2022 STAAR Grade 8 Mathematics Rationales

I #		Ra a
2	Option H is correct	To determine which measurement is closest to the value of *d* in inches, the student should have determined that the line segment containing *d* represents the hypotenuse (longest side) of a right triangle (a closed figure with three sides and one 90-degree angle). The lengths of the two legs of the right triangle can be represented by 11.9 inches and 7.9 inches. Using the Pythagorean theorem (in a right triangle, the square of the hypotenuse [longest side] is equal to the sum [total] of the squares of the other two sides; $^2 + ^2 = ^2$ or $= \sqrt{^2 + ^2}$), the value of *d* can be represented by the expression $\sqrt{11.9$
		$\sqrt{\quad}$ $\sqrt{\quad}$

I #	Ra a	
3	Option A is correct	To determine which equation can be used to find the value of x, the student could have used the formula for the perimeter of a triangle, where P represents the perimeter and a, b, and c each represent a side of the triangle. The student could have identified from the problem that $17x$ represents the perimeter of the triangle, a and b could each equal 15, and c could equal $7x$; therefore, $17x = 15 + 15 + 7x$ or $17x = 30 + 7x$. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.
	Option B is incorrect	The student likely used the formula for the perimeter of a triangle but combined 15 and $7x$, resulting in $17x = 15 + 22x$. The student needs to focus on accurately writing algebraic expressions that represent problem situations.
	Option C is incorrect	The student likely used the formula for the perimeter of a triangle by adding 15 and 15 but placed the x on that sum (total) instead of placing the x on the 7, resulting in $17x = 7 + 30x$. The student needs to focus on accurately writing algebraic expressions that represent problem situations.
	Option D is incorrect	The student likely used the formula for the perimeter of a triangle but combined 15 and 7 as 22 and placed the x with 15, resulting in $17x =$

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I	# [redacted] a[redacted]	

I #	Ra a	
5	Option C is correct	To determine which graph shows the relationship between *y*, the cost of the bracelets in dollars, and *x*, the total number of bracelets bought, the student could have determined that for 5 bracelets bought, the cost is \$12.50, so the unit rate is ——— = The student should have then identified the graph that shows the point (1, 2.5) indicating the cost of 1 bracelet, which is \$2.50, and the point (2, 5) indicating the cost of 2 bracelets, which is \$2.50(2) = \$5.00. If a line was drawn through these points the slope would be 2.5. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.
	Option A is incorrect	The student likely used 5, the number of bracelets given in the context, as a unit rate (cost of 1 bracelet). The student then chose the graph with the point (1, 5) representing the cost of one bracelet and the point (2, 10) representing the cost of 2 bracelets, which is 2(5) = 10. The student needs to focus on the unit rate and how it translates to the graph.
	Option B is incorrect	The student likely used 12.50, the cost of 5 bracelets, as a unit rate (cost of 1 bracelet). The student then chose the graph with the point (0, 0) and the point (1, 12.5). The student needs to focus on the unit rate and how it translates to the graph.
	Option D is incorrect	The student likely inverted (flipped) the unit rate to get $\frac{5}{12.50} = 0.4$ instead of $\frac{12.50}{5}$, graphing the ordered pairs (0, 0), (1, 0.4), (2, 0.8), (3, 1.2), (4, 1.6), (5, 2), (6, 2.4), and (7, 2.8). The student needs to focus on determining the unit rate and how it translated to the graph.

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I #		Ra a
7	Option C is correct	To determine the missing number in the list of items ordered from least to greatest, the student could have converted each value to the same form so that a compart ≅ (6b3 l6.346 8.4o477s026 Tc 3.e.S)0.5 (Ra)0.53

I #		Ra a
9	5 and any equivalent values are correct	To determine the value of the exponent when a number is written in scientific notation, the student should have moved the decimal point 5 places to the left to create a number between 1 and 10 and used the number of places moved to the left as the power for 10, resulting in 4.631 10^5. The value of the exponent is 5.

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I #	Ra a	
15	Option B is correct	To determine the volume of a cylinder in cubic centimeters, the student could have used the formula for the volume of a cylinder, $= ! ^{2}$. To determine the radius, *r*, the student could have divided the diameter, 6 inches, by 2 for a result of 3 inches. The student could then have substituted the radius, *r*, and the height, ^{2}

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I #	Ra a	
19		

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I #	Ra a	
20	Option F is correct	To determine

I #	Ra a	
21	Option C is correct	To determine the relationship between Set Q, rational numbers, and Set Z, integers, the student could have used knowledge of visual representations of sets and subsets to determine that the set of integers, Set Z, is a subset of the set of rational numbers, Set Q; thus, the region representing integers, Z, is inside the region representing rational numbers, Q.
	Option A is incorrect	The student likely incorrectly interpreted the diagram in which Sets Q and Z are switched. The student needs to focus on recognizing sets and subsets of numbers and how to use a visual representation indicating the relationship.
	Option B is incorrect	The student likely recognized that the sets have some numbers in common, but did not recognize that the set of integers, Set Z, is a subset of the set of rational numbers, Set Q. The student needs to focus on recognizing sets and subsets of numbers and how to use a visual representation indicating the relationship.
	Option D is incorrect	The student likely interpreted the sets as having no numbers in common. The student needs to focus on recognizing sets and subsets of numbers and how to use a visual representation indicating the relationship.

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I #	Ra a	
22	Option J is correct	To determine which table represents the relationship between the total cost of books and the number of sets of books the teacher bought, the student could have used the one-time shipping fee, $22, as the *y*-intercept and the cost per set of books, $17.95, as the slope of the line. Substituting 17.95 for *m* and 22 for *b* in the slope-intercept form of a linear equation, $y = mx + b$, results in $y = 17.95x + 22$. The student could then have checked the *y*-values for the corresponding *x*-values in the tables. Substituting the *x*-values into the equation results in $y = 17.95(16) + 22 = 309.20$; $y = 17.95(20) + 22 = 381.00$; $y = 17.95(24) + 22 = 452.80$; $y = 17.95(28) + 22 = 524.60$. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly. soOp1 (t)-2 (i)-3 (ot)1 (n)]TJT.0

I #		Ra a
23	0.60 and any equivalent values are correct	To determine

I #	Ra a	
26	Option J is correct	To determine the location of a corresponding point on pentagon *A'B'C'D'E',* the student could have recognized that if (x, y) represents the location of any point on pentagon *ABCDE* and is dilated with the origin as the center, the coordinates for the corresponding point on pentagon *A'B'C'D'E'* is multiplied by the scale factor of $\frac{7}{3}$, resulting in $\left(\frac{7}{3}, \frac{7}{3}\right)$.
	Option F is incorrect	The student likely used the reciprocal of the scale factor. The student needs to focus on recognizing how a dilation with a positive scale factor affects the location of a point.
	Option G is incorrect	The student likely added the scale factor instead of multiplying by it. The student needs to focus on recognizing how a dilation with a positive scale factor affects the location of a point.
	Option H is incorrect	The student likely added the scale factor instead of multiplying by it and used the reciprocal of the scale factor. The student needs to focus on recognizing how a dilation with a positive scale factor affects the location of a point. t(r. T)1 9 B(t)-2.(ve)-2 (s (to)2 1 (3.(vSubtype 9.oter Type Paginati (i)-1 (t)-2 (079io)32 (2 T

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I #	Ra a	
28	Option G is correct	To determine the *x*-coordinate of the ordered pair that best represents a solution to both equations, the student could have estimated the intersection of the two lines, (0, 0), and chosen the first coordinate. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.
	Option F is incorrect	The student likely used the slope of one of the lines, $\frac{1}{7}$, as the *x*-coordinate of the ordered pair that best represents the intersection of the two lines. The student needs to focus on identifying the point of intersection of two intersecting lines.
	Option H is incorrect	The student likely used the slope of one of the lines, 5, as the *x*-coordinate of the ordered pair that best represents the intersection of the two lines. The student needs to focus on identifying the point of intersection of two intersecting lines.
	Option J is incorrect	The student likely used the reciprocal of the slope of one of the lines, 7, as the *x*-coordinate of the ordered pair that best represents the intersection of the two lines. The student needs to focus on identifying the point of intersection of two intersecting lines.

I #	Ra a	
29	Option D is correct	To determine which statement is true, the student should have concluded that if a shape is dilated, the length of each side of the shape is dilated by the same scale factor and is proportional to the length of the corresponding side of the original shape.
	Option A is incorrect	The student likely confused the side lengths of the original shape and the new shape. The student needs to focus on understanding the effects of a scale factor applied to a two-dimensional figure on a coordinate plane.
	Option B is incorrect	The student likely confused a dilation with a transformation that preserves congruence, such as a reflection, rotation, or translation. The student needs to focus on understanding the effects of a scale factor applied to a two-dimensional figure on a coordinate plane.
	Option C is incorrect	The student likely multiplied the measure of each angle by the scale factor. The student needs to focus on understanding the effects of a scale factor applied to a two-dimensional figure on a coordinate plane.

I #	Ra a	
31	Option A is correct	To determine which function best represents the relationship between the time spent drilling, x, and the depth of the well, y

I #	Ra a	
32	Option J is correct	To determine which graph does not represent *y* as a function of *x*, the student could have chosen a graph where an *x*-value, 1, corresponds to two *y*-values, 1 and 1. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.
	Option F is incorrect	The student likely interpreted a set of non-connected points as not representing a function. The student needs to focus on understanding the definition of a function and being able to identify one on a graph.
	Option G is incorrect	The student likely interpreted a curve as not representing a function. The student needs to focus on understanding the definition of a function and being able to identify one on a graph.
	Option H is incorrect	The student likely interpreted a graph with more than one *x*-value for each *y*-value as not representing a function. The student needs to focus on understanding the definition of a function and being able to identify one on a graph.

I #	Ra a	
35	Option C is correct	To determine the cost of each ticket, the student could have determined that the total amount spent when buying 9 tickets and receiving a $120 discount is equivalent to the total amount spent when buying 3 tickets and receiving a $30 discount. Letting *t* represent the cost of each ticket, the student could have set up the equation 9*t* 120 = 3*t* 30. To solve the equation the student first could have subtracted 3*t* from both sides of the equ(n)3.22n*h*(d)2 77.121 0 22.5421(5od(n)3.22g o)2 (5od(n)3.22 6t)-2 (i)-4 (ng)]TJ*T*T069

2022 STAAR Grade 8 Mathematics Rationales

I #	Ra a	
36	Option H is correct	To determine which set of ordered pa.551 3etio8(d)-0.9 (r)-3 (e)-1p(r)-1 (r)-3 (e)-1 (s)-1.1 (e)-0.9n(m)2 (#0.024

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I #		Ra a
37	Option A is correct	To determine the location of a corresponding point on triangle $X'Y'Z'$, the student could have recognized that, if (x, y) represents the location of any point on triangle XYZ and the point is dilated with the origin as the center, the coordinates of (x, y) are multiplied by the scale factor of $\frac{3}{2}$, resulting in the point $\left(\frac{3}{}, \frac{3}{}\right)$ on triangle X'

I #		Ra a
38	1,698.84 and any equivalent values are correct	To determine the balance in the savings account at the end of 8 years, the student should have used the formula for simple interest, $I = prt$, with p representing the principal (initial amount), r representing the interest rate, and t representing the time in years. The student should have substituted the values $p = 1{,}287$, $r = 0.04$, and $t = 8$ into the formula, resulting in $I = (1{,}287)(0.04)(8) = 411.84$. The student then should have added the interest, \$411.84, to the principal, \$1,287, for a result of \$1,698.84.

I #		Ra a
39	Option C is correct	To determine which graph has a slope that best represents the rate, $\frac{6}{136}$, or $\frac{1}{2}$, the student could have determined that the equation represents a proportional relationship and therefore has a graph that goes through the origin, (0, 0), and has a slope of $\frac{1}{}$.

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I #	Ra a	
42	Option J is correct	To determine the situation that can be represented by the equation $18x = 19 + 12x$