

Math

Module 1

(27 questions)

QUESTION 1

Choice B is correct. It's given that 1 yard = 36 inches. Therefore, 612 inches is equivalent to 612 inches $\left(\frac{1 \text{ yard}}{36 \text{ inches}}\right)$, which can be rewritten as $\frac{612 \text{ yards}}{36}$, or 17 yards.

Choice A is incorrect. This is the number of yards that are equivalent to 2.124 inches. *Choice C* is incorrect. This is the number of yards that are equivalent to 20,736 inches. *Choice D* is incorrect. This is the number of yards that are equivalent to 793,152 inches.

QUESTION 2

Choice C is correct. The table gives the results of 200 people who were asked how often they see a movie in a theater. The table shows that 29 people responded "never" and 53 people responded "almost never." Therefore, $29 + 53$, or 82, people responded either "never" or "almost never."

Choice A is incorrect. This is the difference between the number of people who responded "almost never" and the number of people who responded "never."

Choice B is incorrect. This is the number of people who responded "almost never" but doesn't include those who responded "never." *Choice D* is incorrect. This is the number of people who responded something other than "never" or "almost never," rather than the number of people who responded either "never" or "almost never."

QUESTION 3

Choice D is correct. The y -intercept of a line graphed in the xy -plane is the point where the line intersects the y -axis. The line graphed intersects the y -axis at the point $(0, 8)$. Therefore, the y -intercept of the line graphed is $(0, 8)$.

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

QUESTION 4

Choice A is correct. Subtracting 180 from both sides of the given equation yields $5p = 70$. Dividing both sides of this equation by 5 yields $p = 14$. Therefore, the value of p that satisfies the equation $5p + 180 = 250$ is 14.

Choice B is incorrect. This value of p satisfies the equation $5p + 180 = 505$.

Choice C is incorrect. This value of p satisfies the equation $5p + 180 = 610$.

Choice D is incorrect. This value of p satisfies the equation $5p + 180 = 1,430$.

QUESTION 5

Choice D is correct. The area A , in square centimeters, of a rectangle can be found using the formula $A = \ell w$, where ℓ is the length, in centimeters, of the rectangle and w is its width, in centimeters. It's given that the rectangle has a length of 36 centimeters and a width of 34 centimeters. Substituting 36 for ℓ and 34 for w in the formula $A = \ell w$ yields $A = 36(34)$, or $A = 1,224$. Therefore, the area, in square centimeters, of this rectangle is 1,224.

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

Choice B is incorrect. This is the perimeter, in centimeters, not the area, in square centimeters, of the rectangle. *Choice C* is incorrect and may result from conceptual or calculation errors.

QUESTION 6

The correct answer is 17. It's given that there are 170 blocks in a container, and of these blocks, 10% are green. Since 10% can be rewritten as $\frac{10}{100}$, or 0.1, the number of green blocks in the container is $0.1(170)$, or 17.

QUESTION 7

The correct answer is 14. It's given that the equation $46 = 2a + 2b$ gives the relationship between the side lengths a and b of a certain parallelogram.

Substituting 9 for a in the given equation yields $46 = 2(9) + 2b$, or $46 = 18 + 2b$.

Subtracting 18 from both sides of this equation yields $28 = 2b$. Dividing both sides of this equation by 2 yields $14 = b$. Therefore, if $a = 9$, the value of b is 14.

QUESTION 8

Choice B is correct. It's given that the graph shows the possible combinations of the number of pounds of tangerines, x , and the number of pounds of lemons, y , that could be purchased for \$18 at a certain store. If Melvin purchased lemons and 4 pounds of tangerines for a total of \$18, the number of pounds of lemons he purchased is represented by the y -coordinate of the point on the graph where $x = 4$. For the graph shown, when $x = 4$, $y = 10$. Therefore, if Melvin purchased lemons and 4 pounds of tangerines for a total of \$18, then he purchased 10 pounds of lemons.

Choice A is incorrect. This is the number of pounds of tangerines Melvin purchased if he purchased tangerines and 4 pounds of lemons for a total of \$18.

Choice C is incorrect. This is the number of pounds of lemons Melvin purchased if

he purchased lemons and 2 pounds of tangerines for a total of \$18. *Choice D* is incorrect. This is the number of pounds of lemons Melvin purchased if he purchased lemons and 1 pound of tangerines for a total of \$18.

QUESTION 9

Choice A is correct. It's given that the area of a square is 64 square inches. The area A , in square inches, of a square is given by the formula $A = s^2$, where s is the side length, in inches, of the square. Substituting 64 for A in this formula yields $64 = s^2$. Taking the positive square root of both sides of this equation yields $8 = s$. Thus, the side length, in inches, of this square is 8.

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

Choice C is incorrect. This is the area, in square inches, of the square, not the side length, in inches, of the square. *Choice D* is incorrect and may result from conceptual or calculation errors.

QUESTION 10

Choice A is correct. It's given that Connor has c dollars, Maria has m dollars, and Connor has 4 times as many dollars as Maria. This can be represented by the equation $c = 4m$. It's also given that together, Connor and Maria have a total of \$25.00, which can be represented by the equation $c + m = 25$. Therefore, the system consisting of the equations $c = 4m$ and $c + m = 25$ represents this situation.

Choice B is incorrect. The equation $m = 4c$ represents a situation where Maria has 4 times as many dollars as Connor, rather than the situation where Connor has 4 times as many dollars as Maria. *Choice C* is incorrect. The equation $c = 25m$ represents a situation where Connor has 25 times, rather than 4 times, as many dollars as Maria. The equation $c + m = 4$ represents a situation where Connor and Maria together have a total of \$4.00, rather than \$25.00. *Choice D* is incorrect. The equation $m = 25c$ represents a situation where Maria has 25 times as many dollars as Connor, rather than the situation where Connor has 4 times as many dollars as Maria. The equation $c + m = 4$ represents a situation where Connor and Maria together have a total of \$4.00, rather than \$25.00.

QUESTION 11

Choice C is correct. It's given that in the equation $d = 16t$, d represents the distance, in inches, and t represents the number of seconds since an object started moving. In this equation, t is being multiplied by 16. This means that the object's distance increases by 16 inches each second. Therefore, the best interpretation of 16 in this context is that the object is moving at a rate of 16 inches per second.

Choice A is incorrect and may result from conceptual errors. *Choice B* is incorrect. This is the best interpretation of $16t$, rather than 16, in this context. *Choice D* is incorrect and may result from conceptual errors.

QUESTION 12

Choice C is correct. The scatterplot shows that there was an increase in recorded temperature from $x = 2$ to $x = 3$ and from $x = 6$ to $x = 7$. When $x = 2$, the recorded temperature was approximately 60°F and when $x = 3$, the recorded temperature was greater than 70°F . This means that the increase in recorded temperature from $x = 2$ to $x = 3$ was greater than $(70 - 60)^{\circ}\text{F}$, or 10°F . When $x = 6$, the recorded temperature was greater than 60°F and when $x = 7$, the recorded temperature was less than 70°F . This means that the increase in recorded temperature from $x = 6$ to $x = 7$ was less than $(70 - 60)^{\circ}\text{F}$, or 10°F . It follows that the greatest increase in recorded temperature took place from $x = 2$ to $x = 3$.

Choice A is incorrect. The increase in recorded temperature from $x = 6$ to $x = 7$ was less than the increase in recorded temperature from $x = 2$ to $x = 3$. **Choice B** is incorrect. From $x = 5$ to $x = 6$, a decrease, not an increase, in recorded temperature took place. **Choice D** is incorrect. From $x = 1$ to $x = 2$, a decrease, not an increase, in recorded temperature took place.

QUESTION 13

The correct answer is 73,920. It's given that 1 furlong = 220 yards and 1 yard = 3 feet. It follows that a distance of 112 furlongs is equivalent to

$(112 \text{ furlongs})\left(\frac{220 \text{ yards}}{1 \text{ furlong}}\right)\left(\frac{3 \text{ feet}}{1 \text{ yard}}\right)$, or 73,920 feet.

QUESTION 14

The correct answer is 39. It's given that for the linear function j , m is a constant and $j(12) = 18$. Substituting 12 for x and 18 for $j(x)$ in the given equation yields $18 = m(12) + 144$. Subtracting 144 from both sides of this equation yields $-126 = m(12)$. Dividing both sides of this equation by 12 yields $-10.5 = m$.

Substituting -10.5 for m in the given equation, $j(x) = mx + 144$, yields

$j(x) = -10.5x + 144$. Substituting 10 for x in this equation yields

$j(10) = (-10.5)(10) + 144$, or $j(10) = 39$. Therefore, the value of $j(10)$ is 39.

QUESTION 15

Choice B is correct. It's given by the second equation in the system that $y = 19$. Substituting 19 for y in the first equation yields $19 = 4x - 9$. Adding 9 to both sides of this equation yields $28 = 4x$. Dividing both sides of this equation by 4 yields $7 = x$. Therefore, since $x = 7$ and $y = 19$, the solution (x, y) to the given system of equations is $(7, 19)$.

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 16

Choice D is correct. The given expression follows the difference of two squares pattern, $x^2 - y^2$, which factors as $(x - y)(x + y)$. Therefore, the expression $256w^2 - 676$ can be written as $(16w)^2 - 26^2$, or $(16w)(16w) - (26)(26)$, which factors as $(16w - 26)(16w + 26)$.

Choice A is incorrect. This expression is equivalent to $256w^2 - 832w + 676$.

Choice B is incorrect. This expression is equivalent to $64w^2 - 169$. **Choice C** is incorrect. This expression is equivalent to $64w^2 - 208w + 169$.

QUESTION 17

Choice C is correct. Each point (x, y) on the graph represents an elapsed time x , in hours, and the corresponding ocean water level y , in feet, at a certain location based on the model. The graph shown passes through the points $(0, 0)$, $(3, -12)$, and $(6, 0)$. Thus, the table in choice C gives the values of x and their corresponding values of y based on the model.

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 18

Choice A is correct. It's given that line j is perpendicular to line k in the xy -plane. It follows that the slope of line j is the opposite reciprocal of the slope of line k . The equation for line k is written in slope-intercept form $y = mx + b$, where m is the slope of the line and b is the y -coordinate of the y -intercept of the line. It follows that the slope of line k is 3. The opposite reciprocal of a number is -1 divided by the number. Thus, the opposite reciprocal of 3 is $-\frac{1}{3}$. Therefore, the slope of line j is $-\frac{1}{3}$.

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 19

Choice A is correct. It's given that the store's sales of a certain Greek yogurt totaled 1,277.94 dollars last month. It's also given that the equation $5.48x + 7.30y = 1,277.94$ represents this situation, where x is the number of smaller containers sold and y is the number of larger containers sold. Since x represents the number of smaller containers of yogurt sold, the expression $5.48x$ represents the total sales, in dollars, from smaller containers of yogurt. This means that x smaller containers of yogurt were sold at a price of 5.48 dollars each. Therefore, according to the equation, 5.48 represents the price, in dollars, of each smaller container.

Choice B is incorrect. This expression represents the total sales, in dollars, from selling y larger containers of yogurt. **Choice C** is incorrect. This value represents

the price, in dollars, of each larger container of yogurt. *Choice D* is incorrect. This expression represents the total sales, in dollars, from selling x smaller containers of yogurt.

QUESTION 20

The correct answer is 2,216. The surface area of a prism is the sum of the areas of all its faces. A right rectangular prism consists of six rectangular faces, where opposite faces are congruent. It's given that this prism has a length of 28 cm, a width of 15 cm, and a height of 16 cm. Thus, for this prism, there are two faces with area $(28)(15)$ cm², two faces with area $(28)(16)$ cm², and two faces with area $(15)(16)$ cm². Therefore, the surface area, in cm², of the right rectangular prism is $2(28)(15) + 2(28)(16) + 2(15)(16)$, or 2,216.

QUESTION 21

The correct answer is 5. Dividing each side of the given equation by 3 yields $x^2 - 6x - 5 = 0$. Adding 5 to each side of this equation yields $x^2 - 6x = 5$. Therefore, if $3x^2 - 18x - 15 = 0$, the value of $x^2 - 6x$ is 5.

QUESTION 22

Choice C is correct. Applying the distributive property to the given expression yields $d(8d^2 - 3) - 6(8d^2 - 3)$. Applying the distributive property once again to this expression yields $(d)(8d^2) + (d)(-3) + (-6)(8d^2) + (-6)(-3)$, or $8d^3 + (-3d) + (-48d^2) + 18$. This expression can be rewritten as $8d^3 - 48d^2 - 3d + 18$. Thus, $(d - 6)(8d^2 - 3)$ is equivalent to $8d^3 - 48d^2 - 3d + 18$.

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 23

Choice B is correct. The Pythagorean theorem states that in a right triangle, the sum of the squares of the lengths of the two legs is equal to the square of the length of the hypotenuse. It's given that the right triangle has legs with lengths of 28 centimeters and 20 centimeters. Let c represent the length of this triangle's hypotenuse, in centimeters. Therefore, by the Pythagorean theorem, $28^2 + 20^2 = c^2$, or $1,184 = c^2$. Taking the positive square root of both sides of this equation yields $\sqrt{1,184} = c$, or $4\sqrt{74} = c$. Therefore, the length of this triangle's hypotenuse, in centimeters, is $4\sqrt{74}$.

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 square of the length of the triangle's hypotenuse.

QUESTION 24

Choice A is correct. The tables in choices B, C, and D each represent a data set where the values 80 and 90 have the same frequency and the values 70 and 100 have the same frequency. It follows that each of these data sets is symmetric around the value halfway between 80 and 90, or 85. When a data set is symmetric around a value, that value is the mean of the data set. Therefore, the data sets represented by the tables in choices B, C, and D each have a mean of 85. The table in choice A represents a data set where the value 90 has a greater frequency than the value 80 and the value 100 has a greater frequency than the value 70. It follows that this data set has a mean greater than 85. Therefore, of the given choices, choice A represents the data set with the greatest mean.

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 25

Choice A is correct. Dividing both sides of the second equation in the given system by 3 yields $8x + 7y = 9$, which is the first equation in the given system. Therefore, the first and second equations represent the same line in the xy -plane. If the x - and y -coordinates of a point satisfy an equation, the point lies on the graph of the equation in the xy -plane. Choice A is a point with x -coordinate r and y -coordinate $-\frac{8r}{7} + \frac{9}{7}$. Substituting r for x and $-\frac{8r}{7} + \frac{9}{7}$ for y in the equation $8x + 7y = 9$ yields $8r + 7\left(-\frac{8r}{7} + \frac{9}{7}\right) = 9$. Applying the distributive property to the left-hand side of this equation yields $8r - 8r + 9 = 9$. Combining like terms on the left-hand side of this equation yields $9 = 9$, so the coordinates of the point $\left(r, -\frac{8r}{7} + \frac{9}{7}\right)$ satisfy both equations in the given system. Therefore, for each real number r , the point $\left(r, -\frac{8r}{7} + \frac{9}{7}\right)$ lies on the graph of each equation in the xy -plane for the given system.

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 26

Choice B is correct. It's given that a salesperson's total earnings consist of a base salary of x dollars per year plus commission earnings of 11% of the total sales the salesperson makes during the year. If the salesperson makes s dollars in total sales this year, the salesperson's total earnings can be represented by the expression $x + 0.11s$. It's also given that the salesperson has a goal for the total earnings to be at least 3 times and at most 4 times the base salary, which can be represented by the expressions $3x$ and $4x$, respectively. Therefore, this situation can be represented by the inequality $3x \leq x + 0.11s \leq 4x$. Subtracting x from each part of this inequality yields $2x \leq 0.11s \leq 3x$. Dividing each part

of this inequality by 0.11 yields $\frac{2}{0.11}x \leq s \leq \frac{3}{0.11}x$. Therefore, the inequality $\frac{2}{0.11}x \leq s \leq \frac{3}{0.11}x$ represents all possible values of total sales s , in dollars, the salesperson can make this year in order to meet their goal.

Choice A is incorrect. This inequality represents a situation in which the total sales, rather than the total earnings, are at least 2 times and at most 3 times, rather than at least 3 times and at most 4 times, the base salary. *Choice C* is incorrect. This inequality represents a situation in which the total sales, rather than the total earnings, are at least 3 times and at most 4 times the base salary. *Choice D* is incorrect. This inequality represents a situation in which the total earnings are at least 4 times and at most 5 times, rather than at least 3 times and at most 4 times, the base salary.

QUESTION 27

The correct answer is .48. It's given that the number a is 70% less than the positive number b . Therefore, $a = \left(1 - \frac{70}{100}\right)b$, which is equivalent to $a = (1 - 0.70)b$, or $a = 0.30b$. It's also given that the number c is 60% greater than a . Therefore, $c = \left(1 + \frac{60}{100}\right)a$, which is equivalent to $c = (1 + 0.60)a$, or $c = 1.60a$. Since $a = 0.30b$, substituting $0.30b$ for a in the equation $c = 1.60a$ yields $c = 1.60(0.30b)$, or $c = 0.48b$. Thus, c is 0.48 times b . Note that .48 and $\frac{12}{25}$ are examples of ways to enter a correct answer.