Item #	Rationale	
1	Option B is correct	To determine where $-\sqrt{169}$ should be placed in the Venn diagram, the student should have simplified the value. Since $-\sqrt{169} = -13$, the student should recognize that it is a negative integer and should be placed in the set of integers.
	Option A is incorrect	The student likely divided –169 by 2 instead of finding the square root, resulting in –84.5. The student then likely correctly assigned –84.5 to the set of rational numbers (numbers that can be written as fractions) because it is a terminating decimal. The student needs to focus on simplifying square roots.
	Option C is incorrect	The student likely divided –169 by 2 instead of finding the square root, resulting in –84.5. The student then likely assigned –84.5 to the set of irrational numbers (numbers that cannot be written as fractions), interpreting negative values as irrational. The student needs to focus on simplifying square roots and understanding the difference between rational and irrational numbers.
	Option D is incorrect	The student likely evaluated $-\sqrt{169}$ as 13, forgetting to include the negative sign after evaluating. The student then incorrectly assigned 13 to the set of whole numbers (numbers greater than or equal to zero without fractional parts), instead of placing it into the set of natural numbers (positive whole numbers) because it is an integer greater than zero. The student needs to focus on simplifying square roots and understanding the difference between natural and whole numbers.

Item #	Rationale	
2	Option D is correct	To determine which statement is true, the student should have determined that because a reflection (mirror image) is a transformation that preserves congruence (same shape and size), the sides of trapezoid *KLMN* are congruent to the corresponding sides of trapezoid *WXYZ*. 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 misunderstood the effect a reflection has on the area of a figure and interpreted a reflection as changing the area of the figure. The student needs to focus on the effect a reflection has on a figure and the fact that a reflection preserves congruence.
	Option B is incorrect	The student likely misunderstood the effect a reflection has on the angles of a figure and interpreted a reflection as reducing the angle measures of a figure. The student needs to focus on the effect a reflection has on a figure and the fact that a reflection preserves congruence.
	Option C is incorrect	The student likely misunderstood the effect a reflection has on the angles of a figure and interpreted a reflection as increasing the angle measures of the figure. The student needs to focus on the effect a reflection has on a figure and the fact that a reflection preserves congruence.

Item #	Rationale	
3	Option C is correct	To determine whether the point (4, 3) belongs to the function (relationship in which each input [value put into an equation, *x*] has a single output [value that comes out of the equation, *y*]) described in the table, the student should have determined that each value of *x* can be paired with only one value of *y*. Since *x* = 4 is not shown in the table, the ordered pair (4, 3) can belong to the function. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.
	Option E is correct	To determine whether the point (9, 8) belongs to the function described in the table, the student should have determined that each value of *x* can be paired with only one value of *y*. Since *x* = 9 is not shown in the table, the ordered pair (9, 8) can belong to the function. 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 did not realize that the first ordered pair in the table has the same *x*-value (–4) paired with a different *y*-value (–5). The student needs to focus on the definition of a function and on applying it to determine whether a set of ordered pairs represents a function.
	Option B is incorrect	The student likely did not realize that the second ordered pair in the table has the same *x*-value (–2) paired with a different *y*-value (–3). The student needs to focus on the definition of a function and on applying it to determine whether a set of ordered pairs represents a function.
	Option D is incorrect	The student likely did not realize that the third ordered pair in the table has the same *x*-value (6) paired with a different *y*-value (5). The student needs to focus on the definition of a function and on applying it to determine whether a set of ordered pairs represents a function.

Item #	Rationale	
4	Option D is correct	To determine which statement is true, the student should have recognized that the diagram shows a right triangle (closed figure with three sides and one 90-degree angle) in the middle with squares formed by each side of the triangle. Therefore, the student should have recognized the need to use the Pythagorean theorem to answer this question. The Pythagorean theorem ($a^2 + b^2 = c^2$, where the variables *a* and *b* represent the lengths of the legs of the right triangle and *c* represents the length of the hypotenuse [the longest side, opposite the 90-degree angle]) shows the relationships between the squares of the side lengths of the right triangle. Since the areas of Square D and Square E are equal to the squares of the lengths of the legs of the right triangle, and the area of Square F is equal to the square of the length of the hypotenuse of the right triangle, it follows that the sum of the areas of Square D and Square E must be equal to the area of Square F.
	Option A is incorrect	The student likely confused Square F with Square E and assumed that the sum of the areas of the two smallest squares was less than the area of the largest square. The student likely did not make the connection between the areas of the squares and the Pythagorean theorem for right triangles. The student needs to focus on using models and diagrams to explain the Pythagorean theorem.
	Option B is incorrect	The student likely assumed that the sum of the areas of Square D and Square E was greater than the area of Square F. The student likely did not make the connection between the areas of the squares and the Pythagorean theorem for right triangles. The student needs to focus on using models and diagrams to explain the Pythagorean theorem.
	Option C is incorrect	The student likely recognized that the diagram shows a right triangle and recognized the need to use the Pythagorean theorem to answer this question. The student likely did not correctly match the hypotenuse with the correct square and chose Square E instead of Square F as the largest. The student needs to focus on using models and diagrams to explain the Pythagorean theorem.

Item #	Rationale	
5	Option A is correct	To determine which proportion represents the slope (steepness of a straight line when graphed on a coordinate grid) of the line containing points *R*, *S*, and *T*, the student could have determined the slope of each line segment that lies on the graph of the line, using the formula for slope, $m = \frac{y_2 - y_1}{x_2 - x_1}$. For $\overline{RS}$, the student could have written the slope as $\frac{6-(-4)}{-11-(-6)}$, which simplifies to –2. For $\overline{RT}$, the student could have written the slope as $\frac{6-2}{-11-(-9)}$, which also simplifies to –2. Therefore, the slopes of the two line segments are equal. 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 inverted the *x*-values and *y*-values when substituting to find the slope of $\overline{RS}$, resulting in $m = \frac{-11-(-6)}{6-(-4)}$, which simplifies to $-\frac{1}{2}$. The student likely calculated the correct slope for $\overline{RT}$, $m = \frac{6-2}{-11-(-9)}$, which simplifies to –2. The student likely did not notice that the expressions are unequal. The student needs to focus on correctly using the formula for the slope of a line.
	Option C is incorrect	The student likely calculated the correct slope for $\overline{RS}$ but calculated the reciprocal slope for $\overline{VS}$ instead of calculating the slope for $\overline{TS}$, resulting in $m = \frac{-11-(-6)}{2-(-4)}$. The student needs to focus on correctly using the formula for the slope of a line and using the correct sides of the triangle to show that the slopes are equal.
	Option D is incorrect	The student likely calculated the correct slope for $\overline{RS}$, $m = \frac{6-(-4)}{-11-(-6)}$, which simplifies to –2. The student likely reversed the order of the subtraction in the numerator when substituting to find the slope for $\overline{RT}$, resulting in $m = \frac{2-6}{-11-(-9)}$, which simplifies to 2. The student likely did not notice that the expressions are unequal. The student needs to focus on correctly using the formula for the slope of a line.

Item #	Rationale	
6	Option D is correct	To determine the total surface area of the rectangular prisms, the student should have used the formula for the total surface area of a prism ($S = Ph + 2B$, where S represents surface area, P represents the perimeter of the base of the prism, h represents the height of the prism (the distance between the two bases), and B represents the area of one base). For the rectangular prism shown , the student could have defined the base as the 8-inch by 20-inch rectangle. In that case, P = 56 in., h = 4 in., and B = 160 in.^{2}. By substituting into the formula, the student could have evaluated S = (56)(4) + 2(160) = 544 in.^{2}. The student should have found the areas of the four prisms: Option F: S = (56)(3) + 2(196) = 560 in.^{2} Option G: S = (24)(16) + 2(20) = 424 in.^{2} Option H: S = (88)(3) + 2(160) = 584 in.^{2} Option J: S = (32)(14) + 2(48) = 544 in.^{2} The student should have identified option J as the prism with surface area equal to that of the primary prism. 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 identified a prism that has the same base perimeter (56 in.) as the primary prism. The student needs to focus on understanding and properly applying the formula for the surface area of a prism.
	Option B is incorrect	The student likely identified a prism that has two faces with the same area (16 in. by 2 in. results in an area of 32 in.^{2}) as two faces of the primary prism (8 in. by 4 in.). The student needs to focus on understanding and properly applying the formula for the surface area of a prism.
	Option C is incorrect	The student likely identified a prism that has the same base area (160 in.^{2}) as the primary prism. The student needs to focus on understanding and properly applying the formula for the surface area of a prism.

Item #	Rationale	
7	Option B is correct	To determine which table shows a proportional relationship between *x* and *y*, the student should have recognized that the ratio $\frac{y}{x}$ is equivalent for each row in the table. The student should have calculated the ratios $\frac{1.5}{-4.5}$, $\frac{-1}{3}$, $\frac{-2}{6}$, and $\frac{-3.5}{10.5}$ and determined that each value is equivalent to $-\frac{1}{3}$.
	Option A is incorrect	The student likely performed a linear regression on the points on the table and determined the line of best fit to be $y = 2.957x + 0.618$. Since the value of the *y*-intercept is close to 0, the student likely assumed that (0, 0) would be part of the line. If a linear function passes through (0, 0), it is proportional. However, the values in this table do not have a perfect linear fit. The student needs to focus on understanding the definition of a proportional relationship and applying it to determine whether a table represents a proportional relationship.
	Option C is incorrect	The student likely calculated the rate of change between each set of points on the table as equivalent to 3 and associated equivalent rates of change with a linear relationship. The student likely failed to recognize that a linear relationship is not enough to ensure proportionality. The student needs to focus on understanding the definition of a proportional relationship and applying it to determine whether a table represents a proportional relationship.
	Option D is incorrect	The student likely calculated the rate of change between each set of points on the table as equivalent to $-\frac{1}{3}$ and associated equivalent rates of change with a linear relationship. The student likely failed to recognize that a linear relationship is not enough to ensure proportionality. The student needs to focus on understanding the definition of a proportional relationship and applying it to determine whether a table represents a proportional relationship.

Item #	Rationale	
8	$x - 4$, $y + 3$	To complete the rule that describes the transformation, the student could have considered the translation in each direction separately. The translation of 4 units left affects the x-coordinate of each point on rectangle *MNPQ* by decreasing it by 4: $(x - 4)$. The translation of 3 units up affects the y-coordinate of each point on rectangle *MNPQ* by increasing it by 3: $(y + 3)$. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.

Item #	Rationale	
9	Option B is correct	To determine which measurement is closest to the side length of the wall, the student should have determined that the side length in feet is equal to the square root of the area of the wall, $\sqrt{182}$. Using a calculator, the student should have determined that the side length is approximately 13.5 ft.
	Option A is incorrect	The student likely determined that the side length is equal to the square root of the area of the wall, $\sqrt{182}\ \text{ft}^2$, but evaluated this as $\frac{182}{2}$, which is 91.0 ft. The student needs to focus on understanding how to find the square root of a number.
	Option C is incorrect	The student likely determined that the side length is equal to the square root of the area of the wall, $\sqrt{182}\ \text{ft}^2$, and evaluated that to find a side length of 13.5 ft. The student likely misinterpreted the question as asking for the perimeter of the wall instead of side length and multiplied by 4 to arrive at 54.0 ft. The student needs to focus on answering the question as presented.
	Option D is incorrect	The student likely divided the area by 4, as if the question gave a perimeter of 182 feet and asked the student to find the side length. The student needs to focus on understanding the difference between area and perimeter.

Item #	Rationale	
10	Option A is correct	To determine the value of x in the equation modeled by the tiles, the student should have first identified the equation modeled as $-3x + 4 = -2x + 1$. The student could have subtracted 4 from each side of the equation to simplify it to $-3x = -2x + -3$. Next, the student could have added $-2x$ to each side, resulting in $-x = -3$. Finally, the student could have divided each side by –1, resulting in a solution of $x = 3$. 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 canceled out 3 "$-x$" tiles by adding 3 "x" tiles to each side of the equation, leaving 4 "1" tiles equal to 1 "x" tile and 1 "1" tile. The student then likely combined the "1" tiles to make 5 and found the solution to be $x = 5$. The student needs to focus on using the proper steps to solve an equation.
	Option C is incorrect	The student likely identified the correct initial equation ($-3x + 4 = -2x + 1$) and took the first steps in solving it, resulting in $-x = -3$. The student likely identified the value of –3 as the solution instead of dividing both sides of the equation by –1. The student needs to focus on using the proper steps to solve an equation.
	Option D is incorrect	The student likely counted a total of 5 "$-x$" tiles and a total of 5 "1" tiles and determined that $5(-x) = 5$, which would result in $x = -1$. The student needs to focus on using the proper steps to solve an equation.

Item #	Rationale	
11	Option C is correct	To determine which statement is true, the student should have concluded that when a shape is dilated, the length of each side of the shape is multiplied by the same scale factor.
	Option A is incorrect	The student likely misunderstood the effects of a dilation, concluding that a dilation multiplies 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.
	Option B is incorrect	The student likely misunderstood the effects of a dilation, concluding that a dilation affects the measure of each angle by adding the scale factor to the angle. The student needs to focus on understanding the effects of a scale factor applied to a two-dimensional figure on a coordinate plane.
	Option D is incorrect	The student likely misunderstood the effects of a dilation, concluding that a dilation affects the side lengths by addition of the scale factor instead of multiplication. The student needs to focus on understanding the effects of a scale factor applied to a two-dimensional figure on a coordinate plane.

Item #	Rationale	
12	Option A is correct	To determine from the scatterplot (a graph of plotted points that shows the relationship between two sets of data) the best prediction for the number of servings of iced tea sold on a day when the food trailer has 80 customers, the student could have drawn a line that closely follows the pattern formed by the points on the graph by keeping about half the points above the line and half the points below. A good line would pass slightly above the point (64, 40) and slightly below the point (84, 60). The student could have identified where the grid line marked 80 (representing 80 customers) intersects the line the student drew and determined that the number of servings of iced tea would have a value between 48 and 56. This would lead to the selection of 53 as the only possible answer among the choices listed. 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 chose a value that is close to the average number of servings of iced tea in the cluster of three points at the top right of the graph. The student needs to focus on drawing a line as close as possible to all points, with a similar number of points above and below the line.
	Option C is incorrect	The student likely chose the nearest point to the left of 80 customers (64, 40), and therefore believed that the number of servings of iced tea is 40. The student needs to focus on drawing a line as close as possible to all points, with a similar number of points above and below the line.
	Option D is incorrect	The student likely chose a value that is close to the average number of servings of iced tea in the cluster of four points at the bottom left of the graph. The student needs to focus on drawing a line as close as possible to all points, with a similar number of points above and below the line.

Item #	Rationale	
13	Option D is correct	To determine the ordered pair that represents the solution to the system of equations, the student should have identified the intersection point of the two lines, found the *x*- and *y*-coordinates of the intersection, and written those coordinates as an ordered pair in the form (*x*, *y*). Since the lines intersect at point (4, 5), this pair represents the solution to the system. 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 determined the intersection point of the two lines but switched the order of *x* and *y* in the ordered pair itself, (*y*, *x*). The student needs to focus on naming points in the *xy*-plane with ordered pairs.
	Option B is incorrect	The student likely identified the intersection of one of the lines with the *y*-axis. The student needs to focus on identifying the point of intersection of two intersecting lines.
	Option C is incorrect	The student likely selected one of the named points on one of the lines in the graph. The student needs to focus on identifying the point of intersection of two intersecting lines.

Item #	Rationale	
14	Option C is correct	To determine the volume of the figure represented, the student should have decomposed the figure into two pieces: a cylinder with height 7 cm and radius 3 cm and a hemisphere with radius 3 cm. Using the formula for the volume of a cylinder, $V = \pi r^2 h$ (where r represents the radius of the circle that forms the cylinder's base and h represents the perpendicular distance between the two circular bases), the cylinder has a volume of $\pi(3)^2(7)$ cm^3, which rounds to 197.92 cm^3. The volume of a hemisphere is one-half the volume of a sphere. The formula for the volume of a sphere is given by $V = \frac{4}{3}\pi r^3$, where r represents the radius of the sphere. The volume of a hemisphere is half of this, which can be determined by $V = \frac{2}{3}\pi r^3$. Replacing the value of r with the given radius, the student should have determined that $V = \frac{2}{3}\pi(3)^3$ cm^3, which rounds to 56.55 cm^3. Adding the two volumes together, the total volume of the composite figure is $V = (197.92 + 56.55)$ cm^3, or 254.47 cm^3.
	Option A is incorrect	The student likely calculated the volumes of the cylinder and hemisphere correctly, as shown above, but then subtracted the two values instead of adding, to get the result (197.92 – 56.55) cm^3, or 141.37 cm^3. The student needs to focus on using the correct process to decompose a compound figure and using an appropriate method to determine the volumes of the individual components and of the whole.
	Option B is incorrect	The student likely calculated the volume of the cylinder but neglected to add the volume of the hemisphere. The student needs to focus on using the correct process to decompose a compound figure and using an appropriate method to determine the volumes of the individual components and of the whole.
	Option D is incorrect	The student likely calculated the volume of the cylinder, 197.92 cm^3, and the volume of a sphere with radius 3 cm, $\frac{4}{3}\pi(3)^3$ cm^3, which rounds to 113.10 cm^3. Added together, (197.92 + 113.10) cm^3 = 311.02 cm^3. The student needs to focus on using the correct process to decompose a compound figure and using an appropriate method to determine the volumes of the individual components and of the whole.

<table>
<tr><th>Item #</th><th colspan="2">Rationale</th></tr>
<tr><td>15</td><td>$625; $750</td><td>To determine the monthly amount that Desmond’s family should save, the student should determine the total amount that must be saved and divide that value by the total number of months that the family will be saving. There are two different scenarios that would affect the total amount that must be saved:
If Desmond wins the scholarship, the amount of money that must be saved is the total cost for one year minus the amount that has already been saved minus the amount of the scholarship: $15,000 - $6,000 - $1,500 = $7,500. Over 12 months, his family would need to save $7,500 ÷ 12 = $625 per month.
If Desmond does not win the scholarship, the amount of money that must be saved is $15,000 - $6,000 = $9,000. Over 12 months, his family would need to save $9,000 ÷ 12 = $750 per month.
This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.</td></tr>
</table>

Item #	Rationale	
16	Option B is correct	To determine which graph has a slope that best represents the width of each book in inches, the student should have determined that the relationship is proportional and that since 15 books have a combined width of 12 inches, the unit rate is $\frac{12}{15}$ or $\frac{4}{5}$ inch per book. The student could then have identified the graph that shows the point (0, 0), which is a point in all proportional relationships, and the point (5, 4), indicating that 5 books have a width of 4 inches. If a line is drawn through these points, the slope would be $\frac{4}{5}$. 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 the reciprocal of the slope, dividing *x* by *y*. The student needs to focus on understanding how unit rates are represented on graphs.
	Option C is incorrect	The student likely rounded the unit rate to 1 and chose a graph that passes through (0, 0) and (1, 1). The student needs to focus on understanding how unit rates are represented on graphs.
	Option D is incorrect	The student likely calculated the unit rate correctly, $\frac{12}{15} = \frac{4}{5}$, but chose the graph of the constant function $y = \frac{4}{5}$ instead of a proportional graph with a slope of $\frac{4}{5}$. The student needs to focus on understanding how unit rates are represented on graphs.

Item #	Rationale	
17	Option A is correct	To determine the amount of interest earned at the end of 4 years, the student should have used the formula for simple interest, $I = prt$, where p represents the principal (initial amount), r represents the interest rate as a decimal, and t represents the time in years. The student should have substituted the values p = 10,500, r = 0.012, and t = 4 into the formula, resulting in I = (10,500)(0.012)(4) = 504, indicating that the interest earned is \$504.
	Option B is incorrect	The student likely correctly calculated the interest earned, as shown above, but added this value to the principal, \$10,500, to calculate the account balance at the end of 4 years, \$11,004. The student needs to focus on attending to the details of the question in the problem.
	Option C is incorrect	The student likely calculated the interest earned in 1 year by multiplying the interest rate by the principal, (0.012)(10,500) = \$126. The student needs to focus on attending to the details of the question in the problem.
	Option D is incorrect	The student likely calculated the interest earned in 1 year, as shown above, and added this value to the principal, \$10,500, to calculate the account balance at the end of 1 year, \$10,626. The student needs to focus on attending to the details of the question in the problem.

Item #	Rationale	
18	$\sqrt{34}$, $\frac{19}{3}$, $2\sqrt{11}$	To determine the values in the list that satisfy the inequality, the student could have converted each of the irrational or repeating decimal values to an approximate decimal form. The inequality $x > \frac{28}{5}$ is equivalent to $x > 5.6$, so only values that exceed 5.6 will satisfy it. The decimal approximations of those values are $\sqrt{34} \approx 5.83$, $\frac{19}{3} \approx 6.33$, and $2\sqrt{11} \approx 6.63$. The values –8, 4.7, and 5.28 should have been kept in decimal form. To satisfy the inequality, the student should then have chosen only the values that exceed 5.6, which are $\sqrt{34}$, $\frac{19}{3}$, and $2\sqrt{11}$. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.

Item #	Rationale	
19	Option B is correct	To determine the rule that is applied to the original rectangle to create the new rectangle, the student should have understood that when a figure is dilated (enlarged or reduced in size), its measurements increase or decrease based on the scale factor (ratio of the length of a side of one figure to the length of the corresponding [paired] side of a similar figure). A dilation by a scale factor with the origin (the point represented by (0, 0), where the *x*-axis [horizontal] and *y*-axis [vertical] on a coordinate grid intersect [cross]) as the center of dilation means that each point on the dilated figure will be a certain number of times as far from the origin as it was on the original figure. Since the location of a vertex from the original rectangle was represented by (12, 9), and the location of the corresponding vertex of the dilated rectangle was represented by (8, 6), the scale factor of the dilation can be determined by dividing the value of each coordinate of the dilated rectangle by the value of the corresponding coordinate of the original rectangle ($8 \div 12 = \frac{2}{3}$ and $6 \div 9 = \frac{2}{3}$), so the rule $(x, y) \longrightarrow \left(\frac{2}{3}x,\ \frac{2}{3}y\right)$ represents the dilation.
	Option A is incorrect	The student likely divided the coordinates of the vertex of the original rectangle by the coordinates of the corresponding vertex of the dilated rectangle, resulting in a scale factor of $\frac{3}{2}$. The student needs to focus on understanding the effect a dilation by a given scale factor has on a figure and how to determine the rule to explain the effect.
	Option C is incorrect	The student likely determined a transformation rule by finding the difference between the *x*-coordinates and the difference between the *y*-coordinates in the points from row 1. For *x*, 8 – 12 = –4, and for *y*, 6 – 9 = –3, making the rule $(x, y) \longrightarrow (x - 4, y - 3)$. The student needs to focus on understanding how the scale factor affects the dilation.
	Option D is incorrect	The student likely determined a transformation rule by finding the difference between the *x*-coordinates and the difference between the *y*-coordinates in the points from row 4 of the table. For *x*, –8 – (–12) = 4, and for *y*, 6 – 9 = –3, making the rule $(x, y) \longrightarrow (x + 4, y - 3)$. The student needs to focus on understanding how the scale factor affects the dilation.

Item #	Rationale	
20	Option D is correct	To determine which equation represents the linear function that contains the points (–2, 70) and (6, –50), the student should have determined the slope (steepness of the line) and used that value to find the *y*-intercept. To find the slope, the student could have used the slope formula $m = \frac{y_2 - y_1}{x_2 - x_1}$. By substituting the values for x_1, x_2, y_1, and y_2, the student could have determined that the slope is $\frac{-50 - 70}{6 - (-2)}$ = $\frac{-120}{8}$ = –15. The student then should have substituted that value into the slope-intercept form of the equation, *y* = *mx* + *b*. The student could have chosen the point (–2, 70) for values of *x* and *y* and substituted: 70 = –15(–2) + *b*, which simplifies to *b* = 40. The equation of the linear function is *y* = –15*x* + 40. 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 graphed the points on the grid and determined the slope by using rise (change in *y*) over run (change in *x*). The student likely did not account for the scale factor of 10 on the *y*-axis, resulting in a slope calculation of $\frac{-12}{8} = -\frac{3}{2}$. By connecting the two points on the grid, the student likely determined that the line crosses the *y*-axis 4 grid lines above the *x*-axis, meaning that the *y*-intercept is 40. The student needs to focus on using the scale of an axis correctly.
	Option B is incorrect	The student likely graphed the points on the grid and determined the slope by using rise (change in *y*) over run (change in *x*). The student likely did not account for the scale factor of 10 on the *y*-axis, resulting in a slope calculation of $\frac{-12}{8} = -\frac{3}{2}$. The student likely misidentified the *y*-intercept as 4 by connecting the two points on the grid and estimating that the line crosses the *y*-axis 4 grid lines above the *x*-axis. The student needs to focus on using the scale of an axis correctly.
	Option C is incorrect	The student likely calculated the slope correctly but then misidentified the *y*-intercept as 4 by connecting the two points on the grid and estimating that the line crosses the *y*-axis 4 grid lines above the *x*-axis. The student needs to focus on using the scale of an axis correctly.

Item #	Rationale	
21	Option B is correct	To determine whether the transformation $(x, y) \rightarrow (x - 2, y - 2)$ does NOT produce a square with the same vertices, the student could have chosen a vertex of the original square, such as (2, 2), and applied the transformation. The student could have recognized that (2, 2) maps to (0, 0), which is not a vertex of the square, so this transformation does not produce a square with the same vertices. 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 did not recognize that the transformation rule $(x, y) \rightarrow (-x, y)$ is a reflection across the *y*-axis and that it will produce a square with vertices at the same set of coordinate pairs as the vertices of the square shown. The student needs to focus on interpreting the rules for transformations.
	Option C is incorrect	The student likely did not recognize that the transformation rule $(x, y) \rightarrow (-x, -y)$ is a 180° rotation about the origin and that it will produce a square with vertices at the same set of coordinate pairs as the vertices of the square shown. The student needs to focus on interpreting the rules for transformations.
	Option D is incorrect	The student likely did not recognize the transformation rule $(x, y) \rightarrow (x, -y)$ is a 90° counterclockwise rotation about the origin and that will produce a square with vertices at the same set of coordinate pairs as the vertices of the square shown. The student needs to focus on interpreting the rules for transformations.

Item #	Rationale	
22	Option A is correct	To determine whether the equation represents the relationship, the student should have interpreted the verbal description "the value of y" (y =) "is 3 more than" (+ 3) "twice the opposite of x" ($-2x$), resulting in an equation of $y = -2x + 3$. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.
	Option C is correct	To determine whether the graph represents the relationship, the student should have identified the rate of change (constant increase or decrease) of the line as –2. The y-intercept of the graph is 3, making the equation of the line $y = -2x + 3$, which is equivalent to the expression described in the stem. 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 made a sign error when calculating the slope of the line, identifying the slope as –2 instead of 2, and correctly identified the y-intercept as 3, making the equation of the line $y = -2x + 3$, which is equivalent to the expression described in the question. The student needs to focus on identifying the sign of the slope from the graph of a line.
	Option D is incorrect	The student likely recognized that the x-values in the table are 3 more than twice the opposite of the y-values, which resembles the expression described in the stem, but with x and y reversed. The student needs to focus on finding the y-intercept and the rate of change from a verbal situation and identifying a table of values with the same relationship.
	Option E is incorrect	The student likely made a sign error when calculating the slope of the line from the table, identifying the slope as –2 instead of 2, and correctly identified the y-intercept as 3, making the equation of the line $y = -2x + 3$, which is equivalent to the expression described in the question. The student needs to focus on identifying the sign of the slope from the values in a table.

Item #	Rationale	
23	Option D is correct	To determine which statement would prove that parallelogram *PQRT* is a rectangle, the student would need to recognize that triangle *QRT* must be a right triangle and that the Pythagorean theorem, $a^2 + b^2 = c^2$, would apply. The c in the Pythagorean theorem represents the hypotenuse (the longest side, which is opposite the 90° angle), while a and b represent the legs (in no particular order). The student should have recognized that the lengths of legs of the right triangle are 8 and 15 and that *TQ* would be the length of the hypotenuse. To satisfy the Pythagorean theorem, the sum of the squares of the legs must be equal to the square of the length of the hypotenuse, $8^2 + 15^2 = TQ^2$.
	Option A is incorrect	The student likely recognized that for *PQRT* to be a rectangle, *QRT* would have to be a right triangle. The student likely applied the Pythagorean theorem incorrectly, identifying an equation that equates the difference between the squares of the legs to the square of the hypotenuse, $15^2 – 8^2 = TQ^2$. The student needs to focus on understanding how to properly apply the Pythagorean theorem with the given information.
	Option B is incorrect	The student likely recognized that for *PQRT* to be a rectangle, *QRT* would have to be a right triangle but believed that the lengths of the two legs of a right triangle must sum to the length of the hypotenuse. The student likely identified the equation $8 + 15 = TQ$. The student needs to focus on understanding the relationships between the sides of a right triangle.
	Option C is incorrect	The student likely recognized that for *PQRT* to be a rectangle, *QRT* would have to be a right triangle but believed that the difference between the lengths of the long leg and the short leg of a right triangle equals the length of the hypotenuse. The student likely identified the equation $15 – 8 = TQ$. The student needs to focus on understanding the relationships between the sides of a right triangle.

Item #	Rationale	
24	$\frac{1}{4}$, 0, –2 and any equivalent values are correct.	To determine the slope (steepness of a straight line when graphed on a coordinate grid) of the graph of the linear function, the student should have divided the change in *y*-coordinates by the change in *x*-coordinates. For the points (–4, –3) and (4, –1), this would yield $\frac{-1-(-3)}{4-(-4)} = \frac{2}{8} = \frac{1}{4}$. To determine the coordinates of the *y*-intercept of the graph of the linear function, the student should have identified that the line crosses the *y*-axis 2 units below the *x*-axis, so the coordinates of the *y*-intercept are (0, –2). This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.

Item #	Rationale	
25	Option A is correct	To determine the total surface area (total area of the surfaces of a three-dimensional figure) of the square prism, the student could have determined the length of each side of the square base is 4 inches by evaluating the square root of 16 square inches as 4 inches. Then the student should have used the formula for total surface area of a prism ($S = Ph + 2B$, where S represents surface area, P represents the perimeter of the base of the prism, h represents the height of the prism (the distance between the two bases), and B represents the area of one base). The student could have identified that the perimeter is 16 inches, the height is 8 inches, and the base area is 16 square inches. The student could have substituted those values into the formula, resulting in $S = (16)(8) + 2(16) = 160$ square inches. 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 calculated the volume of the prism instead of the surface area. The student likely used the formula $V = Bh$, where V represents volume, B represents the area of the base of the prism, and h represents the height of the prism. Since the base area is 16 square inches and the height is 8 inches, $V = (16)(8) = 128$ cubic inches. The student likely did not recognize that the units for volume would be cubic inches instead of square inches. The student needs to focus on understanding and properly applying the formula for the total surface area of a figure.
	Option C is incorrect	The student likely attempted to use the surface area formula and made calculation errors. The student likely determined that each side of the square base is 4 inches but miscalculated the perimeter as 8 inches instead of 16. The student likely evaluated the lateral surface area to be 64 square inches. Then the student likely added one base area (16 square inches) to the lateral surface area, resulting in a total surface area of 80 square inches. The student needs to focus on understanding and properly applying the formula for the total surface area of a figure.
	Option D is incorrect	The student likely tried to use the surface area formula $S = Ph + 2B$ but made an error in determining the perimeter of the base. The student likely divided the base area by 2 ($16 \div 2$) instead of evaluating the square root ($\sqrt{16}$). If each side of the base were 8 inches in length, the perimeter would be 32 inches. Substituting into the surface area formula, $S = (32)(8) + 2(16) = 288$ square inches. The student needs to focus on understanding and properly applying the formula for the total surface area of a figure.

Item #	Rationale	
26	Option C is correct	To determine which graph best represents the number of miles per minute that the bus travels, the student should have determined that the rate 25 miles per 30 minutes is equivalent to $\frac{5}{6}$ mile per minute $\left(\frac{25}{30} = \frac{5}{6}\right)$. The student should have calculated the slope for this option using the points (0, 0) and (60, 50) and the slope formula, $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{50-0}{60-0} = \frac{5}{6}$, which matches the rate in the question. 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 rounded the rate at which the bus travels to 1 mile per minute and selected the option with a slope of 1. The student needs to focus on understanding the unit rate and how it is represented on the graph.
	Option B is incorrect	The student likely inverted (flipped) the unit rate to get $\frac{30}{25} = \frac{6}{5}$ instead of $\frac{25}{30}$. The student then likely chose the graph with a slope of $\frac{6}{5}$. The student needs to focus on understanding the unit rate and how it is represented on the graph.
	Option D is incorrect	The student likely identified the number of miles in the question, 25, as the rate and selected a graph with the *y*-value of 25 at the first major gridline, (10, 25). The student needs to focus on understanding the unit rate and how it is represented on the graph.

Item #	Rationale	
27	Option A is correct	To determine the volume (amount of three-dimensional space taken up) of the cone, the student should have used the volume formula of a cone ($V = \frac{1}{3}\pi r^2 h$, where *V* represents the volume, *r* represents the radius (distance from the center to the circumference of the circular base) and *h* represents the height (vertical distance from top to bottom) of the cone). The student should have identified the radius as 5 centimeters and the height as 12 centimeters. Substituting *r* = 5 and *h* = 12 into the formula results in $V = \frac{1}{3}\pi(5)^2(12) \approx 314.2$.
	Option B is incorrect	The student likely used the volume formula but used the slant height, 13 centimeters, instead of the height. Substituting *r* = 5 and *h* = 13 into the formula results in $V = \frac{1}{3}\pi(5)^2(13) \approx 340.3$. The student needs to focus on understanding the formula for determining the volume of a cone.
	Option C is incorrect	The student likely used the volume formula but confused the radius with the height when substituting into the formula, resulting in $V = \frac{1}{3}\pi(12)^2(5) \approx 754.0$. The student needs to focus on understanding the formula for determining the volume of a cone.
	Option D is incorrect	The student likely used the volume formula for a cylinder, $V = \pi r^2 h$, instead of the volume formula for a cone. Substituting *r* = 5 and *h* = 12 into the formula results in $V = \pi(5)^2(12) \approx 942.5$. The student needs to focus on understanding and using the appropriate formula for determining the volume of a cone.

Item #	Rationale	
28	Option C is correct	To determine the best prediction of the word count for a 10-page pamphlet from the scatterplot, the student should have drawn a line that closely follows the pattern formed by the points on the graph by keeping about half of the points above the line and the other half below the line. A good line for this scatterplot would pass slightly below the point at (7, 1,750) but above the point at (6, 1,350) and through the point at (4, 900). The student then should have identified where the line would cross the gridline marked 10 (representing 10 pages) and determined that the number of words corresponding to that point of intersection is about 2,400. 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 chose a value on the horizontal access about halfway between the two points farthest to the right on the graph, (6, 1,350) and (7, 1,750). The student needs to focus on drawing a line as close as possible to all points, with a similar number of points above and below the line.
	Option B is incorrect	The student likely chose the greatest value marked on the vertical axis, 2,000. The student needs to focus on drawing a line as close as possible to all points, with a similar number of points above and below the line.
	Option D is incorrect	The student likely overestimated the steepness of the line of best fit and determined 2,700 as a likely fit. The student needs to focus on drawing a line as close as possible to all points, with a similar number of points above and below the line.

Item #	Rationale	
29	$\frac{3}{2}$, 6	To create an equation that represents the relationship shown in the graph, the student could have selected any two points on the line to determine the slope (steepness of a line) and *y*-intercept (the point where the graph of a line crosses the *y*-axis) of the line. The slope can be determined by finding the ratio between the change in *y* and the change in *x* for any two points on the line. Using the points (–2, 3) and (0, 6), the student could have determined that the slope is $m = \frac{6-3}{0-(-2)} = \frac{3}{2}$. The point (0, 6) could also be used to identify the value of the *y*-intercept, 6. Substituting into the slope-intercept form of the equation, $y = mx + b$, where *m* represents the slope of the line and *b* represents the value of the *y*-intercept, the equation of the line is $y = \frac{3}{2}x + 6$. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.

Item #	Rationale	
30	Option A is correct	To determine the order of the values in the list from least to greatest, the student could have converted each value to a decimal representation so that a comparison could be made. The decimal representations are $-\frac{4}{3} \approx -1.333$, $\sqrt{3} \approx 1.732$, and $\frac{5}{2} = 2.5$. Therefore, from least to greatest, the values are –1.333, –0.43, 1.732, 2.5. 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 misunderstood the correct way to order the two negative numbers. The student needs to focus on determining the value of any type of number (negative, positive, fraction, square root [a value that, when multiplied by itself, is equal to the number under the $\sqrt{}$], etc.) and ordering the numbers by value.
	Option C is incorrect	The student likely ignored the radical ($\sqrt{}$) when evaluating $\sqrt{3}$, using the value 3 instead, which is greater than $\frac{5}{2}$. The student needs to focus on determining the value of any type of number (negative, positive, fraction, square root, etc.) and ordering the numbers by value.
	Option D is incorrect	The student likely reversed the order and chose the list ordered from greatest to least. The student needs to focus on attending to the details of the question in the problem.

Item #	Rationale	
31	Option D is correct	To determine the equation that represents the height of the cylinder, the student should have used the volume formula for a cylinder ($V = \pi r^2 h$, where V represents the volume, r represents the radius of the circle that forms the cylinder's base, and h represents the height of the cylinder (the perpendicular distance between the two circular bases)). Then the student could have substituted the given values into the volume equation, $87.35 = \pi(5.17)^2 h$. To solve for h, the student should have divided both sides by $\pi(5.17)^2$, resulting in $h = \frac{87.35}{\pi(5.17)^2}$. 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 substituted the known values into the formula for the volume of a cylinder but omitted π, yielding $87.35 = (5.17)^2 h$. To solve for h, the student likely divided both sides by $(5.17)^2$, resulting in $h = \frac{87.35}{(5.17)^2}$. The student needs to focus on understanding the formula for the volume of a cylinder, $V = \pi r^2 h$.
	Option B is incorrect	The student likely substituted the known values into the formula for the volume of a cylinder but omitted π, yielding $87.35 = (5.17)^2 h$. To solve for h, the student likely chose to divide by 87.35 instead of dividing by $(5.17)^2$, resulting in $h = \frac{(5.17)^2}{87.35}$. The student needs to focus on correctly applying the formula for the volume of a cylinder, $V = \pi r^2 h$.
	Option C is incorrect	The student likely substituted the known values into the formula for the volume of a cylinder, yielding $87.35 = \pi(5.17)^2 h$. To solve for h, the student chose to divide by 87.35 instead of dividing by $(5.17)^2$, resulting in $h = \frac{\pi(5.17)^2}{87.35}$. The student needs to focus on correctly applying the formula for the volume of a cylinder, $V = \pi r^2 h$.

Item #	Rationale	
32	Option B is correct	To determine the initial amount of money placed in the jar, the student should have determined the weekly savings and worked backward to determine the starting value. The student could have used the first two rows of the table to determine that Josh saved $60 in two months, for a unit rate of $30/month. The student should have determined that between 0 and 5 months, Josh would have saved $150, which is $75 less than the amount in the jar at 5 months. The student should have concluded that the initial amount put in the jar was $75. 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 misinterpreted the amount of money in the top row of the table, $225, as the initial amount. The student should focus on recognizing that the initial amount occurs when $x = 0$. The student needs to focus on identifying and interpreting the *y*-intercept and rate of change in real-world situations.
	Option C is incorrect	The student likely divided the amount of money in the jar at 5 months by the number of months (225 ÷ 5 = 45). The student needs to focus on identifying and interpreting the *y*-intercept and rate of change in real-world situations.
	Option D is incorrect	The student likely subtracted the total amounts in the jar in the first two rows of the table, $285 – $225 = $60, and assumed this was the unit rate for savings per month. The student likely did not recognize that the change of $60 represents 2 months of savings (7 – 5), not 1. The student needs to focus on identifying and interpreting the *y*-intercept and rate of change in real-world situations.

Item #	Rationale	
33	$(x, y) \rightarrow \left(\frac{1}{2}x, \frac{1}{2}y\right)$, $(x, y) \rightarrow (2x, 2y)$	To determine the transformation rule for a dilation, the student should have used the format $(x, y) \rightarrow (kx, ky)$, where k is the scale factor. For the first dilation in the table, the scale factor is $k = \frac{1}{2}$, so the student should have recognized that the transformation is $(x, y) \rightarrow \left(\frac{1}{2}x, \frac{1}{2}y\right)$. For the second dilation, the scale factor is 2, so the student should have recognized that the transformation is $(x, y) \rightarrow (2x, 2y)$. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.

Item #	Rationale	
34	Option D is correct	To determine which mapping (a representation of a relation in which arrows are used to show the pairing of values) represents *y* as a function (relation of values in which each *x*-value is paired with exactly one *y*-value) of *x*, the student should have checked to see whether each value of *x*, contained in the oval labeled *x*, is paired with exactly one value of *y*, contained in the oval labeled *y*. In this mapping, the arrows indicate that $x = –1.5$ is paired with $y = 1.5$, $x = –1.0$ is paired with $y = 1.0$, $x = –0.5$ is paired with $y = 1.0$, and $x = 0.5$ is paired with $y = 1.0$. Therefore, each value of *x* is paired with exactly one value of *y* and the mapping represents *y* as a function of *x*.
	Option A is incorrect	The student likely did not recognize that $x = 0.35$ is paired with two *y*-values, $y = 0.7$ and $y = 1.10$. The student needs to focus on understanding the definition of a function.
	Option B is incorrect	The student likely did not recognize that $x = 20$ is paired with two *y*-values, $y = 5$ and $y = 20$. The student needs to focus on understanding the definition of a function.
	Option C is incorrect	The student likely switched the relationship for a function and identified the mapping where each *y*-value is paired with exactly one *x*-value as representing a function. The student needs to focus on understanding the definition of a function.

Item #	Rationale	
35	Option A is correct	To determine the area in square meters of Polygon B, the student should have recognized that a dilation (transformation that enlarges or reduces the size of a figure) affects the area of the figure by multiplying the area of the original figure by the square of the scale factor. Since the original area is 27*r* square meters and the scale factor is 3, the area of the dilated figure is $(27r)(3)^2 = (27r)(9) = 243r$ square meters. 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 divided the area of Polygon A by the scale factor to find the area of Polygon B, resulting in $\frac{27r}{3} = 9r$. The student needs to focus on understanding the effect of a dilation on the area of a figure.
	Option C is incorrect	The student likely squared the coefficient (number in front of a variable) of *r* in the area of Polygon A to find the area of Polygon B, resulting in $(27^2)r = 729r$. The student needs to focus on understanding the effect of a dilation on the area of a figure.
	Option D is incorrect	The student likely multiplied the area of Polygon A by the scale factor to find the area of Polygon B, resulting in $(27r)(3) = 81r$. The student needs to focus on understanding the effect of a dilation on the area of a figure.

Item #	Rationale	
36	Option D is correct	To determine the number of cookies that Jessica sold if she and Max each had the same number of cookies left over, the student could have written two expressions that describe the numbers of cookies Jessica and Max had left over. Since Jessica began with 72 cookies and sold *x* cookies, the total number of cookies she had left over is 72 – *x*. Max started with 36 cookies and sold half as many as Jessica. Therefore, the number of cookies Max had left is $36 - \frac{1}{2}x$. The student could have recognized that since Jessica and Max had the same number of cookies left over, the expressions are equal, resulting in the equation $72 - x = 36 - \frac{1}{2}x$. To solve this equation, the student could have added *x* to both sides of the equation, $72 - x + x = 36 - \frac{1}{2}x + x$ or $72 = 36 + \frac{1}{2}x$ Next, the student could have subtracted 36 from both sides of the equation, resulting in $72 - 36 = 36 - 36 + \frac{1}{2}x$ or $36 = \frac{1}{2}x$. Finally, the student could have determined the number of cookies that Jessica sold, *x*, by multiplying both sides of the equation by 2, resulting in $2 \cdot 36 = 2 \cdot \frac{1}{2}x$ or $72 = x$. 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 set up the correct equation $72 - x = 36 - \frac{1}{2}x$ and correctly solved to get to $36 = \frac{1}{2}x$. However, instead of multiplying both sides of the equation by 2, the student likely divided by 2, resulting in 36 ÷ 2 = 18. The student needs to focus on using the proper steps to solve an equation.
	Option B is incorrect	The student likely solved the equation for *x* but calculated the number of cookies that Max sold, resulting in $\frac{1}{2}(72) = 36$. The student needs to focus on interpreting and solving real-world problems with one-variable equations.
	Option C is incorrect	The student likely set up the correct equation $72 - x = 36 - \frac{1}{2}x$ but likely ignored the subtraction sign on the right side of the equation when adding *x* to both sides, resulting in $36 = \frac{3}{2}x$. Then, by dividing both sides of the equation by $\frac{3}{2}$, the student obtained *x* = 24. The student needs to focus on using the proper steps to solve an equation.

Item #	Rationale	
37	\$250.00, \$506.25	To determine the interest the investment account will earn at the end of the first and second years, the student should have used the formula for compound interest to determine the balance in the account for each year and subtracted the principal (initial deposit) from each balance. The student should have used the formula $A = P(1 + r)^t$, where A represents the account balance in dollars, P represents the principal in dollars, r represents the interest rate in decimal form, and t represents the time in years. The student should have found the ending balance for the first year by substituting $P = 10{,}000$, $r = 0.025$, and $t = 1$ into the formula, resulting in $A = (10{,}000)(1.025)^1 = \$10{,}250$. The interest earned is found by subtracting the principal from the balance at the end of the first year, resulting in \$10,250 – \$10,000 = \$250. The student should have found the ending balance for the second year by substituting $P = 10{,}000$, $r = 0.025$, and $t = 2$ into the formula, resulting in $A = (10{,}000)(1.025)^2 = \$10{,}506.25$. The interest earned is found by subtracting the principal from the balance at the end of the second year, resulting in \$10,506.25 – \$10,000 = \$506.25.

Item #	Rationale	
38	Option C is correct	To determine which proportion (comparison of two ratios) is true for similar figures (two figures with corresponding angles that are equal and corresponding sides that are proportional), the student should have determined that the corresponding (paired) angles in quadrilateral *KLMN* and quadrilateral *TUVW* are equal, which means that the lengths of the corresponding sides of the figures forming those equal angles are proportional. The student then should have determined that the ratio $\frac{20}{30}$ relates the length of the bottom side in quadrilateral *KLMN* to the length of the bottom side in quadrilateral *TUVW*. The ratio $\frac{5}{x}$ represents the ratio of the length of the right side in quadrilateral *KLMN* to the length of the right side in quadrilateral *TUVW*.
	Option A is incorrect	The student likely reversed the ratio on the right side of the equation; $\frac{y}{15}$ is equal to $\frac{28}{22.5}$, not to $\frac{22.5}{28}$. The student needs to focus on paying attention to details when identifying the correspondence between the sides of similar figures.
	Option B is incorrect	The student likely misidentified the ratio correspondence on the right side of the equation; $\frac{y}{28}$ is equal to $\frac{5}{x}$, not to $\frac{5}{22.5}$. The student needs to focus on paying attention to details when identifying the correspondence between the sides of similar figures.
	Option D is incorrect	The student likely misidentified the ratio correspondence on the right side of the equation; $\frac{15}{20}$ is equal to $\frac{22.5}{30}$, not to $\frac{x}{30}$. The student needs to focus on paying attention to details when identifying the correspondence between the sides of similar figures.

Item #	Rationale	
39	Option A is correct	To determine the function that can be used to find the total cost in dollars, *c*, for purchasing *n* oranges, the student could have determined the unit rate (cost for one orange) by dividing $\frac{2.52}{6} = \$0.42$ per orange. The student could have used 0.42 as the constant of proportionality (*k* in the linear proportional equation *y* = *kx*). By substituting 0.42 for *k*, *n* for the independent variable (*x*), and *c* for the dependent variable (*y*), the resulting equation is *c* = 0.42*n*. 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 cost of 6 oranges as the constant of proportionality for the equation, resulting in *c* = 2.52*n*. The student needs to focus on determining the unit rate for a proportional equation.
	Option C is incorrect	The student likely used the number of oranges that can be purchased for $2.52 as the constant of proportionality for the equation, resulting in *c* = 6*n*. The student needs to focus on determining the unit rate for a proportional equation.
	Option D is incorrect	The student likely multiplied $2.52 by the number of oranges, 6, and used the product, 15.12, as the constant of proportionality for the equation, resulting in *c* = 15.12*n*. The student needs to focus on determining the unit rate for a proportional equation.

Item #	Rationale	
40	Option C is correct	To determine the correct similarity statement about the fourth pair of triangles, the student should have determined that having two pairs of corresponding congruent angles implies that the triangles are similar. The student should also have recognized that in a similarity statement, the vertices of corresponding angles are always in the same position of the triangle name. For triangle *TUV*, the known angles *U* and *V* are in the second and third positions. For triangle *PQR*, the corresponding angles *Q* and *R* are also in second and third positions, so the similarity statement is correct.
	Option A is incorrect	The student likely did not use the corresponding vertices to write the similarity statement. The student needs to focus on understanding concepts of correspondence and similarity.
	Option B is incorrect	The student likely did not use the corresponding vertices to write the similarity statement. The student needs to focus on understanding concepts of correspondence and similarity.
	Option D is incorrect	The student likely did not use the corresponding vertices to write the similarity statement. The student needs to focus on understanding concepts of correspondence and similarity.