C consists of the heights of the 125 buildings from data sets A and B. What is the mean, in meters, of data set C?

15

The expression $4x^2 + bx - 45$, where b is a constant, can be rewritten as $(hx + k)(x + j)$, where h , k , and j are integer constants. Which of the following must be an integer?

- A) $\frac{b}{h}$
- B) $\frac{b}{k}$
- C) $\frac{45}{h}$
- D) $\frac{45}{k}$

16

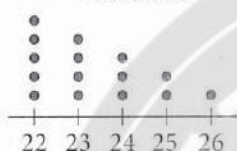
$$y = -1.5$$

$$y = x^2 + 8x + a$$

In the given system of equations, a is a positive constant. The system has exactly one distinct real solution. What is the value of a ?

17

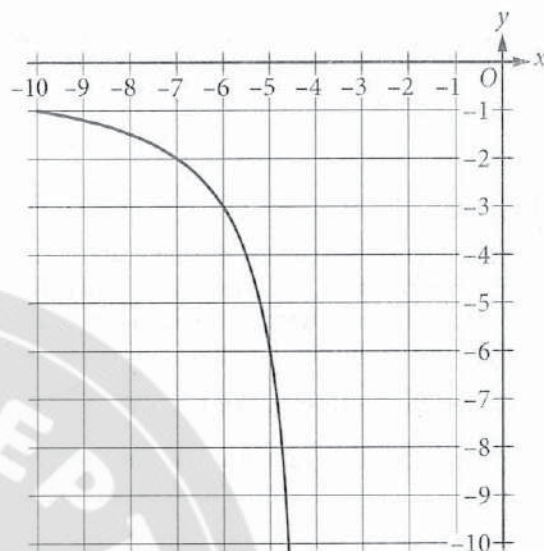
Data Set A



The dot plot represents the 15 values in data set A. Data set B is created by adding 56 to each of the values in data set A. Which of the following correctly compares the medians and the ranges of data sets A and B?

- A) The median of data set B is equal to the median of data set A, and the range of data set B is equal to the range of data set A.
- B) The median of data set B is equal to the median of data set A, and the range of data set B is greater than the range of data set A.
- C) The median of data set B is greater than the median of data set A, and the range of data set B is equal to the range of data set A.
- D) The median of data set B is greater than the median of data set A, and the range of data set B is greater than the range of data set A.

18



The rational function f is defined by an equation in the form $f(x) = \frac{a}{x+b}$ where a and b are constants. The partial graph of $y = f(x)$ is shown. If $g(x) = f(x+4)$, which equation could define function g ?

- A) $g(x) = \frac{6}{x}$
- B) $g(x) = \frac{6}{x+4}$
- C) $g(x) = \frac{6}{x+8}$
- D) $g(x) = \frac{6(x+4)}{x+4}$

19

$$57x^2 + (57b + a)x + ab = 0$$

In the given equation, a and b are positive constants. The product of the solutions to the given equation is kab , where k is a constant. What is the value of k ?

- A) $\frac{1}{57}$
- B) $\frac{1}{19}$
- C) 1
- D) 57

20

The graph of $x^2 + x + y^2 + y = \frac{199}{2}$ in the xy -plane is a circle. What is the length of the circle's radius?

21

Two identical rectangular prisms each have a height of 90 centimeters (cm). The base of each prism is a square, and the surface area of each prism is K cm². If the prisms are glued together along a square base, the resulting prism has a surface area of $\frac{92}{47}K$ cm². What is the side length, in cm, of each square base?

- A) 4
- B) 8
- C) 9
- D) 16

22

In the xy -plane, a parabola has vertex $(9, -14)$ and intersects the x -axis at two points. If the equation of the parabola is written in the form $y = ax^2 + bx + c$, where a , b , and c are constants, which of the following could be the value of $a + b + c$?

- A) -23
- B) -19
- C) -14
- D) -12

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 #4

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 B is the best answer because it most logically completes the text's discussion of Booker T. Whatley. In this context, "hinder" means hold back or obstruct. The text explains that Whatley encouraged farms to allow customers on site to pick their own produce for a fee. He did so despite critics' concerns that the customers would never pay to do so. This context establishes that the critics' concerns didn't hinder Whatley's efforts to promote the practice.

Choice A is incorrect. The text indicates that critics' skepticism of the idea that customers would pay to pick their own produce didn't have some effect on Whatley's promotion of the practice. The text illustrates this assertion by describing Whatley's "determined advocacy" for the practice. This context suggests that critics' concerns didn't obstruct Whatley's efforts, not that critics' concerns didn't "enhance," or increase or improve, Whatley's efforts.

Choice C is incorrect because in this context, "misrepresent" would mean portray inaccurately, and the text includes no information relevant to the issue of how Whatley's efforts were portrayed by critics of the practice of charging customers to pick their own produce. **Choice D** is incorrect. The text indicates that critics' skepticism of the idea that customers would pay to pick their own produce didn't have some effect on Whatley's promotion of the practice. The text illustrates this assertion by describing Whatley's "determined advocacy" for the practice. This context suggests that critics' concerns didn't obstruct Whatley's efforts, not that critics' concerns didn't "aggravate," or irritate or make more severe, Whatley's efforts.

QUESTION 2

Choice B is the best answer because it most logically completes the text's discussion of bronze- and brasscasting techniques used by the Igum Eronmwon guild. In this context "adhere to" would mean to act in accordance with. The text states that although members of the Igum Eronmwon guild typically do something with techniques that have been passed down since the thirteenth century, they "don't strictly observe every tradition." By establishing a contrast with not always following traditions, the context suggests that guild members do typically adhere to traditional techniques.

Choice A is incorrect because in this context "experiment with" would mean to do something new with. Although using motors rather than manual bellows is presented as a new approach, the text establishes a contrast between

what the guild members typically do with techniques that have been passed down over centuries and the idea that the members “don’t strictly observe every tradition.” The phrase “experiment with” wouldn’t support the contrast because regularly trying new things with the techniques would be an example of not strictly following all traditions. *Choice C* is incorrect because in this context “improve on” would mean to make better. Although using motors rather than manual bellows might be an improved approach, the text establishes a contrast between what the guild members typically do with techniques that have been passed down over centuries and the idea that the members “don’t strictly observe every tradition.” The phrase “improve on” wouldn’t support the contrast because regularly making changes to the techniques would be an example of not strictly following all traditions. *Choice D* is incorrect because in this context “grapple with” would mean to try hard to solve a difficult problem. Although bronze- and brasscasting are likely challenging tasks, nothing in the text suggests that the guild members have any particular difficulties with the techniques passed down since the thirteenth century.

QUESTION 3

Choice A is the best answer because it most logically completes the text’s discussion of Yu’s novel. In this context, “haphazard” means marked by a lack of plan or order. The text indicates that the quest featured in the novel, which involves the protagonist bouncing across time, is chaotic and causes the reader to often wonder what will happen. This context suggests that the protagonist’s journey seems to be marked by a lack of order.

Choice B is incorrect because the text indicates that the journey featured in Yu’s novel involves a character “ricocheting chaotically,” or bouncing in a disordered way, across time and causes the reader to often wonder what will happen. It wouldn’t make sense to say that a chaotic journey seems “premeditated,” or characterized by forethought and planning. *Choice C* is incorrect because the text doesn’t give any indication that readers regard the journey in Yu’s novel as “inspirational,” or as causing extraordinarily creative or brilliant thoughts or actions; instead, the text focuses on the idea that the protagonist’s journey is chaotic, or disordered, and doesn’t give readers a clear sense of what will happen. *Choice D* is incorrect. Rather than suggesting that the journey featured in Yu’s novel is “fruitless,” or has an unsuccessful outcome, the text focuses on the idea that while reading about the protagonist’s chaotic movements across time, readers are often unsure of what will happen—that is, they don’t know whether the protagonist will be successful in finding his father.

QUESTION 4

Choice B is the best answer because it most logically completes the text’s discussion of single-celled organism behavior. As used in this context, “rudimentary” means basic or unsophisticated. According to the text, a study of the single-celled protozoan *Stentor roeseli* showed that the organisms can switch strategies for escaping certain stimuli, “sophisticatedly ‘changing their minds’” and using new strategies should other strategies fail. This context suggests that single-celled organisms may not be limited to behaviors that are basic or rudimentary, since the study showed that single-celled protozoans can respond complexly to irritating stimuli.

Choice A is incorrect because the text doesn’t suggest that single-celled organisms may not be limited to behavior that is “aggressive,” or threatening. Rather, the text suggests that single-celled organisms may not be limited to behaviors that are basic, since the study of *Stentor roeseli* showed that single-celled protozoans can respond complexly to irritating stimuli.

Choice C is incorrect because the text doesn't suggest that single-celled organisms may not be limited to behavior that is "evolving," or advancing. Rather, the text suggests that single-celled organisms may not be limited to behaviors that are basic, since the study of *Stentor roeseli* showed that single-celled protozoans can respond complexly to irritating stimuli. *Choice D* is incorrect because the text doesn't suggest that single-celled organisms may not be limited to behavior that is "advantageous," or helpful. Rather, the text suggests that single-celled organisms may not be limited to behaviors that are basic, since the study of *Stentor roeseli* showed that single-celled protozoans can respond complexly to irritating stimuli.

QUESTION 5

Choice A is the best answer because it most logically completes the text's discussion of late nineteenth- and early twentieth-century household food purchases. In this context, "surmised" means formed an idea or assumption with little evidence. The text explains that certain economic historians "assumed" that large and small households spent different amounts on food per person, but that another economist found this supposition to be false based on evidence from available data. This context suggests that the economic historians made an incorrect assumption without enough consideration of evidence.

Choice B is incorrect. In this context, "contrived" would mean brought about or created through trickery. Nothing in the text suggests that the economic historians were deliberately trying to trick people with a claim about food purchasing behaviors in late nineteenth- and early twentieth-century households; the text simply suggests that they made an assumption about those behaviors that another historian believes isn't supported by the available data. *Choice C* is incorrect because the text indicates that it's Logan and not the economic historians who "questioned," or doubted, the assumption that large and small households in the late nineteenth and early twentieth centuries spent different amounts on food per person; the economic historians are the ones who made that assumption to begin with. *Choice D* is incorrect because nothing in the text suggests that some economic historians "regretted," or felt sad or remorseful about, the food purchasing behaviors of late nineteenth- and early twentieth-century households. The text focuses on the idea that the economic historians made an assumption about those behaviors that may not be supported by available data, not on the historians' emotional response to what households did in the past.

QUESTION 6

Choice D is the best answer because as used in the text, "answers" most nearly means fulfills. In the text, Fabry and Busman claim that the robots manufactured by their company are more efficient than human workers, which they refer to as "the human machine." Fabry observes that the human machine "no longer answers the requirements of *modern engineering*." That is, human workers are incapable of meeting the rigorous needs of modern, industrialized workplaces.

Choice A is incorrect. Although in some contexts "answers" can mean explains, it doesn't have that meaning in this context because the topic under discussion is human beings' inability to perform labor efficiently, not their inability to engage in discussion or explanation. *Choice B* is incorrect. Although in some contexts "answers" can mean rebuts, or proves a claim or argument to be false, it wouldn't make sense to speak of proving requirements to be false; requirements might or might not be reasonable, but they can't be verified as truthful or untruthful, as claims or accusations can. *Choice C* is incorrect.

Although in some contexts, “answers” can mean defends against criticism, or justifies, it doesn’t have that meaning in this context because the opinion that Fabry expresses is that human workers can no longer fulfill the requirements of modern workplaces, not that they have ceased to justify those requirements or to defend them against criticism; indeed, there is no suggestion in the text that workers ever defended those requirements.

QUESTION 7

Choice A is the best answer because it presents an explanation about a helicopter that is directly supported by the text. The text states that Mars’s atmosphere is much less dense than Earth’s, and as a result, the air on Mars doesn’t provide the resistance required to support the blades of a helicopter built for Earth and to keep the helicopter aloft. In other words, a helicopter built for Earth can’t fly on Mars because of the differences in the two planets’ atmospheres.

Choice B is incorrect because instead of stating that the blades of helicopters built for Earth are too large to work on Mars, the text indicates that the helicopter built to fly on Mars actually has even longer blades than a helicopter built for Earth. **Choice C** is incorrect because the text never addresses the role of gravity on Mars or on Earth; instead, it focuses on atmospheric conditions. **Choice D** is incorrect because the text doesn’t indicate that helicopters built for Earth are too small to operate in the conditions on Mars. In fact, the text states that the size of the helicopter built to fly on Mars is the same size as a helicopter built for Earth, even though it has longer blades that rotate faster.

QUESTION 8

Choice A is the best answer because it best states the main idea of the text. According to the text, jalis’ traditional role has been to maintain information about families’ histories and significant events. The text goes on to say that although technological changes have altered jalis’ role somewhat, jalis are still valued for preserving the histories of their communities.

Choice B is incorrect because the text says nothing about jalis’ views of the various tasks they perform. There is no information to support the idea that many jalis prefer teaching to other tasks. **Choice C** is incorrect because the text doesn’t describe jalis as being sources of entertainment. Rather, jalis are presented as valued sources of knowledge. Additionally, the text gives no indication of how long jalis have been serving their communities. **Choice D** is incorrect because the main focus of the text is on jalis’ role and their continued value despite the effects of technology, not on what technology can now do. Although the text indicates that jalis’ role has changed as a result of technological changes, the text doesn’t present any specific information about technology performing tasks that jalis once performed.

QUESTION 9

Choice D is the best answer because it most accurately states the main idea of the text. After establishing that Buck views most people “as nothing,” the text explains that Buck won’t acknowledge people other than Thornton unless they appear friendly toward Thornton, and even then he’s only reluctantly accepting. Thus, the text focuses on the idea that Thornton has a special status in Buck’s mind, with Buck holding him in higher regard than other people.

Choice A is incorrect because the text conveys that Buck isn’t social with people other than Thornton but doesn’t address Buck’s life or temperament before he lived with Thornton. **Choice B** is incorrect because the text conveys

that Buck doesn't really care about people other than Thornton and is aloof toward them. However, there's no indication that Buck mistrusts and avoids people generally; indeed, he accepts Thornton, who is a human. *Choice C* is incorrect because the text refers to random travelers praising and petting Buck and Thornton's partners giving Buck favors, but there's no indication that any of these people are Thornton's friends or that they have a particular fondness for Buck.

QUESTION 10

Choice B is the best answer because the quotation from *The Souls of Black Folk* illustrates the claim that Du Bois felt a sense of cultural recognition when he heard Black folk songs. In the quotation, Du Bois explains that for his entire life, Black folk songs "stirred [him] strangely." Even though they originated in the South, a region he wasn't familiar with, he knew the songs "as of me and of mine." That is, he identified strongly with them and associated them with his community. Therefore, Du Bois felt an intuitive sense of cultural recognition when he heard Black folk songs.

Choice A is incorrect. Although the quotation considers the cultural and spiritual value of Black folk music, it doesn't establish that this music inspired in Du Bois a sense of cultural recognition. *Choice C* is incorrect because this quotation addresses the cultural survival of Black folk songs despite attempts to caricature, or parody, them, not Du Bois's sense of cultural connection to them. *Choice D* is incorrect because the quotation indicates that the Black folk songs and music are old, "the siftings of centuries," instead of addressing how Du Bois felt when he heard the songs.

QUESTION 11

Choice C is the best answer because it uses data from the graph to effectively complete the example of Eludoyin and his colleagues' findings concerning female farmers in some regions of Ondo State, Nigeria. The graph presents values for the percentage of Ondo State small-scale farmers who are female, by type of crop and region. The graph shows that of the farmers mainly cultivating non-root vegetables, approximately 57% in north Ondo and approximately 54% in south Ondo are female; in other words, most of those farmers are female, which exemplifies the idea that female farmers make up the majority (more than half) of the farmers cultivating specific types of crops in some regions.

Choice A is incorrect because it inaccurately cites data from the graph: the graph shows that in south Ondo, most of the farmers mainly cultivating non-root vegetables are women (approximately 54%), but that only about 35% (less than half) of the farmers mainly cultivating cereals are women. *Choice B* is incorrect because it inaccurately cites data from the graph: the graph shows that more women in central Ondo mainly cultivate cereals than mainly cultivate root crops (approximately 36% and 20%, respectively). Additionally, it doesn't effectively complete the example because the graph shows that female farmers don't make up the majority (more than half) of the farmers for any type of crop in central Ondo. *Choice D* is incorrect because it doesn't effectively complete the example; it simply states that a relatively equal proportion of women across the three regions mainly cultivate cereals, which doesn't address the value for that proportion and thus doesn't show that a majority (more than half) of the farmers cultivating certain crops are female.

QUESTION 12

Choice B is the best answer because it most logically completes the text's discussion of Zelda Fitzgerald's contributions to literature. The text begins by saying that many scholars view Zelda mainly in terms of her marriage to F. Scott Fitzgerald and "don't recognize Zelda as a writer in her own right." The text then mentions a novel and "numerous short stories" that she wrote and that such scholars tend to ignore. Therefore, those scholars who focus on Zelda only as an inspiration for F. Scott's writings risk misrepresenting the full range of Zelda's contributions to literature.

Choice A is incorrect. Although the text does mention that Zelda Fitzgerald "likely influenced" her husband's literary work, its focus is on Zelda's own writing, not on her husband's writing or factors that might have influenced it. **Choice C** is incorrect because the text does not discuss F. Scott and Zelda Fitzgerald's opinions of each other's works. **Choice D** is incorrect. Although the text does suggest that F. Scott Fitzgerald's works were "likely influenced in part" by his marriage to Zelda, it does not discuss autobiographical interpretations of the works of either F. Scott or Zelda.

QUESTION 13

Choice B is the best answer because it presents the conclusion that most logically follows from the text's discussion of the relationship between atmospheric carbon dioxide and sauropod body size. The text establishes that sauropods evolved to reach enormous sizes, and it notes that some scientists have asserted that the cause of this phenomenon was increased plant production that resulted from increased atmospheric carbon dioxide. The text goes on to state, however, that atmospheric carbon dioxide levels didn't increase around the time of important periods in sauropods' evolution of larger body sizes. If significant periods of sauropod evolution toward larger sizes occurred without increased atmospheric carbon dioxide levels, that suggests that the evolution of larger sizes didn't depend on increased carbon dioxide in the atmosphere.

Choice A is incorrect because the text doesn't describe any fluctuations in atmospheric carbon dioxide, so there's no evidence in the text to support the conclusion that such fluctuations had different effects on different sauropod lineages. All that the text says about atmospheric carbon dioxide levels is that there weren't increases at particular points that correspond with key moments in sauropod evolution. **Choice C** is incorrect because the text indicates that there weren't significant increases in atmospheric carbon dioxide around the time of important periods in sauropods' evolution toward larger body sizes, not that atmospheric carbon dioxide was higher when the largest sauropods lived than when sauropods first appeared. **Choice D** is incorrect because the text indicates that atmospheric carbon dioxide levels didn't increase at important periods in sauropod evolution, not that higher levels would have affected that evolution. The text provides no information about how higher levels of atmospheric carbon dioxide might have affected sauropods.

QUESTION 14

Choice D is the best answer. The convention being tested is punctuation between a subject and a verb. When, as in this case, a subject ("Calida Garcia Rawles") is immediately followed by a verb ("was"), 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 C* is incorrect because no punctuation is needed between the subject and the verb.

QUESTION 15

Choice D is the best answer. The convention being tested is punctuation use between sentences. In this choice, the period after "walls" is used correctly to mark the boundary between the first sentence ("In...walls") and the second sentence ("With...techniques"), which starts with a supplementary phrase.

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 because it results in a run-on sentence. The sentences ("In...walls" and "with...paintings") are fused without punctuation and/or a conjunction. *Choice C* is incorrect. Without a comma preceding it, the conjunction "so" can't be used in this way to join sentences.

QUESTION 16

Choice B is the best answer. The convention being tested is the use of plural and possessive nouns. The plural possessive noun "grains'" and the plural noun "properties" correctly indicate that the simulations involved multiple snow grains and that those snow grains had several properties.

Choice A is incorrect because the context requires the plural possessive noun "grains'" and the plural noun "properties," not the singular possessive noun "grain's" and the plural possessive noun "properties'." *Choice C* is incorrect because the context requires the plural noun "properties," not the singular possessive noun "property's." *Choice D* is incorrect because the context requires the plural possessive noun "grains'," not the plural noun "grains."

QUESTION 17

Choice C is the best answer. The convention being tested is the coordination of main clauses within a sentence. This choice uses a semicolon to correctly join the first main clause ("The Mission...parks") and the second main clause that begins with "it."

Choice A is incorrect. When coordinating two longer main clauses such as these, it's conventional to use a comma before the coordinating conjunction. *Choice B* is incorrect because it results in a run-on sentence. The two main clauses are fused without punctuation and/or a conjunction. *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.

QUESTION 18

Choice A is the best answer. The convention being tested here is subject-verb agreement. The singular verb "was" agrees in number with the singular subject "Josephine St. Pierre Ruffin."

Choice B is incorrect because the plural verb "were" doesn't agree in number with the singular subject "Josephine St. Pierre Ruffin." *Choice C* is incorrect because the plural verb "are" doesn't agree in number with the singular subject "Josephine St. Pierre Ruffin." *Choice D* is incorrect because the plural verb "have been" doesn't agree in number with the singular subject "Josephine St. Pierre Ruffin."

QUESTION 19

Choice D is the best answer. The convention being tested is the punctuation of a supplementary element within a sentence. In this choice, the dash after "cephalopods" pairs with the dash after "cuttlefish" to clearly separate the supplementary element "ocean dwellers that include the squid, the octopus, and the cuttlefish" from the rest of the sentence. This supplementary element functions to explain what cephalopods are, and the pair of dashes indicates that this element could be removed without affecting the grammatical coherence of the sentence.

Choice A is incorrect because it fails to use appropriate punctuation to separate the supplementary element that explains what cephalopods are from the rest of the sentence. **Choice B** is incorrect because it fails to use appropriate punctuation to separate the supplementary element that explains what cephalopods are from the rest of the sentence. **Choice C** is incorrect because it fails to use appropriate punctuation to separate the supplementary element that explains what cephalopods are from the rest of the sentence.

QUESTION 20

Choice D is the best answer. The convention being tested is finite and nonfinite verb forms within a sentence. Relative clauses, such as the one beginning with "that," 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 future tense verb "will be."

Choice A is incorrect because the nonfinite participle "being" doesn't supply the clause with a finite verb. **Choice B** is incorrect because the nonfinite to-infinitive "to be" doesn't supply the clause with a finite verb. **Choice C** is incorrect because the nonfinite to-infinitive "to have been" doesn't supply the clause with a finite verb.

QUESTION 21

Choice D is the best answer. "In fact" logically signals that the information in this sentence—that McFerrin finds the research phase of her work to be just as fascinating as travel—emphasizes and elaborates on the previous sentence's point that McFerrin regards background research as a rewarding activity.

Choice A is incorrect because "by contrast" illogically signals that the information in this sentence contrasts with the previous sentence's point about McFerrin's attitude toward background research. Instead, it emphasizes and elaborates on that point. **Choice B** is incorrect because "likewise" illogically signals that this sentence merely adds a second, similar point to the previous sentence's point about McFerrin's attitude toward background research. Instead, it emphasizes and elaborates on that point. **Choice C** is incorrect because "besides" illogically signals that this sentence provides a separate point in addition to, or apart from, the previous sentence's point about McFerrin's attitude toward background research. Instead, it emphasizes and elaborates on that point.

QUESTION 22

Choice C is the best answer. The sentence effectively introduces *The Holder of the World* to an audience already familiar with Mukherjee, explaining that the novel centers around two women and mentioning the author without providing any other identifying information.

Choice A is incorrect. The sentence provides a detail about Mukherjee's settings; it doesn't introduce, or even mention, the novel. *Choice B* is incorrect. The sentence provides introductory information about Mukherjee; it doesn't effectively introduce her novel to an audience already familiar with the author. *Choice D* is incorrect. The sentence provides introductory information about Mukherjee; it doesn't effectively introduce her novel to an audience already familiar with the author.

QUESTION 23

Choice D is the best answer. The sentence presents both the study and its findings, noting the study's date and the researcher's name as well as describing what the researcher determined about the jawbones and how she determined it.

Choice A is incorrect. While the sentence describes the study and the researcher's initial assessment, it doesn't present the study's findings. *Choice B* is incorrect. While the sentence describes the study and its focus, it doesn't present the study's findings or the name of the researcher who conducted it. *Choice C* is incorrect. While the sentence mentions the study's methodology and provides information about pterosaurs, it doesn't present the study's findings.

QUESTION 24

Choice A is the best answer. By noting that Selvon is a Trinidadian author and indicating that *The Lonely Londoners*, published in 1956, is about a group of men who emigrate from the Caribbean to Great Britain after World War II, the sentence effectively introduces Samuel Selvon and his novel to a new audience.

Choice B is incorrect. The sentence indicates the order in which two of Selvon's novels were written; it doesn't introduce Samuel Selvon and *The Lonely Londoners* to a new audience. *Choice C* is incorrect. While the sentence describes the novel *The Lonely Londoners*, it doesn't mention its author, Samuel Selvon, by name and thus doesn't effectively introduce him to a new audience. *Choice D* is incorrect. The sentence indicates that two of Selvon's novels include the same characters; it doesn't introduce Samuel Selvon and *The Lonely Londoners* to a new audience.

QUESTION 25

Choice C is the best answer. The sentence emphasizes a similarity between the two sea turtle species: both can be found in the Atlantic Ocean.

Choice A is incorrect. The sentence indicates that the olive ridley sea turtle is one of seven species of sea turtle; it fails to mention the Kemp's ridley sea turtle. *Choice B* is incorrect. The sentence emphasizes a difference between the two sea turtle species rather than a similarity. *Choice D* is incorrect. The sentence emphasizes a difference between the two sea turtle species rather than a similarity.

QUESTION 26

Choice D is the best answer. The sentence effectively summarizes the study, noting who conducted it, when it was conducted, and what its results showed: that auks' landing success rate decreased as wind conditions intensified.

Choice A is incorrect. While the sentence presents the methodology of the study—that is, the approach taken by the researchers—it fails to summarize the study as a whole. *Choice B* is incorrect. While the sentence presents the

aim, or goal, of the study, it fails to summarize the study as a whole. *Choice C* is incorrect. While the sentence indicates what Shepard studied, it fails to mention a key factor: the effect of wind. It thus fails to summarize the study as a whole.

QUESTION 27

Choice C is the best answer. The sentence effectively introduces *Paradise* to an audience unfamiliar with the novel and its author, describing *Paradise* as a historical novel about colonial East Africa and its author as the winner of the 2021 Nobel Prize in Literature.

Choice A is incorrect. While the sentence introduces Abdulrazak Gurnah to an audience unfamiliar with the author, it doesn't effectively introduce *Paradise*. *Choice B* is incorrect. While the sentence provides background information about *Paradise*, it doesn't effectively introduce the novel to an audience unfamiliar with its author. *Choice D* is incorrect. While the sentence provides background information about *Paradise*, it doesn't effectively introduce the novel to an audience unfamiliar with its author.



Reading and Writing

Module 2

(27 questions)

QUESTION 1

Choice B is the best answer because it most logically completes the text's discussion of Ward and colleagues' findings. As used in this context, "innocuous" means mild or unharmed. The text describes the vibration and warming that Ward and colleagues used to alleviate itching as "harmless applications" and goes on to contrast these applications with another stimulus that actually offers more relief even though it seems to be stronger and "less benign." This context conveys the idea that vibration and warming were innocuous stimuli.

Choice A is incorrect because the text focuses on a distinction between harmless stimuli and those that seem to be less benign. Nothing in the text suggests that any of the treatments are "deceptive," or misleading; indeed, even the less effective ones are described as offering some relief. **Choice C** is incorrect because the text focuses on the amount of relief from itching offered by harmless stimuli and those that seem to be less benign. The text doesn't suggest that any of these stimuli are "novel," or original and new; heat, vibration, and electricity aren't new inventions. **Choice D** is incorrect because it wouldn't make sense to describe an application of vibration or warming as "impractical," or not suitable for use. The text indicates that these harmless applications are useful in that they offer at least some temporary relief.

QUESTION 2

Choice B is the best answer because it most logically and precisely completes the text's discussion of studies of altitude's effect on blood chemistry. In this context, "paucity of" means lack of. In describing the inspiration behind Al-Sweedan and Alhaj's research, the text uses the word "though" to suggest a contrasting relationship between two types of studies: those examining the effect on blood chemistry of living at a high altitude and those examining the effect on blood chemistry of living in locations below sea level. This contrasting relationship and the text's use of the word "many" provide context suggesting that there are few, if any, examples of the second type of study, whereas there are numerous examples of the first type.

Choice A is incorrect because it wouldn't make sense in context for there to be a "quarrel about," or open disagreement about, studies of the effect on blood chemistry of living in locations below sea level. The text's use of the words "though" and "many" suggests a contrasting relationship in terms of

amount between two types of studies: those examining the effect on blood chemistry of living at a high altitude and those examining the effect on blood chemistry of living in locations below sea level. There's nothing in the text to suggest that the contrast between the two types of studies involves the extent to which researchers broadly agree or disagree about the contents of either type. *Choice C* is incorrect because it wouldn't make sense in context for there to be a "profusion of," or great abundance of, studies of the effect on blood chemistry of living in locations below sea level. The text's use of the words "though" and "many" suggests a contrasting relationship in terms of amount between two types of studies: those examining the effect on blood chemistry of living at a high altitude and those examining the effect on blood chemistry of living in locations below sea level. Rather than logically completing this contrast, "profusion of" would indicate that the two types of studies are similar in terms of amount, with many examples existing of both types. *Choice D* is incorrect because it wouldn't make sense in context for there to be a "verisimilitude in," or appearance of truth in, studies of the effect on blood chemistry of living in locations below sea level. The text's use of the words "though" and "many" suggests a contrasting relationship in terms of amount between two types of studies: those examining the effect on blood chemistry of living at a high altitude and those examining the effect on blood chemistry of living in locations below sea level. There's nothing in the text to suggest that the contrast between the two types of studies involves the extent to which either type of study presents an appearance of truth.

QUESTION 3

Choice C is the best answer because it most logically completes the text's discussion of the legitimacy of the reigns of French monarchs such as Hugh Capet and Henry I. As used in this context, "buttress" means to strengthen or defend. The text indicates that regardless of whether a French monarch's reign was significant or uneventful, each monarch faced questions about his right to the throne. The text goes on to say that in order to understand the path of a French monarch's reign, it's important to understand what contributed to the monarch's ability to "hold the throne." This context suggests that French monarchs such as Hugh Capet and Henry I had to buttress, or defend, their right to be monarch.

Choice A is incorrect. Saying that a monarch who is faced with questions about the legitimacy of his reign was able to "reciprocate" his right to the French throne would mean that he either returned his right to the throne or that he responded in kind to the challenge. Neither of these meanings would make sense in context because the text focuses on people who did reign as French monarchs and defended their right to do so. *Choice B* is incorrect because it wouldn't make sense in context to discuss factors that enabled a monarch to "annotate," or add notes to or explain, his right to the French throne. Nothing in the text suggests that the monarchs were writing notes about their right to the throne; instead, faced with questions about the legitimacy of their reign, the monarchs defended their right. *Choice D* is incorrect because it wouldn't make sense in context to discuss factors that enabled a monarch to "disengage," or withdraw his right to the French throne. The text focuses on an examination of people who reigned as French monarchs, not on people who didn't choose to rule.

QUESTION 4

Choice C is the best answer because it most logically completes the text's discussion of Jung and her team's study of acts of kindness. In this context, "foster" means encourage or promote the development of. The text indicates that Jung and her team found that seeing a helpful (or prosocial) act makes a

bystander more likely to help someone else, which can in turn inspire additional people to help others. That is, the team showed that single acts of kindness can foster additional prosocial acts across a group.

Choice A is incorrect because nothing in the text suggests that Jung and her team found that single acts of kindness “require,” or depend on or make obligatory, broader prosocial (or helpful) behavior across a group. There’s no suggestion in the text that individual acts of kindness can only occur if other prosocial acts have already occurred, and the text indicates only that an act of kindness *can* inspire additional helpful acts, not that it necessarily *will* do so. *Choice B* is incorrect because the text focuses on a possible direct effect of individual acts of kindness, or single helpful actions, and it wouldn’t make sense to suggest that actions can “remember,” or hold a memory of, something. *Choice D* is incorrect because the text doesn’t indicate that Jung and her team found that single acts of kindness can “discourage,” or hinder, prosocial (or helpful) behavior across a group. On the contrary, the text states that Jung and her team found that seeing a helpful act makes a bystander *more* likely to help someone else, which can in turn inspire even more people to help others.

QUESTION 5

Choice D is the best answer because it best describes the function of the underlined sentence in the text’s overall portrayal of how the women in Ohiyesa’s tribe harvested maple syrup. The text states that the women used an axe to strike the maple trees in order to find out which ones would produce sap. The underlined sentence compares the trees to people, with the sap described as the trees’ “life-blood.” Some of the trees are ready to give out their sap, while others are unwilling to do so. Using personification, the sentence provides greater detail about the aspect of the maple trees—their potential to give sap—that the women are evaluating.

Choice A is incorrect because the personalities of the women are not discussed in the text. Although the underlined sentence does mention “individual characters,” this reference is not to the women in the text but rather to the maple trees, which the sentence compares to people with individual character traits. *Choice B* is incorrect because the underlined sentence focuses on the trees’ willingness or refusal to yield sap, not on the beneficial relationship between the women and the trees. Additionally, although the text does suggest that the women and their tribe benefit from the maple trees since the trees allow the women to harvest syrup, there is nothing in the text to suggest that the trees benefit from this relationship in turn. *Choice C* is incorrect because the underlined sentence is comparing maple trees to humans, not addressing the influence of the natural environment on how the actual humans in the text, the women, behave.

QUESTION 6

Choice A is the best answer because it most accurately describes the main purpose of the text, which is to show that while Jane calmly goes about her daily tasks, she is experiencing internal agitation about possibly seeking a new job. At the start of the text, Jane says, “I went on with my day’s business tranquilly,” indicating that she is outwardly calm. This outward calmness is then contrasted with her intense internal restlessness, as Jane says that thoughts of leaving her job keep running through her mind, that she is “involuntarily framing advertisements” (meaning that she can’t stop herself from thinking up potential listings for jobs), and that she often wonders what new “situations” (or jobs) would be like.

Choice B is incorrect because the text gives no indication of Jane's feelings, either positive or negative, about the people she works for at Thornfield Hall. And rather than emphasizing that Jane feels particularly loyal to her employers, the text focuses on her constant consideration of leaving her job. *Choice C* is incorrect because the text gives no indication that Jane finds her current situation fulfilling, or satisfying. Given that much of the text is focused on Jane's thoughts about possibly leaving her job for a new one, it might be the case that she finds her situation challenging, but there is no evidence in the text that Jane also finds that situation satisfying—she says nothing positive about her current job at all, in fact. *Choice D* is incorrect because the text describes Jane as wondering about getting a new job, not as determined to definitely do so. Jane keeps thinking about reasons why she "should" quit her current job (indicating that she hasn't yet decided to) and imagining possible new situations she could find, but she says at the end of the text that these thoughts "might germinate and bear fruit if they could," meaning that the thoughts haven't yet led to a decision—that Jane isn't yet determined to get a new job somewhere else.

QUESTION 7

Choice A is the best answer because it accurately describes the organization of the elements within the text. The text begins with the claim that Joni Mitchell's album covers use images she creates in order to emphasize ideas embedded in her albums. It then goes on to provide an example of how Mitchell's self-portrait on the cover of *Turbulent Indigo* resembles a painting by Van Gogh, which the text indicates helps emphasize the strong connection Mitchell feels toward Van Gogh, a connection that is also expressed in the album's title song.

Choice B is incorrect because there are no references in the text to artists other than Joni Mitchell and Van Gogh. *Choice C* is incorrect because there is nothing in the text that calls attention to any similarities or differences between Joni Mitchell and Van Gogh. Instead, it mentions that Mitchell feels a strong "artistic connection" to Van Gogh. *Choice D* is incorrect because the text discusses the cover before referring to any songs, and it only references one song from the album not all the songs.

QUESTION 8

Choice C is the best answer because it best describes how the underlined sentence functions in the text as a whole. The first sentence presents the implications of Veeraraghavan's team's study: sunshine exposure during work hours can cause overly optimistic behavior. The underlined sentence then describes the data the team consulted and how they were used (comparing predictions about earnings to what the companies actually earned), and the final sentence presents what the team found in their examination of the data. Thus, the underlined sentence mainly functions to explain part of the methodology used in the team's study.

Choice A is incorrect because the underlined sentence explains in part how the team conducted their analysis of the effect of sunshine but doesn't address what the team found; a broad summary is instead given in the other two sentences. *Choice B* is incorrect because the underlined sentence doesn't present any specific examples from the team's comparisons of 29,000 earnings predictions to actual earnings; it simply explains in part how the team conducted their analysis. *Choice D* is incorrect because the underlined sentence simply explains in part how the team conducted their analysis; the text never mentions any challenges that the team encountered in their study.

QUESTION 9

Choice B is the best answer because it reflects how the author of Text 2 would most likely respond to Text 1 based on the information provided. Text 1 discusses the discovery of a regeneration-linked gene, EGR, in both three-banded panther worms (which are capable of full regeneration) and humans (who have relatively limited regeneration abilities). Text 1 characterizes this discovery as “especially promising” and a sign of “exciting progress” in understanding human regeneration. The author of Text 2, on the other hand, focuses on the fact that the team that reported the EGR finding pointed out that while EGR’s function in humans isn’t yet known, it’s likely very different from its function in panther worms. Therefore, the author of Text 2 would most likely say that Text 1’s enthusiasm about the EGR discovery is overly optimistic given Srivastava’s team’s observations about EGR in humans.

Choice A is incorrect because the author of Text 2 explains that Srivastava and her team explicitly reported that they haven’t yet identified how EGR functions in humans; therefore, the author of Text 2 wouldn’t say that Text 1’s excitement is reasonable for the stated reason. Instead, the author of Text 2 would likely characterize Text 1’s excitement as premature and overly optimistic. **Choice C** is incorrect because Text 1 does treat Srivastava’s team’s findings with enthusiasm; it describes the discovery of EGR in both three-banded panther worms and humans as promising and exciting. It would be illogical for the author of Text 2 to say that because most others treat the discovery with enthusiasm, Text 1’s enthusiastic characterization of the discovery is unexpected. **Choice D** is incorrect because Text 1 isn’t at all dismissive of Srivastava’s team’s findings; instead, Text 1 is optimistic about the EGR discovery, characterizing it as promising and exciting. There’s nothing in Text 2 to suggest that the author of Text 2 would say that Text 1’s praise for the discovery is dismissive, or disdainful.

QUESTION 10

Choice C is the best answer because it uses data from the table to effectively exemplify the idea that the film outputs of the four individuals included in the table should be considered bare minimums—that is, that we should assume that the individuals actually had higher outputs than those recorded. The table presents the years during which the individuals were active and the number of known films the individuals are credited in. The table indicates that Lillian St. Cyr has 66 film credits as an actor and that Edwin Carewe has 58 film credits as a director; it follows that if some films and records for the era were lost, it’s possible that Lillian St. Cyr acted in far more than 66 films and that Edwin Carewe directed more than 58 films.

Choice A is incorrect because it doesn’t effectively exemplify the idea that the film outputs of the four individuals included in the table should be considered bare minimums. Rather than addressing the idea that the individuals likely had higher outputs than those presented in the table, this choice simply compares data from the table to make the point that Dark Cloud has fewer credited acting roles than Lillian St. Cyr (35 and 66, respectively). **Choice B** is incorrect because it misrepresents data from the table, even though it may exemplify the idea that the film outputs of the four individuals included in the table should be considered bare minimums by implying that Edwin Carewe acted in more than 47 films. The table indicates that Edwin Carewe was active from 1912 to 1934, meaning that his 47 credited acting roles were in films made before or during 1934, not after that time. **Choice D** is incorrect because it doesn’t effectively exemplify the idea that the film outputs of the four individuals included in the table should be considered bare minimums. Instead of addressing the idea that the individuals likely had higher outputs than those recorded, this choice

suggests that James Young Deer actually acted in and directed fewer films than presented in the table (only 33 known films as a director instead of 35, and only 10 known films as an actor instead of 33).

QUESTION 11

Choice C is the best answer because it presents the finding that, if true, would best support Suarez, Pérez-Huerta, and Harrell's claim about mosasaurs. The text states that Suarez, Pérez-Huerta, and Harrell's research on mosasaur tooth enamel led them to conclude that mosasaurs were endothermic, which means that they could live in waters at many different temperatures and still maintain a stable body temperature. The researchers claim that endothermy enabled mosasaurs to live in relatively cold waters near the poles. If several mosasaur fossils have been found in areas that were near the poles during the period when mosasaurs were alive and fossils of nonendothermic marine reptiles are rare in such locations, that would support the researchers' claim: it would show that mosasaurs inhabited polar waters but nonendothermic marine mammals tended not to, suggesting that endothermy may have been the characteristic that enabled mosasaurs to include polar waters in their range.

Choice A is incorrect because finding that it's easier to determine mosasaur body temperatures from tooth enamel data than it is to determine nonendothermic reptile body temperatures wouldn't support the researchers' claim. Whether one research process is more difficult than another indicates nothing about the results of those processes and therefore is irrelevant to the issue of where mosasaurs lived and what enabled them to live in those locations. **Choice B** is incorrect because finding roughly equal numbers of mosasaur and nonendothermic marine reptile fossils in areas that were near the poles in the Late Cretaceous would suggest that endothermy didn't give mosasaurs any particular advantage when it came to expanding their range to include relatively cold polar waters, thereby weakening the researchers' claim rather than supporting it. **Choice D** is incorrect because finding that the temperature of seawater in the Late Cretaceous was warmer than seawater today wouldn't weaken the researchers' claim. Seawater in the Late Cretaceous could have been warmer than seawater today but still cold enough for endothermy to be advantageous to mosasaurs, so this finding wouldn't provide enough information to either support or weaken the researchers' claim.

QUESTION 12

Choice D is the best answer because it describes data from the graph that support the researchers' conclusion that there is a growing interest among CEOs in connecting with more departments in their companies. The graph shows the average number of individuals reporting directly to CEOs during three different time periods: the individuals are divided into managers and department leaders. The average number of department leaders directly reporting to their CEO during the 1991–1995 period was slightly more than three, during the 1996–2001 period it was four, and during the 2001–2008 period it was almost seven. Thus, the average number of department leaders reporting directly to their CEO rose over the three periods studied, which suggests that CEOs were connecting with more departments.

Choice A is incorrect because the average number of managers and department leaders reporting directly to their CEO rose for both categories between the 1991–1995 and 2001–2008 periods; thus, it isn't true that the average numbers didn't fluctuate. **Choice B** is incorrect because the average number of managers reporting directly to their CEO was highest in the 2001–2008 period, not in the 1996–2001 period. **Choice C** is incorrect.

Although it correctly describes a feature of the graph, the observation that more department leaders than managers are reporting to CEOs does not by itself address the question of whether CEOs are connecting with more departments over time—to address that question, one needs to know whether the number of department leaders reporting to CEOs is increasing over time.

QUESTION 13

Choice C is the best answer because it presents a finding that, if true, would weaken the astronomers' claim about the makeup of host stars and their planets. The text explains that because stars and planets begin forming from the same gas and dust, astronomers believe planets should be composed of the same materials as their host stars, but in equal or smaller quantities. The finding that the amount of iron in some rocky planets is much higher than the amount in their host star would weaken the astronomers' claim because it would show that some planets contain the same material as their host star, but in higher quantities.

Choice A is incorrect because a finding only about the makeup of stars, whether they've cooled or not, would provide no information about the makeup of planets. Thus, it wouldn't have any bearing on the claim that planets and their host stars are composed of the same materials in differing quantities. **Choice B** is incorrect because a finding about two host stars having similar proportions of certain materials wouldn't provide any information about the makeup of planets. Thus, it wouldn't be relevant to the claim that planets and their host stars are composed of the same materials in differing quantities. **Choice D** is incorrect because the text indicates that the astronomers' claim is based on a fact—that stars and planets begin forming from the same gas and dust in space—which would remain true regardless of the effectiveness of a method for analysis of compositions. The text does cite analysis of rocky planets in our solar system and the Sun, but only as a single piece of evidence that is consistent with the claim and not as the source of the claim; the finding that the method used for that analysis is less effective in other scenarios wouldn't weaken a claim that's based on knowledge of how stars and planets initially form.

QUESTION 14

Choice B is the best answer because it presents a finding that, if true, would most directly support the arts journalist's claim about Enwezor's work as a curator and art historian. In the text, the arts journalist asserts that Enwezor wished not just to focus on modern African artists but also to show "how their work fits into the larger context of global modern art and art history," or how their work relates to artistic developments and work by other artists elsewhere in the world. The description of *Postwar: Art Between the Pacific and the Atlantic, 1945–1965* indicates that Enwezor and Siegel's exhibition brought works by African artists together with works by artists from other countries, thus supporting the arts journalist's claim that Enwezor sought to show works by African artists in a context of global modern art and art history.

Choice A is incorrect because it describes a retrospective that wouldn't support the arts journalist's claim that Enwezor wanted to show how works by modern African artists fit into the larger context of global modern art and art history. The description of *El Anatsui: Triumphant Scale* indicates that the retrospective focused only on the work of a single African artist, El Anatsui. The description doesn't suggest that the exhibition showed how El Anatsui's works fit into a global artistic context. **Choice C** is incorrect because it describes an exhibition that wouldn't support the arts journalist's claim that Enwezor wanted

to show how works by modern African artists relate to the larger context of global modern art and art history. The description of *The Short Century: Independence and Liberation Movements in Africa, 1945–1994* indicates that the exhibition showed how African artists were influenced by movements for independence from European colonial powers following the Second World War. Although this suggests that Enwezor intended the exhibition to place works by African artists in a political context, it doesn't indicate that the works were placed in a global artistic context. *Choice D* is incorrect because it describes an exhibition that wouldn't support the arts journalist's claim that Enwezor wanted to show how works by modern African artists relate to the larger context of global modern art and art history. The description of *In/sight: African Photographers, 1940 to the Present* indicates that the exhibition was intended to reveal the broad range of approaches taken by African photographers, not that the exhibition showed how photography by African artists fits into a global artistic context.

QUESTION 15

Choice D is the best answer because it presents the conclusion that most logically follows from the text's discussion of the challenge researchers face when studying the effects of holding elected office on a person's behavior. The text explains that it's hard for researchers to test for the effects that elected office has on people because finding people to serve as a control group is difficult. The text indicates that a control group needs to be made up of people who share characteristics of the group being tested but don't have the variable being tested (in this case, holding elected office). Because researchers aren't able to influence who wins elections, they're also unable to determine who would serve as an appropriately similar member of a control group. Thus, it logically follows that researchers will find it difficult to identify a group of people who can function as an appropriate control group for their studies.

Choice A is incorrect because the text focuses on the struggle to put together a control group for experiments; it doesn't suggest that finding information about politicians' behavior is difficult. **Choice B** is incorrect because the experiments mentioned in the text are testing the effects of holding elected office on a person's behavior. Studying people who have already held elected office wouldn't provide an opportunity to note any behavioral changes that the position might cause. **Choice C** is incorrect because the text defines people in a control group as those "who are otherwise similar to the office-holders"; selecting people who differ from the office-holders wouldn't fit the criteria for an appropriate control group.

QUESTION 16

Choice A is the best answer because it most logically completes the text. The text explains that the *Cantares Mexicanos* contains poems about the Aztec Empire from before the Spanish invasion. Furthermore, it indicates that notes in the collection attest that some of these poems predate the Spanish invasion, while some customs depicted are likely Spanish in origin. The implication is that some poems were composed before the invasion but the references to Spanish customs could have come about only after the invasion, and thus that the collection includes content that predates the invasion and also content from after the invasion.

Choice B is incorrect because the text clearly indicates that the collection is in Nahuatl, not Spanish, so the compilers' unfamiliarity with Spanish is irrelevant to whether the collection contains material composed after the Spanish invasion. **Choice C** is incorrect because the text mentions only the Aztec Empire and

Spain; there is no information about the relationship of Aztec literature to any traditions other than its own or Spain's. *Choice D* is incorrect because the text states that some of the poems make "inarguable references" to common Spanish customs, which conflicts with the idea that these references can reasonably be attributed to mere coincidence.

QUESTION 17

Choice D is the best answer. The convention being tested is the coordination of main clauses within a sentence. The semicolon is correctly used to join the first main clause ("To humans...prey") and the second main clause ("rather...approach"). Further, the comma after the adverb "rather" is correctly used to separate the adverb from the main clause ("the brightly...approach") it modifies, logically indicating that the information in this clause (how the spider's behavior appears to humans) is contrary to the information in the previous clause (how the spider's behavior does not appear to humans).

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. *Choice B* is incorrect because it results in a run-on sentence. The two main clauses are fused without appropriate punctuation and/or a conjunction. *Choice C* is incorrect. Placing the comma between the first main clause "To humans...prey" and the adverb "rather" illogically indicates that the information in the first main clause is contrary to what came before, which doesn't make sense in this context.

QUESTION 18

Choice D is the best answer. The convention being tested is the use of verbs to express tense in a sentence. In this choice, the past progressive tense verb "was studying" is consistent with the other past tense verbs (e.g., "made" and "collected") used to describe Buratti's discovery. Further, the past progressive tense correctly indicates that an ongoing action in the past was occurring (she was studying) at the same time that another event occurred in the past (she made an interesting discovery).

Choice A is incorrect because the present tense verb "studies" isn't consistent with the past tense verbs used to describe Buratti's discovery. *Choice B* is incorrect because the present perfect progressive tense verb "has been studying" isn't consistent with the past tense verbs used to describe Buratti's discovery. *Choice C* is incorrect because the future tense verb "will study" isn't consistent with the past tense verbs used to describe Buratti's discovery.

QUESTION 19

Choice B is the best answer. The convention being tested is punctuation use between sentences. In this choice, the period after "Bay" is used correctly to mark the boundary between one sentence ("On...Bay") and another sentence that begins with a supplementary phrase ("Having...years"). Here, the supplementary phrase beginning with "having" modifies the subject of the second sentence, "the celebrated ship."

Choice A 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 comma splice. A comma can't be used in this way to join two sentences. *Choice D* is incorrect because it results in a run-on sentence. The sentences ("On...Bay" and "having...years") are fused without punctuation and/or a conjunction.

QUESTION 20

Choice A is the best answer. The convention being tested is subject-verb agreement. The singular verb "has enhanced" agrees in number with the singular subject "A Sheaf Gleaned in French Fields," which is the title of a book of poems.

Choice B is incorrect because the plural verb "are enhancing" doesn't agree in number with the singular subject "A Sheaf Gleaned in French Fields." **Choice C** is incorrect because the plural verb "have enhanced" doesn't agree in number with the singular subject "A Sheaf Gleaned in French Fields." **Choice D** is incorrect because the plural verb "enhance" doesn't agree in number with the singular subject "A Sheaf Gleaned in French Fields."

QUESTION 21

Choice A is the best answer. The convention being tested is punctuation use between sentences. In this choice, the period after "tombs" is used correctly to mark the boundary between one sentence ("Archaeologist...tombs") and another ("Built...nature").

Choice B 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 C** is incorrect. Without a comma preceding it, the conjunction "and" can't be used in this way to join the two sentences. **Choice D** is incorrect because it results in a run-on sentence. The sentences ("Archaeologist...tombs" and "Built...nature") are fused without punctuation and/or a conjunction.

QUESTION 22

Choice C is the best answer. The conventions being tested are punctuation use between titles and proper nouns and between verbs and integrated quotations. No punctuation is needed to set off the proper noun "Stina Chyn" from the title that describes Chyn, "critic." Because "Stina Chyn" is essential information identifying the "critic," no punctuation is necessary. Further, no punctuation is needed between the verb "claims" and the following quotation because the quotation is integrated into the structure of the sentence.

Choice A is incorrect because no punctuation is needed before or after the proper noun "Stina Chyn." Setting the critic's name off with commas suggests that it could be removed without affecting the coherence of the sentence, which isn't the case. **Choice B** is incorrect because no punctuation is needed before or after the proper noun "Stina Chyn." Setting the critic's name off with commas suggests that it could be removed without affecting the coherence of the sentence, which isn't the case. Additionally, no punctuation is needed between "claims" and the integrated quotation. **Choice D** is incorrect because no punctuation is needed between the verb "claims" and its subject, "critic Stina Chyn." Additionally, no punctuation is needed between the verb "claims" and the integrated quotation.

QUESTION 23

Choice B is the best answer. The convention being tested is the punctuation of items in a complex series (a series including internal punctuation). The semicolon after "nonnative" is correctly used to separate the first item ("growing diverse plant species, both native and nonnative") and the second item ("fostering scientific research") in the series of things that botanical gardens are dedicated to. Further, the comma after "species" is correctly used to separate the noun phrase "diverse plant species" and the supplementary phrase "both native and nonnative" that modifies it.

Choice A is incorrect because a comma (specifically, the comma after “nonnative”) can’t be used in this way to separate items in a complex series. *Choice C* is incorrect because a semicolon can’t be used in this way to separate the noun phrase “diverse plant species” and the supplementary phrase “both native and nonnative” that modifies it. Further, a comma can’t be used in this way to separate items in a complex series. *Choice D* is incorrect because it fails to use appropriate punctuation to separate the noun phrase “diverse plant species” and the supplementary phrase “both native and nonnative” that modifies it. Further, a comma can’t be used in this way to separate items in a complex series.

QUESTION 24

Choice C is the best answer. “However” logically signals that the information in this sentence—that Hammurabi is mainly remembered for just a single achievement, the Code of Hammurabi—is contrary to what might be assumed from the previous information about Hammurabi’s many achievements.

Choice A is incorrect because “therefore” illogically signals that the information in this sentence is a result of the previous information about Hammurabi’s many achievements. Instead, this sentence makes a point that is contrary to what might be assumed from the previous information. *Choice B* is incorrect because “likewise” illogically signals that the information in this sentence is similar to the previous information about Hammurabi’s many achievements. Instead, this sentence makes a point that is contrary to what might be assumed from the previous information. *Choice D* is incorrect because “for instance” illogically signals that this sentence exemplifies the previous information about Hammurabi’s many achievements. Instead, this sentence makes a point that is contrary to what might be assumed from the previous information.

QUESTION 25

Choice D is the best answer. “Similarly” logically signals that the information in the sentence—that Dove situates Beulah’s life in the context of the US Civil Rights Movement—is similar to the previous information about Thomas and the Great Migration. Both sentences support the first sentence’s claim that Dove portrays her characters in the context of broader historical narratives.

Choice A is incorrect because “specifically” illogically signals that the information about Beulah in this sentence provides specific details elaborating on the previous information about Thomas. Instead, it’s similar to the previous information about Thomas. *Choice B* is incorrect because “thus” illogically signals that the information about Beulah in this sentence is a result or consequence of the previous information about Thomas. Instead, it’s similar to the previous information about Thomas. *Choice C* is incorrect because “regardless” illogically signals that the information about Beulah in this sentence is true despite the previous information about Thomas. Instead, it’s similar to the previous information about Thomas.

QUESTION 26

Choice A is the best answer. “Nevertheless” logically signals that the information in this sentence—that the spacesuits Suttirat Larlarb designed for the film *Sunshine* were made in standard sizes in a factory—presents a notable exception to Larlarb’s typical approach of custom-fitting garments to actors, which is described in the previous sentence.

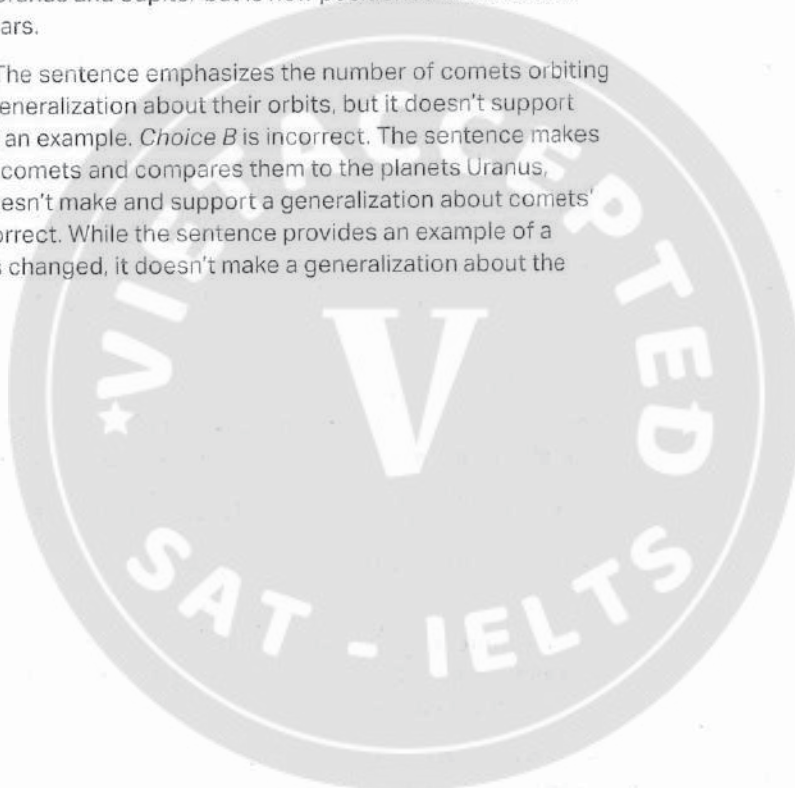
Choice B is incorrect because “thus” illogically signals that the information in this sentence is a result or consequence of the previous information about Larlarb’s typical approach of custom-fitting garments to actors. Instead,

it presents a notable exception to Larlarb's typical approach. *Choice C* is incorrect because "likewise" illogically signals that the information in this sentence is similar to the previous information about Larlarb's typical approach of custom-fitting garments to actors. Instead, it presents a notable exception to Larlarb's typical approach. *Choice D* is incorrect because "moreover" illogically signals that the information in this sentence merely adds to the previous information about Larlarb's typical approach of custom-fitting garments to actors. Instead, it presents a notable exception to Larlarb's typical approach.

QUESTION 27

Choice D is the best answer. The sentence makes a generalization—that a comet's orbit around the Sun may change over time—and supports the generalization with the example of the orbit of comet 81P/Wild, which once lay between the orbits of Uranus and Jupiter but is now positioned between the orbits of Jupiter and Mars.

Choice A is incorrect. The sentence emphasizes the number of comets orbiting the Sun and makes a generalization about their orbits, but it doesn't support the generalization with an example. *Choice B* is incorrect. The sentence makes a generalization about comets and compares them to the planets Uranus, Jupiter, and Mars; it doesn't make and support a generalization about comets' orbits. *Choice C* is incorrect. While the sentence provides an example of a comet whose orbit has changed, it doesn't make a generalization about the orbits of comets.



Math

Module 1

(22 questions)

QUESTION 1

Choice C is correct. It's given that $x = 7$. Substituting 7 for x into the given expression $x + 20$ yields $7 + 20$, which is equivalent to 27.

Choice A is incorrect. This is the value of $x + 6$. **Choice B** is incorrect. This is the value of $x + 13$. **Choice D** is incorrect. This is the value of $x + 27$.

QUESTION 2

Choice B is correct. 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 of data set X is $\frac{5 + 9 + 9 + 13}{4}$, or 9, and the mean of data set Y is $\frac{5 + 9 + 9 + 13 + 27}{5}$, or 12.6. Since 9 is less than 12.6, the mean of data set X is less than the mean of data set Y.

Alternate approach: Data set Y consists of the 4 values in data set X and one additional value, 27. Since the additional value, 27, is larger than any value in data set X, the mean of data set X is less than the mean of data set Y.

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 3

Choice B is correct. In similar triangles, corresponding angles are congruent. It's given that right triangles PQR and STU are similar, where angle P corresponds to angle S . It follows that angle P is congruent to angle S . In the triangles shown, angle R and angle U are both marked as right angles, so angle R and angle U are corresponding angles. It follows that angle Q and angle T are corresponding angles, and thus, angle Q is congruent to angle T . It's given that the measure of angle Q is 18° , so the measure of angle T is also 18° . Angle U is a right angle, so the measure of angle U is 90° . The sum of the measures of the interior angles of a triangle is 180° . Thus, the sum of the measures of the interior angles of triangle STU is 180 degrees. Let s represent the measure, in degrees, of angle S . It follows that $s + 18 + 90 = 180$,

or $s + 108 = 180$. Subtracting 108 from both sides of this equation yields $s = 72$. Therefore, if the measure of angle Q is 18 degrees, then the measure of angle S is 72 degrees.

Choice A is incorrect. This is the measure of angle T.

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

Choice D is incorrect. This is the sum of the measures of angle S and angle U.

QUESTION 4

Choice A is correct. It's given that the rocket contained 467,000 kilograms (kg) of propellant before launch and had 362,105 kg remaining exactly 21 seconds after launch. Finding the difference between the amount, in kg, of propellant before launch and the remaining amount, in kg, of propellant after launch gives the amount, in kg, of propellant burned during the 21 seconds:

$467,000 - 362,105 = 104,895$. Dividing the amount of propellant burned by the

number of seconds yields $\frac{104,895}{21} = 4,995$. Thus, an average of 4,995 kg of

propellant burned each second after launch.

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 finding the amount of propellant burned, rather than the amount of propellant burned each second.

QUESTION 5

Choice C is correct. It's given that $4x = 20$ and $-3x + y = -7$ is a system of equations with a solution (x, y) . Adding the second equation in the given system to the first equation yields $4x + (-3x + y) = 20 + (-7)$, which is equivalent to $x + y = 13$. Thus, the value of $x + y$ is 13.

Choice A is incorrect. This represents the value of $-2(x + y) - 1$. *Choice B* is incorrect. This represents the value of $-(x + y)$. *Choice D* is incorrect. This represents the value of $2(x + y) + 1$.

QUESTION 6

The correct answer is 5. It's given that the equation $10x + 15y = 85$ represents the situation, where x is the number of on-site training courses, y is the number of online training courses, and 85 is the total number of hours of training courses the apprentice has enrolled in. Therefore, $10x$ represents the number of hours the apprentice has enrolled in on-site training courses, and $15y$ represents the number of hours the apprentice has enrolled in online training courses. Since x is the number of on-site training courses and y is the number of online training courses the apprentice has enrolled in, 10 is the number of hours each on-site course takes and 15 is the number of hours each online course takes. Subtracting these numbers gives $15 - 10$, or 5 more hours each online training course takes than each on-site training course.

QUESTION 7

Choice D is correct. The perimeter, P , of a square can be found using the formula $P = 4s$, where s is the length of each side of the square. It's given that square X has a side length of 12 centimeters. Substituting 12 for s in the formula for the perimeter of a square yields $P = 4(12)$, or $P = 48$. Therefore, the perimeter of square X is 48 centimeters. It's also given that the perimeter of square Y is 2 times the perimeter of square X. Therefore, the perimeter of

square Y is $2(48)$, or 96, centimeters. Substituting 96 for P in the formula $P = 4s$ gives $96 = 4s$. Dividing both sides of this equation by 4 gives $24 = s$. Therefore, the length of one side of square Y is 24 centimeters.

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 8

Choice A is correct. It's given that the function g models the number of gallons that remain from a full gas tank in a car after driving m miles. In the given function $g(m) = -0.05m + 12.1$, the coefficient of m is -0.05 . This means that for every increase in the value of m by 1, the value of $g(m)$ decreases by 0.05. It follows that for each mile driven, there is a decrease of 0.05 gallons of gasoline. Therefore, 0.05 gallons of gasoline are used to drive each mile.

Choice B is incorrect and represents the number of gallons of gasoline in a full gas tank. *Choice C* is incorrect and may result from conceptual errors. *Choice D* is incorrect and may result from conceptual errors.

QUESTION 9

The correct answer is 28. The given absolute value equation can be rewritten as two linear equations: $4x - 4 = 112$ and $-(4x - 4) = 112$, or $4x - 4 = -112$. Adding 4 to both sides of the equation $4x - 4 = 112$ results in $4x = 116$. Dividing both sides of this equation by 4 results in $x = 29$. Adding 4 to both sides of the equation $4x - 4 = -112$ results in $4x = -108$. Dividing both sides of this equation by 4 results in $x = -27$. Therefore, the two values of $x - 1$ are $29 - 1$, or 28, and $-27 - 1$, or -28 . Thus, the positive value of $x - 1$ is 28.

Alternate approach: The given equation can be rewritten as $|4(x - 1)| = 112$, which is equivalent to $4|x - 1| = 112$. Dividing both sides of this equation by 4 yields $|x - 1| = 28$. This equation can be rewritten as two linear equations: $x - 1 = 28$ and $-(x - 1) = 28$, or $x - 1 = -28$. Therefore, the positive value of $x - 1$ is 28.

QUESTION 10

Choice C is correct. Multiplying each side of the given equation by y yields the equivalent equation $\frac{y}{7b} = 11x$. Dividing each side of this equation by 11 yields

$$\frac{y}{77b} = x, \text{ or } x = \frac{y}{77b}.$$

Choice A is incorrect. This equation is not equivalent to the given equation.

Choice B is incorrect. This equation is not equivalent to the given equation.

Choice D is incorrect. This equation is not equivalent to the given equation.

QUESTION 11

The correct answer is 11. It's given that $f(x)$ is defined by the equation $f(x) = mx - 28$, where m is a constant. It's also given in the table that when $x = 10$, $f(x) = 82$. Substituting 10 for x and 82 for $f(x)$ in the equation $f(x) = mx - 28$ yields $82 = m(10) - 28$. Adding 28 to both sides of this equation yields $110 = 10m$. Dividing both sides of this equation by 10 yields $11 = m$. Therefore, the value of m is 11.

QUESTION 12

The correct answer is 9. The given expression can be rewritten as $(5x^3 - 3) + (-1)(-4x^3 + 8)$. By applying the distributive property, this expression can be rewritten as $5x^3 - 3 + 4x^3 + (-8)$, which is equivalent to $(5x^3 + 4x^3) + (-3 + (-8))$. Adding like terms in this expression yields $9x^3 - 11$. Since it's given that $(5x^3 - 3) - (-4x^3 + 8)$ is equivalent to $bx^3 - 11$, it follows that $9x^3 - 11$ is equivalent to $bx^3 - 11$. Therefore, the coefficients of x^3 in these two expressions must be equivalent, and the value of b must be 9.

QUESTION 13

Choice A is correct. It's given that the point $(x, 53)$ is a solution to the given system of inequalities in the xy -plane. This means that the coordinates of the point, when substituted for the variables x and y , make both of the inequalities in the system true. Substituting 53 for y in the inequality $y > 14$ yields $53 > 14$, which is true. Substituting 53 for y in the inequality $4x + y < 18$ yields $4x + 53 < 18$. Subtracting 53 from both sides of this inequality yields $4x < -35$. Dividing both sides of this inequality by 4 yields $x < -8.75$. Therefore, x must be a value less than -8.75 . Of the given choices, only -9 is less than -8.75 .

Choice B is incorrect. Substituting -5 for x and 53 for y in the inequality $4x + y < 18$ yields $4(-5) + 53 < 18$, or $33 < 18$, which is not true.

Choice C is incorrect. Substituting 5 for x and 53 for y in the inequality $4x + y < 18$ yields $4(5) + 53 < 18$, or $73 < 18$, which is not true.

Choice D is incorrect. Substituting 9 for x and 53 for y in the inequality $4x + y < 18$ yields $4(9) + 53 < 18$, or $89 < 18$, which is not true.

QUESTION 14

Choice D is correct. Let y represent the number of cells per milliliter x hours after the initial observation. Since the number of cells per milliliter doubles every 3 hours, the relationship between x and y can be represented by an exponential equation of the form $y = a(b)^{\frac{x}{k}}$, where a is the number of cells per milliliter during the initial observation and the number of cells per milliliter increases by a factor of b every k hours. It's given that there were 300,000 cells per milliliter during the initial observation. Therefore, $a = 300,000$. It's also given that the number of cells per milliliter doubles, or increases by a factor of 2, every 3 hours. Therefore, $b = 2$ and $k = 3$. Substituting 300,000 for a , 2 for b , and 3 for k in the equation $y = a(b)^{\frac{x}{k}}$ yields $y = 300,000(2)^{\frac{x}{3}}$. The number of cells per milliliter there will be 15 hours after the initial observation is the value of y in this equation when $x = 15$. Substituting 15 for x in the equation $y = 300,000(2)^{\frac{x}{3}}$ yields $y = 300,000(2)^{\frac{15}{3}}$, or $y = 300,000(2)^5$. This is equivalent to $y = 300,000(32)$, or $y = 9,600,000$. Therefore, 15 hours after the initial observation, there will be 9,600,000 cells per milliliter.

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 D is correct. The y -intercept of the graph is the point at which the graph crosses the y -axis, or the point for which the value of x is 0. Therefore, the y -intercept of the given graph is the point $(0, 9)$. It's given that x represents the number of years since the end of 1992. Therefore, $x = 0$ represents 0 years since the end of 1992, which is the same as the end of 1992. It's also given that y represents the estimated number of catalogs, in thousands, that the company

sent to its customers at the end of the year. Therefore, $y = 9$ represents 9,000 catalogs. It follows that the y -intercept $(0, 9)$ means that the estimated number of catalogs the company sent to its customers at the end of 1992 was 9,000.

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 16

Choice B is correct. For positive values of a and b , $a^m b^m = (ab)^m$, $\sqrt[n]{a} = (a)^{\frac{1}{n}}$, and

$(a^j)^k = a^{jk}$. Therefore, the given expression, $\sqrt[7]{x^9 y^9}$, can be rewritten as $\sqrt[7]{(xy)^9}$.

This expression is equivalent to $((xy)^9)^{\frac{1}{7}}$, which can be rewritten as $(xy)^{9 \cdot \frac{1}{7}}$, or $(xy)^{\frac{9}{7}}$.

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 17

Choice C is correct. It's given that the population of City A increased by 7% from 2015 to 2016. Therefore, the population of City A in 2016 includes 100% of the population of City A in 2015 plus an additional 7% of the population of City A in 2015. This means that the population of City A in 2016 is 107% of the population in 2015. Thus, the population of City A in 2016 is $\frac{107}{100}$, or 1.07, times the 2015 population. Therefore, the value of k is 1.07.

Choice A is incorrect. This would be the value of k if the population in 2016 was 7% of the population in 2015. *Choice B* is incorrect. This would be the value of k if the population in 2016 was 70% of the population in 2015. *Choice D* is incorrect. This would be the value of k if the population increased by 70%, not 7%, from 2015 to 2016.

QUESTION 18

Choice C is correct. A system of two linear equations in two variables, x and y , has no solution if the graphs of the lines represented by the equations in the xy -plane are distinct and parallel. The graphs of two lines in the xy -plane represented by equations in slope-intercept form, $y = mx + b$, where m and b are constants, are parallel if their slopes, m , are the same and are distinct if their y -coordinates of the y -intercepts, b , are different. In the equations $y = 16x + 3$ and $y = 16x + 19$, the values of m are each 16, and the values of b are 3 and 19, respectively. Since the slopes of these lines are the same, and the y -coordinates of the y -intercepts are different, it follows that the system of linear equations in choice C has no solution.

Choice A is incorrect. The lines represented by the equations in this system are a vertical line and a horizontal line. Therefore, this system has a solution, $(3, 5)$, rather than no solution. *Choice B* is incorrect. The two lines represented by these equations have different slopes and the same y -coordinate of the y -intercept. Therefore, this system has a solution, $(0, 6)$, rather than no solution. *Choice D* is incorrect. The two lines represented by these equations are a horizontal line and a line with a slope of 5 that have the same y -coordinate of the y -intercept. Therefore, this system has a solution, $(0, 5)$, rather than no solution.

QUESTION 19

Choice D is correct. Since w represents the n th term of the sequence and 9 is the first term of the sequence, the value of w is 9 when the value of n is 1. Since each term after the first is 4 times the preceding term, the value of w is $9(4)$ when the value of n is 2. Therefore, the value of w is $9(4)(4)$, or $9(4)^2$, when the value of n is 3. More generally, the value of w is $9(4^{n-1})$ for a given value of n . Therefore, the equation $w = 9(4^{n-1})$ gives w in terms of n .

Choice A is incorrect. This equation describes a sequence for which the first term is 36, rather than 9, and each term after the first is 9, rather than 4, times the preceding term. **Choice B** is incorrect. This equation describes a sequence for which the first term is 4, rather than 9, and each term after the first is 9, rather than 4, times the preceding term. **Choice C** is incorrect. This equation describes a sequence for which the first term is 36, rather than 9.

QUESTION 20

Choice B is correct. It's given that the minimum value of x is 12 less than 6 times another number n . Therefore, the possible values of x are all greater than or equal to the value of 12 less than 6 times n . The value of 6 times n is given by the expression $6n$. The value of 12 less than $6n$ is given by the expression $6n - 12$. Therefore, the possible values of x are all greater than or equal to $6n - 12$. This can be shown by the inequality $x \geq 6n - 12$.

Choice A is incorrect. This inequality shows the possible values of x if the maximum, not the minimum, value of x is 12 less than 6 times n . **Choice C** is incorrect. This inequality shows the possible values of x if the maximum, not the minimum, value of x is 6 times n less than 12, not 12 less than 6 times n . **Choice D** is incorrect. This inequality shows the possible values of x if the minimum value of x is 6 times n less than 12, not 12 less than 6 times n .

QUESTION 21

Choice B is correct. It's given that right triangle RST is similar to triangle UVW , where S corresponds to V and T corresponds to W . It's given that the side lengths of the right triangle RST are $RS = 20$, $ST = 48$, and $TR = 52$. Corresponding angles in similar triangles are equal. It follows that the measure of angle T is equal to the measure of angle W . The hypotenuse of a right triangle is the longest side. It follows that the hypotenuse of triangle RST is side TR . The hypotenuse of a right triangle is the side opposite the right angle. Therefore, angle S is a right angle. The adjacent side of an acute angle in a right triangle is the side closest to the angle that is not the hypotenuse. It follows that the adjacent side of angle T is side ST . The opposite side of an acute angle in a right triangle is the side across from the acute angle. It follows that the opposite side of angle T is side RS . The tangent of an acute angle in a right triangle is the ratio of the length of the opposite side

to the length of the adjacent side. Therefore, $\tan T = \frac{RS}{ST}$. Substituting 20 for RS and 48 for ST in this equation yields $\tan T = \frac{20}{48}$, or $\tan T = \frac{5}{12}$. The tangents of two acute angles with equal measures are equal. Since the measure of angle T is equal to the measure of angle W , it follows that $\tan T = \tan W$. Substituting $\frac{5}{12}$ for $\tan T$ in this equation yields $\frac{5}{12} = \tan W$. Therefore, the value of $\tan W$ is $\frac{5}{12}$.

Choice A is incorrect. This is the value of $\sin W$. **Choice C** is incorrect. This is the value of $\cos W$. **Choice D** is incorrect. This is the value of $\frac{1}{\tan W}$.