

2019 STAAR Grade 6 Math Rationales

Item#	Rationale	
1	Option C is correct	To determine which histogram displays all the data in the table correctly, the student should have identified that the numbers in the table are ordered by value and categorized these values by the ranges shown in the histogram. The student should have noted that there were three values from the table in the 800–899 category, five values in the 900–999 category, eight values in the 1,000–1,099 category, six values in the 1,100–1,199 category, and three values in the 1,200–1,299 category. The student then should have determined that the histogram has bars that represent the number of values in each of the categories.
	Option A is incorrect	The student likely noted that there are five values in each row and five values in each column of the table and determined that the histogram has bars that represent five values in each category. The student needs to focus on understanding how to display data from a table in a histogram.
	Option B is incorrect	The student likely categorized 1,098 from the table in the 1,100–1,199 category instead of the 1,000–1,099 category and determined that the histogram has bars that represent the number of values in each of the categories. The student needs to focus on attending to details in a set of data when displaying data in a histogram.
	Option D is incorrect	The student likely counted the values that repeated in the table (805 and 1,150) only once within each category and determined that the histogram has bars that represent the number of values in each of the categories. The student needs to focus on understanding that repeated values in a table should be accounted for when the data is displayed in a histogram.

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2	Option F is correct	<p>To determine which Venn diagram shows the correct relationship among the different sets of numbers (rational numbers, integers, and whole numbers) and the correct placement of <math>-648</math>, the student should have first considered the classification system for the sets of numbers. The largest classification in the Venn diagram is Rational numbers. Rational numbers are all numbers that can be represented as the division of two integers. There are many special types of rational numbers, such as fractions, decimals, integers, and whole numbers. Two of the special types of rational numbers are shown in the Venn diagram (Integers and Whole numbers). Integers make up the second largest classification in the Venn diagram. Integers are all of the positive and negative numbers, with no decimal or fraction parts, and zero. Whole numbers make up the smallest classification in the Venn diagram. Whole numbers are all of the positive integers and zero. The student should have determined that this Venn diagram has the classifications in the right order. Then the student should have determined that since <math>-648</math> can be written as <math>\frac{-648}{1}</math>, it is a rational number, and that since <math>-</math></p>

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	Option J is incorrect	The student likely reversed the relationship between whole numbers and integers and determined that $-648$ is a whole number, an integer, and a rational number instead of just an integer and a rational number. The student needs to focus on understanding the relationships between sets of numbers in the classification system and understanding the difference between integers and whole numbers.

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Item#	Rationale	
3	Option D is correct	To determine the amount of change in dollars the customer should receive, the student should have first multiplied the two groupings of numbers in the innermost parentheses, 2 times 5, resulting in 10, and 2 times 2, resulting in 4. The student then should have added the numbers in the outer pair of parentheses ( $14 + 12 + 10 + 4 + 3 = 43$ ). Finally, the student should have subtracted 43 from 50, resulting in a final answer of \$7.
	Option A is incorrect	The student likely calculated $2(2 + 3)$ instead of $2(2) + 3$ , resulting in 10. The student then likely added the numbers in the outer pair of parentheses ( $14 + 12 + 10 + 10 = 46$ ) and subtracted 46 from 50, resulting in a final answer of \$4. The student needs to focus on understanding how to group numbers correctly when multiplying.
	Option B is incorrect	The student likely determined the value of $2(5)$ as 25 and the value of $2(2)$ as 22. The student then likely added the numbers in the outer pair of parentheses ( $14 + 12 + 25 + 22 + 3 = 76$ ) and subtracted 50 from 76, resulting in a final answer of \$26. The student needs to focus on understanding how to use parentheses as indicators of multiplication.
	Option C is incorrect	The student likely determined the value of $2(5)$ correctly as 10 but calculated $(14 + 12 + 10 + 2)(2) + 3$ , which equals $(38)(2) + 3$ , resulting in 79. Then the student likely subtracted 50 from 79, resulting in a final answer of \$29. The student needs to focus on understanding how to group numbers correctly when multiplying.

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Item#	Rationale	
4	Option G is correct	To determine which expression is equivalent to $(6 - p) + 3$ , the student should have applied the commutative property. The commutative property is a property of addition (+) and multiplication ( ) that allows for the order of terms in expressions to change without affecting the result. In the question, 3 is the rightmost term and $(6 - p)$

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5	Option C is correct	To determine the number of liters equivalent to 786 milliliters, the student should have converted 786 milliliters to liters by dividing 786 by 1,000 (1 liter =



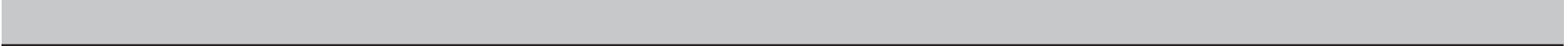
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Item#	Rationale	
7	Option A is correct	To determine the value that is equivalent to the fraction of the days in February that Carlos walked to school, the student could have divided 14 by 20, resulting in 0.70 or 70%. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.
	Option B is incorrect	



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Item#	Rationale	
8	Option F is correct	To determine which statement about the dot plot is true, the student should have identified that the dot plot has one dot above






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Item#	Rationale	
12	Option F is correct	

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Item#	Rationale	
13	Option A is correct	<p>To determine the number of boys in the choir, the student should have interpreted the ratio of the number of boys to the number of girls to mean that for every 5 boys in the choir, there were also 4 girls in the choir. The student could have set up the ratio as a fraction <math>\left(\frac{5}{4}\right)</math>. Then the student could have found an equivalent fraction based on the total number of girls being 60. To get from 4 to 60, a student could have determined that multiplying 4 by 15 was necessary. Then the student could have multiplied 5 by 15 as well <math>\left(\frac{5 \text{ boys} \times 15}{4 \text{ girls} \times 15} = \frac{75 \text{ boys}}{60 \text{ girls}}\right)</math></p>

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Item#	Rationale	
14	Option G is correct	To determine the area of (amount of space covered by) the lawn in square meters, the student should have substituted the values into the formula for the area of a trapezoid from the Area section of the STAAR Grade 6 Mathematics Reference Materials within the student’s test booklet ( $A = \frac{1}{2}(b_1 + b_2)h$ , where $A$ represents the area, $b_1$ represents the length of one base, $b_2$ represents the length of the second base, and $h$ represents the height (vertical distance from top to bottom)). Substituting $b_1 = 12$ , $b_2 = 18$ , and $h = 4$ , the student should have determined that $A = \frac{1}{2}(12 + 18)(4) = 60$ .
	Option F is incorrect	The student likely multiplied the bases (12 and 18) and then multiplied the result by $\frac{1}{2}$ , resulting in 108. The student needs to focus on understanding how to calculate the area of a trapezoid.
	Option H is incorrect	The student likely multiplied the base (18) by the height (4), resulting in 72. The student needs to focus on understanding how to calculate the area of a trapezoid.
	Option J is incorrect	The student likely substituted the values into the formula correctly but did not complete all of the steps, omitting the multiplication by $\frac{1}{2}$ , resulting in 120. The student needs to focus on understanding how to calculate the area of a trapezoid.



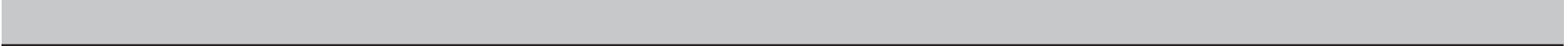
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Item#	Rationale	
16	Option H is correct	<p>To determine the point on the number line that best represents <math>\frac{1}{3}</math>, the student should have determined the least (smallest) and greatest (largest) labels on the number line and then used the tick marks on the number line to determine the intervals (distance between the tick marks) used for the number line. The student should have determined that the least value shown is 0 and the greatest value shown is 0.5. The student should also have determined that there are 10 tick marks following 0, and so the interval for the number line is <math>(0.5 \div 10)</math> or 0.05. The student then could have converted <math>\frac{1}{3}</math> to a decimal, which is approximately equal to 0.33. The student could have used the number line to count 0.05 for each tick mark to find that point <i>M</i></p>



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Item#	Rationale	
17	Option A is correct	To determine which inequality represents all possible values for $t$ , the number of hours Ms. Gallegos must ride her bike to burn more than 590 calories, the student should have created an inequality from the given information




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Item#	Rationale	
	Option H is incorrect	The student likely determined the percentages correctly using the values given in the table (50%, 25%, 12.5%, and 12.5%). The student then likely chose the length of the bar correctly as ending at the 50% label but did not know how to choose the lengths for the values that did not end at labeled values (25%, 12.5%, and 12.5%). The student needs to focus on understanding how to display percentages correctly on percentage bar graphs.

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Item#	Rationale	
19	Option C is correct	<p>To determine the point on the number line that represents the value of <math>\left -\frac{1}{2}\right </math>, or the absolute value (positive distance from zero on the number line) of <math>-\frac{1}{2}</math>, the student should have understood that the tick marks on the number line represent intervals (distance between the tick marks) of 0.5. The student then should have determined <math>\left -\frac{1}{2}\right  = \frac{1}{2}</math> because</p>



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21	16.8 and any equivalent values are correct	To determine the volume of (amount of three-dimensional space taken up by) the rectangular prism in cubic centimeters, the student should have substituted the given values into the formula for the

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Item#	Rationale	
22	Option J is correct	To determine how many servings there are in 22.5 ounces of trail mix, the student could have divided 22.5 by 2.5, which results in a quotient (answer to a division problem) of 9.0. 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 divided 22 by 2 and added 0.5 to the quotient ( $11 + 0.5$ ), resulting in 11.5. The student needs to focus on understanding how to divide decimal numbers.
	Option G is incorrect	The student likely added 2.5 to 22.5, resulting in 25.0. The student needs to focus on recognizing when a situation requires division to solve a problem.
	Option H is incorrect	The student likely multiplied 22.5 by 2.5, resulting in 56.25. The student needs to focus on recognizing when a situation requires division to solve a problem.

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Item#	Rationale	
23	Option A is correct	<p>To determine which expression is equivalent to <math>y + 9 \frac{3}{4}</math>, the student should have grouped <math>9 \frac{3}{4}</math> by using parentheses, converted <math>\frac{3}{4}</math> to <math>3 \div 4</math>, and applied the commutative property. The commutative property is a property of addition. The commutativeu3h707 393iGS0 gs 0 -9.3485 3(u3h707 393i9 ET</p>



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Item#	Rationale	
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Item#	Rationale	
25	Option B is correct	To determine the range of the numbers of employees in these departments, the student should have compared the numbers in the given list to identify the least (smallest) and greatest (largest) values. The student then should have subtracted the number with the least value (3) from the number with the greatest value (54), resulting in a range of 51.
	Option A is incorrect	The student likely put the list of numbers in order from least to greatest value and determined the value of the median (middle number in a set of numbers that is ordered by value) instead of the range (3, 6, 14, 17, <u>23</u> , 26, 26, 30, 54). The student needs to focus on understanding the difference between range and median when summarizing data sets.
	Option C is incorrect	The student likely determined the value of the mode (number in a set of numbers that repeats most often) instead of the range. The student needs to focus on understanding the difference between range and mode when summarizing data sets.
	Option D is incorrect	The student likely put the list of numbers in order from least to greatest value and determined the quartiles (values dividing a data set into quarters: first quartile (Q1), second quartile (Q2), and third quartile (Q3)) of the data set (3, 6, <u>Q1</u> , 14, 17, <u>23</u> or <u>Q2</u> , 26, 26, <u>Q3</u> , 30, 54). Because the list has an odd number of values (9), the median (middle number in a set of numbers that is ordered by value) of 23 is also the second quartile (Q2). The values of Q1 and Q3 are calculated by adding the two values on either side of a quartile and dividing by 2 ( $(6 + 14) \div 2 = 10$ and $(26 + 30) \div 2 = 28$ ). The student then likely found the interquartile range (difference between Q3 and Q1 of the data set) by subtracting 10 from 28, resulting in 18. The student needs to focus on understanding the difference between range and interquartile range.

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26	Option J is correct	To determine the true statement about the three line segments, the student should have first measured the length of the third line segment to the nearest $\frac{1}{2}$ inch and determined the length of the segment was approximately $4\frac{1}{2}$ inches. The student then should have determined that the line segments cannot form a triangle because the longest side of the triangle has to be shorter than 4 inches, since the combined length of the two shortest line segments $\left(1\frac{1}{2} + 2\frac{1}{2}\right)$ is 4 inches.
	Option F is incorrect	The student likely understood that a triangle can have three different side lengths but did not understand that the combined length of the two shortest sides must be greater than the length of the longest side of a triangle. The student needs to focus on understanding how to determine when three line segments form a triangle.
	Option G is incorrect	The student likely made an error in measuring the third line segment. The student needs to focus on understanding how to measure to the nearest $\frac{1}{2}$ inch using a ruler.
	Option H is incorrect	The student likely did not understand that scalene triangles (triangles with no two sides of the same length) exist. The student needs to focus on understanding how to determine when three line segments form a triangle.

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Item#	Rationale	
27	Option B is correct	To determine the graph that shows the relationship between the number of days and the number of frozen treats sold ( $y = 120x$ ), the student should have first determined that 120 frozen treats sold per day means that in 1 day 120 frozen treats are sold, in 2 days 240 frozen treats are sold, in 3 days 360 frozen treats are sold, in 4 days 480 frozen treats are sold, in 5 days 600 frozen treats are sold, in 6 days 720 frozen treats are sold, in 7 days 840 frozen treats are sold, and in 8 days 960 frozen treats are sold. The student then should have determined that based on the labels and the locations of the points, this graph best shows the relationship.
	Option A is incorrect	The student likely did not recognize that the labels on the graph are reversed, showing the relationship of 1 frozen treat being sold every 120 days instead of 120 frozen treats being sold each day. The student needs to focus on understanding how to use a verbal description to show a relationship in the form $y = kx$ on a graph.
	Option C is incorrect	The student likely determined the relationship to mean 120 frozen treats per 2 days (60 frozen treats per day) and did not recognize that the labels in the graph are reversed, showing the relationship of 1 frozen treat being sold every 60 days. The student needs to focus on understanding how to use a verbal description to show a relationship in the form $y = kx$ on a graph.
	Option D is incorrect	The student likely determined the relationship to mean 120 frozen treats per 2 days (60 frozen treats per day). The student needs to focus on understanding how to use a verbal description to show a relationship in the form $y = kx$ on a graph.

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Item#	Rationale	
28	Option G is correct	To determine the statement that is NOT supported by the data in the table, the student should have determined that the number of children who chose oatmeal is 15 and that the total number of children in the group is 50 ( $15 + 10 + 2 + 20 + 3 = 50$ ). The value of 15 does not represent 15% (15 out of 100) of the children in the group, since $15 \div 50$ equals 0.30 or 30%.
	Option F is incorrect	The student likely determined the percentage of "other" as 3% (3 out of 100) based on the 3 from the table and compared 3% to 5% ( $3\% < 5\%$ ). The student needs to focus on understanding how to convert values to percentages.
	Option H is incorrect	The student likely determined there was no mode (number in a data set that repeats most often) in this situation since none of the types of cereal or numbers of children were repeated in the table. The student likely did not understand that the mode of a categorical data set (data set with categories like types of cereal) is the category with the greatest number. The student needs to focus on understanding how to determine the mode of a categorical data set.
	Option J is incorrect	The student likely determined that 10 children is not equal to 20% (10 out of 50 or 20 out of 100). The student needs to focus on understanding how to convert values to percentages.
29	180 and any equivalent values are correct	To determine the number of customers who made additional purchases, the student could have multiplied 72% (0.72) by 250, resulting in 180. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.

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Item#	Rationale	
30	Option H is correct	To determine the temperature in degrees Celsius that is less than both of the temperatures Mari recorded, the student should have determined that $-3.4^{\circ}$ is less than $1.6^{\circ}$ . The student should have compared $-3.4^{\circ}$ to $-5.4^{\circ}$ , determining that $-5.4^{\circ}$ is less than $-3.4^{\circ}$ .
	Option F is incorrect	The student likely compared $-3.4^{\circ}$ to $-2.6^{\circ}$ and determined that since $2.6^{\circ}$ is less than $3.4^{\circ}$ , the same is true for $-2.6^{\circ}$ and $-3.4^{\circ}$ . The student needs to focus on understanding how to order negative numbers.
	Option G is incorrect	The student likely determined a temperature that is greater than instead of less than both $-3.4^{\circ}$ and $1.6^{\circ}$ . The student needs to focus on understanding how to order numbers.
	Option J is incorrect	The student likely compared $0^{\circ}$ with $-3.4^{\circ}$ and $1.6^{\circ}$ but ignored the negative sign in $-3.4^{\circ}$ and determined that $0^{\circ}$ is less than both temperatures. The student needs to focus on understanding how to order negative numbers.

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Item#	Rationale	
31	Option B is correct	To determine the height (vertical distance from top to bottom) of the rectangle, the student could have used the given information and the formula for the area of (amount of space covered by) a rectangle, $A = bh$ , in which $b$ represents the base and $h$ represents the height. The student could have substituted 45.5 for $A$ and 7 for $b$ and solved the equation $45.5 = 7h$ by dividing both sides of the equation by 7, resulting in $h = 6.5$ .
	Option A is incorrect	The student likely multiplied 45.5 by 7 instead of dividing 45.5 by 7 when solving for $h$ . The student needs to focus on understanding how to write and solve a one-step equation that represents a geometric concept.
	Option C is incorrect	The student likely used the formula for the perimeter (distance around the outside) of a rectangle, $P = 2l + 2w$ , and solving for $w$ , substituted 45.5 for $P$ and 7 for $l$ . The student likely solved the equation $(45.5) = 2(7) + 2(w)$ by subtracting 14 from both sides of the equation and then dividing both sides of the equation by 2, resulting in $w = 15.75$ . The student needs to focus on understanding how to write and solve a one-step equation that represents a geometric concept.
	Option D is incorrect	The student likely subtracted 7 from 45.5 instead of dividing 45.5 by 7 when solving for $h$ . The student needs to focus on understanding how to solve a one-step equation.

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Item#	Rationale	
34	Option G is correct	<p>To determine the number of packages of flour tortillas the clerk could have put on the shelf, the student could have first determined the number of packages of flour tortillas out of every 16 packages of tortillas the clerk put on the shelf. Using the ratio of the number of packages of corn tortillas to the total number of packages of tortillas <math>\left(\frac{7}{16}\right)</math>, the student should have determined that the remaining 9 packages of tortillas out of every 16 packages must be packages of flour tortillas (<math>16 - 7 = 9</math>). Based on this information, the student should have determined that the numbers of packages of flour tortillas should always be multiples of 9 (numbers that can be divided by 9 evenly). The student should have determined that 18 is the only multiple of 9 in the answer choices. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.</p>
	Option F is incorrect	<p>The student likely added the values in the ratio of the number of packages of corn tortillas (7) to the total number of packages of tortillas (16) on the shelf, resulting in 23. The student needs to focus on understanding how to determine equivalent ratios to solve real-world problems.</p>
	Option H is incorrect	<p>The student likely found the number of packages of corn tortillas the clerk could have put on the shelf instead of the number of packages of flour tortillas. The student needs to focus on understanding how to determine equivalent ratios to solve real-world problems.</p>
	Option J is incorrect	<p>The student likely used 16 as the number of packages of flour tortillas in shelf</p>

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Item#	Rationale	
35	Option D is correct	<p style="text-align: center;"> <math display="block">\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}</math> </p>

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Item#	Rationale	
36	Option J is correct	To determine the value of $\frac{4}{15} \div \frac{2}{3}$ , the student should have inverted (flipped upside down) the second fraction and multiplied $\left(\frac{4}{15} \cdot \frac{3}{2} = \frac{12}{30}\right)$ and then simplified $\left(\frac{12 \div 6}{30 \div 6} = \frac{2}{5}\right)$ .
	Option F is incorrect	The student likely multiplied the fractions without inverting the second fraction $\left(\frac{4}{15} \cdot \frac{2}{3}\right)$ , resulting in $\frac{8}{45}$ . The student needs to focus on understanding how to divide fractions.
	Option G is incorrect	The student likely added the fractions $\left(\frac{4}{15} + \frac{2}{3} = \frac{4}{15} + \frac{10}{15}\right)$ , resulting in $\frac{14}{15}$ . The student needs to focus on understanding how to divide fractions.
	Option H is incorrect	The student likely inverted the first fraction and multiplied $\left(\frac{15}{4} \cdot \frac{2}{3} = \frac{30}{12}\right)$ and then simplified $\left(\frac{30 \div 6}{12 \div 6} = \frac{5}{2}\right)$ . The student needs to focus on understanding how to divide fractions.

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Item#	Rationale	
37	Option B is correct	To determine the equation that can be used to represent the relationship between $A$ , the area of (amount of space covered by) the squares, and $s$ , the side length of the squares, the student should have looked at the corresponding (paired) numbers in each column. The student should have determined that each value of $A$ is equivalent to each corresponding value of $s$ multiplied by itself ( $1 = 1 \cdot 1$ , $4 = 2 \cdot 2$ , $9 = 3 \cdot 3$ , $16 = 4 \cdot 4$ , $25 = 5 \cdot 5$ , $36 = 6 \cdot 6$ , $49 = 7 \cdot 7$ , and $64 = 8 \cdot 8$ ), so $A = s \cdot s$ .
	Option A is incorrect	The student likely used the first column of values in the table and determined that the equation $A = s$ is true for that column ( $1 = 1$ ). The student needs to focus on understanding how to determine an equation that is true for all corresponding values in a table.
	Option C is incorrect	The student likely used the second column of values in the table and determined that the equation $A = 2 + s$ is true for that column ( $4 = 2 + 2$ ). The student needs to focus on understanding how to determine an equation that is true for all corresponding values in a table.
	Option D is incorrect	The student likely used the second column of values in the table and determined that the equation $A = s + s$ is true for that column ( $4 = 2 + 2$ ). The student needs to focus on understanding how to determine an equation that is true for all corresponding values in a table.

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Item#	Rationale	
38	Option F is correct	To determine the kind of financial assistance Riley received, the student should have recognized that a student loan has to be paid back along with any interest that may accrue after graduation.
	Option G is incorrect	The student likely misinterpreted the meaning of a scholarship, not understanding that it is a way to pay for college that does not need to be paid back after graduation. The student needs to focus on understanding the different ways to pay for college.
	Option H is incorrect	The student likely misinterpreted the meaning of a work-study, not understanding that it is a way to pay for college that does not need to be paid back after graduation. The student needs to focus on understanding the different ways to pay for college.
	Option J is incorrect	The student likely misinterpreted the meaning of a savings plan, not understanding that it is a way to pay for college that does not need to be paid back after graduation. The student needs to focus on understanding the different ways to pay for college.