

| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| 1             | Option A is correct   | To determine how many feet above the ground the actual tree house is, the student could have set up and solved a proportion (comparison of two ratios). The first ratio is the scale for the drawing, 1 inch to 2.5 feet, and the second ratio is the number of inches the tree house is above the ground in the scale drawing (5 inches) to the number of feet the actual tree house is above the ground ( $x$ feet), resulting in a proportion of $\frac{1}{2.5} = \frac{5}{x}$ . To solve, the student could have multiplied both sides of the equation by each denominator (the bottom number of a fraction), resulting in the equation $1x = (2.5)(5)$ . Last, the student could have simplified both sides of the equation, resulting in $x = 12.5$ . The student could have concluded that the actual tree house is 12.5 feet above the ground. 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 added the values in the scale factor, 1 inch and 2.5 feet, resulting in 3.5. Then the student likely multiplied 3.5 by the difference between 5 inches and 1 inch, resulting in $(3.5)(5 - 1) = 14$ feet. The student needs to focus on understanding how to use part-to-part proportional relationships to solve real-world problems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|               | Option C is incorrect | The student likely added the value in the scale factor representing feet (2.5) to the value representing the number of inches the tree house is above the ground in the scale drawing, resulting in $2.5 + 5 = 7.5$ feet. The student needs to focus on understanding how to use part-to-part proportional relationships to solve real-world problems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|               | Option D is incorrect | The student likely divided 5 inches by the value in the scale factor representing feet, 2.5, resulting in 2 feet. The student needs to focus on understanding how to use part-to-part proportional relationships to solve real-world problems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| Item Position | Rationales |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| 2             | 11.2, 75   | <p>To determine the number of miles Shawn rides his bicycle in 60 minutes, the student could have first set up the proportion (comparison of two ratios) of the given distance and time he rides his bicycle (5.6 miles to 30 minutes) compared to the ratio of an unknown number of miles, <math>x</math>, to 60 minutes, resulting in <math>\frac{5.6 \text{ miles}}{30 \text{ minutes}} = \frac{x \text{ miles}}{60 \text{ minutes}}</math>. To solve, the student could have multiplied both sides of the equation by each denominator (the bottom number of a fraction), resulting in <math>(5.6)(60) = 30x</math>. Finally, the student could have divided both sides of the equation by 30, resulting in <math>x = 11.2</math>. The student could have determined that at this rate, Shawn rides 11.2 miles in 60 minutes.</p> <p>To determine the number of minutes it takes Shawn to ride his bicycle 14 miles, the student could have first set up the proportion of the given distance and time he rides his bicycle (5.6 miles in 30 minutes) compared to the ratio of 14 miles to an unknown number of minutes, <math>x</math>, resulting in <math>\frac{5.6 \text{ miles}}{30 \text{ minutes}} = \frac{14 \text{ miles}}{x \text{ minutes}}</math>. To solve, the student could have multiplied both sides of the equation by each denominator, resulting in <math>5.6x = (30)(14)</math>. Finally, the student could have divided both sides of the equation by 5.6, resulting in <math>x = 75</math>. The student could have determined that at this rate, Shawn rides 14 miles in 75 minutes.</p> <p>This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.</p> |

| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| 3             | Option B is correct   | To determine the experimental probability (how likely it is than an event will occur based on the results of an experiment) that the next spin will be an even number, the student could have recognized that, during the experiment, the frequency of the spinner landing on 2 was 48, and the frequency of the spinner landing on 4 was 45. The student then could have added these two values and divided the sum (the result when two or more quantities are added together) by 200, the total number of times the spinner was spun, resulting in $\frac{48+45}{200} = \frac{93}{200}$ . 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 calculated the probability that the next spin will land on 4. Since the frequency of the spinner landing on 4 was 45, and the total number of spins was 200, the experimental probability that the spinner will land on 4 is $\frac{45}{200}$ . The student needs to focus on understanding how to determine the probability of a simple event from an experiment.                                                                                                                                                                                                                                                                                                                            |
|               | Option C is incorrect | The student likely recognized that there were 2 sections with even numbers out of a total of 4 equal sections on the spinner and determined the theoretical probability (how likely it is that an event will occur) of the spinner landing on an even number, $\frac{2}{4}$ . The student could have created an equivalent fraction with the total number of spins (200) as the denominator (the bottom number of a fraction), resulting in $\frac{2}{4} = \frac{100}{200}$ . The student needs to focus on understanding how to determine the probability of a simple event from an experiment.                                                                                                                 |
|               | Option D is incorrect | The student likely calculated the probability that the next spin will land on 1 or 2. Since the frequency of the spinner landing on 1 was 56, and the frequency of the spinner landing on 2 was 48, the student could have added these two values and divided the sum by 200, the total number of times the spinner was spun, resulting in $\frac{56+48}{200} = \frac{104}{200}$ . The student needs to focus on understanding how to determine the probability of a simple event from an experiment.                                                                                                                                                                                                            |

| Item Position | Rationales                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| 4             | 2.50 or any equivalent value | <p>To determine the constant of proportionality (a numeric value multiplied by the input in a situation that involves direct, inverse, or joint variation) that relates the cost of the carnival tickets in dollars, <math>y</math>, to the number of carnival tickets purchased, <math>x</math>, the student could have used the formula for the constant of proportionality: <math>k = \frac{y}{x}</math>, where <math>k</math> represents the constant of proportionality. The student could have substituted <math>y = 12.50</math> and <math>x = 5</math> into the formula, resulting in <math>k = \frac{12.50}{5} = 2.50</math>.</p> <p>This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.</p> |

| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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| 5             | Option C is correct   | <p>To determine how tall the sunflower is in centimeters, the student could have first set up and solved a proportion (comparison of two ratios), in which the ratio of the height of the sunflower in feet (5.5) to the height of the sunflower in inches (<math>x</math>) is compared to the conversion factor where 1 foot is equal to 12 inches, <math>\frac{5.5 \text{ feet}}{x \text{ inches}} = \frac{1 \text{ foot}}{12 \text{ inches}}</math>. To solve the proportion, the student could have multiplied by each denominator (the bottom number of the fraction) on both sides of the equation, resulting in <math>1x = (5.5)(12)</math> or <math>(5.5)(12) = 1x</math>. The student could have then simplified both sides of the equation, resulting in <math>x = 66</math> inches. The student then could have set up and solved another proportion, in which the ratio of the height of the sunflower in inches (66) to the height of the sunflower in centimeters (<math>x</math>) is compared to the conversion factor where 1 inch is equal to 2.54 centimeters, <math>\frac{66 \text{ inches}}{x \text{ centimeters}} = \frac{1 \text{ inch}}{2.54 \text{ centimeters}}</math>. To solve the proportion, the student could have multiplied by each denominator on both sides of the equation, resulting in <math>1x = (66)(2.54)</math> or <math>(66)(2.54) = 1x</math>. The student then could have simplified both sides of the equation, resulting in <math>x = 167.64</math> centimeters. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.</p> |
|               | Option A is incorrect | <p>The student likely multiplied the height of the sunflower in feet (5.5) by the number of inches in 1 foot (12), resulting in <math>(5.5)(12) = 66</math>. The student then likely divided the product (the result of a multiplication expression) by the number of centimeters in 1 inch (2.54), resulting in <math>\frac{66}{2.54} \approx 25.98</math> centimeters. The student needs to focus on understanding how to convert values expressed in one unit of measurement into equivalent values in a different unit of measurement.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|               | Option B is incorrect | <p>The student likely multiplied the whole number of the height of the sunflower in feet (5) by the whole number representing the number of inches in 1 foot (12) and the whole number representing the number of centimeters in 1 inch (2), resulting in <math>(5)(12)(2) = 120</math>. The student then likely added this product to the decimal part of the height of the sunflower in feet (0.5) and the decimal part of the number of centimeters in 1 inch (0.54), resulting in <math>120 + 0.5 + 0.54 = 120.59</math> centimeters. The student needs to focus on understanding how to convert values expressed in one unit of measurement into equivalent values in a different unit of measurement.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|               | Option D is incorrect | <p>The student likely multiplied the number of centimeters in 1 inch (2.54) by the number of inches in 1 foot (12), resulting in <math>(2.54)(12) = 30.48</math>. The student then likely</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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|  |  | multiplied the height of the sunflower in feet (5.5) by the number of inches in 1 foot (12), resulting in $(5.5)(12) = 66$ . Finally, the student likely added the two products, $30.48 + 66 = 96.48$ centimeters. The student needs to focus on understanding how to convert values expressed in one unit of measurement into equivalent values in a different unit of measurement. |
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| Item Position | Rationales                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| 6             | First option is correct    | To determine the best prediction for the number of times a sugar cookie or an oatmeal cookie would be randomly selected for the 24 teachers, the student could have calculated the total number of cookies available by adding the numbers of cookies of each type, resulting in $18 + 12 + 36 + 6 = 72$ . The student then could have determined the theoretical probability (how likely it is that an event will occur) that a sugar cookie or an oatmeal cookie will be selected, which is the ratio of the combined number of sugar cookies and oatmeal cookies to the total number of cookies, resulting in $\frac{18+12}{72} = \frac{5}{12}$ . Finally, the student could have multiplied this probability by 24, the total number of cookies that will be randomly selected for the teachers, resulting in $\frac{5}{12}(24) = 10$ . The student could have reasonably concluded that, of the 24 cookies received during the first lunch period, 10 will be sugar cookies or oatmeal cookies. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly. |
|               | Third option is correct    | To determine the best prediction for the number of times a gingerbread cookie will be randomly selected for the 24 teachers, the student could have calculated the total number of cookies available by adding the numbers of cookies of each type, resulting in $18 + 12 + 36 + 6 = 72$ . The student then could have determined the theoretical probability that a gingerbread cookie is selected as the ratio of the number of gingerbread cookies to the total number of cookies, resulting in $\frac{6}{72} = \frac{1}{12}$ . Finally, the student could have multiplied this probability by 24, the total number of cookies that will be randomly selected for the teachers, resulting in $\frac{1}{12}(24) = 2$ . The student could have reasonably concluded that, of the 24 cookies received during the first lunch period, 2 will be gingerbread cookies. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.                                                                                                                                  |
|               | Second option is incorrect | The student likely determined the probability of randomly selecting a chocolate chip cookie, $\frac{36}{72} = \frac{1}{2}$ , and multiplied the probability by the number of chocolate chip cookies, resulting in $\frac{1}{2}(36) = 18$ . The student likely concluded that of the 24 cookies received during the first lunch period, 18 will be chocolate chip cookies. The student needs to focus on understanding how to use probability to make reasonable predictions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|               | Fourth option is incorrect | The student likely added the number of oatmeal cookies and the number of gingerbread cookies, resulting in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

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|  |                                  | <p><math>12 + 6 = 18</math>. The student likely concluded that, of the 24 cookies received during the first lunch period, 18 will be oatmeal cookies or gingerbread cookies. The student needs to focus on understanding how to use probability to make reasonable predictions.</p>                                                                                                                                                                                                               |
|  | <p>Fifth option is incorrect</p> | <p>The student likely calculated the probability that an oatmeal cookie will be selected as the ratio of the number of oatmeal cookies to the number of cookies that would be randomly selected (24), resulting in <math>\frac{12}{24} = \frac{1}{2}</math>. The student could have concluded that of the 24 cookies received during the first lunch period, half will be oatmeal cookies. The student needs to focus on understanding how to use probability to make reasonable predictions.</p> |



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| 7             | Option D is correct   | To determine which value represents the part of the group of employees with 8 vacation days remaining, the student should have first recognized that the total number of employees represented (total number of dots) on the dot plot is 20 and then divided the number of employees with 8 vacation days remaining (2) by the total number of employees, resulting in $\frac{2}{20} = \frac{1}{10} = 0.1$ . |
|               | Option A is incorrect | The student likely divided the number of employees with 8 vacation days remaining (2) by the number 8, resulting in $\frac{2}{8} = \frac{1}{4}$ . The student needs to focus on understanding the part-to-whole relationship represented in a dot plot.                                                                                                                                                      |
|               | Option B is incorrect | The student likely divided 8 by the total number of employees (20), resulting in $\frac{8}{20} = \frac{4}{10} = 0.4$ . The student needs to focus on understanding the part-to-whole relationship represented in a dot plot.                                                                                                                                                                                 |
|               | Option C is incorrect | The student likely used the number 8 as the denominator (bottom number in a fraction) in a unit fraction (a fraction where the numerator [top number] is 1), resulting in $\frac{1}{8}$ . The student needs to focus on understanding the part-to-whole relationship represented in a dot plot.                                                                                                              |

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| 8             | Option A is correct   | To determine which inequality represents all possible values of $x$ for $7x + 5 - 10x < 4$ , the student could have used inverse operations to isolate the variable (symbol used to represent an unknown number) $x$ on one side of the inequality. First, the student could have simplified the left side of the inequality by combining $7x$ and $-10x$ , resulting in $5 - 3x < 4$ . The student then could have subtracted 5 from both sides of the inequality, resulting in $-3x < -1$ . Next, the student could have divided both sides of the inequality by $-3$ . Since the student divided by a negative number, the inequality sign should have been reversed, resulting in the solution to the inequality, which is $x > \frac{1}{3}$ . 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 added 5 to 4 rather than subtracting, resulting in $-3x < 9$ , or $x > -3$ . The student needs to focus on understanding how to solve a two-step linear inequality.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|               | Option C is incorrect | The student likely did not recognize that when an inequality is divided by a negative number, the inequality sign is reversed, and therefore found the solution $x < \frac{1}{3}$ . The student needs to focus on understanding how to solve a two-step linear inequality.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|               | Option D is incorrect | The student likely added 5 to 4 rather than subtracting and did not recognize that when an inequality is divided by a negative number, the inequality sign is reversed, resulting in $-3x < 9$ , or $x < -3$ . The student needs to focus on understanding how to solve a two-step linear inequality.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

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| 9             | Option B is correct   | To determine the measurement that is closest to the radius (distance from the center of a circle to a point on the circle) of the circular flying disc in centimeters, the student could have used the formula for the circumference (distance around the circle) of a circle: $C = 2\pi r$ , where $C$ is the circumference, $\pi$ is approximately 3.14, and $r$ is the radius. The student could have substituted $C = 78.5$ centimeters, resulting in $78.5 = 2\pi r$ , and then solved for $r$ by dividing both sides of the equation by $2\pi$ , which is approximately $(2)(3.14) = 6.28$ . This results in $r = \frac{78.5}{6.28} = 12.5$ centimeters. 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 formula for the area (amount of space covered by a surface) of a circle, $A = \pi r^2$ , where $A$ is the area, $\pi$ is approximately 3.14, and $r$ is the radius. The student likely substituted $A = 78.5$ and solved for $r$ by dividing both sides of the equation by $\pi$ , or 3.14, resulting in $25 = r^2$ , and then took the square root of both sides, resulting in 5 centimeters. The student needs to focus on correctly applying formulas involving circles.                                                                                                                                                                                                                                                                            |
|               | Option C is incorrect | The student likely used the formula for the circumference of a circle, $C = 2\pi r$ , but divided the circumference by $\pi$ (3.14) instead of $2\pi$ , resulting in $\frac{78.5}{3.14} = 25$ centimeters. The student needs to focus on correctly applying formulas involving circles.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|               | Option D is incorrect | The student likely solved for $r$ in the formula correctly, resulting in 12.5 centimeters, but then divided 12.5 by 2 for a final result of $\frac{12.5}{2} = 6.25$ centimeters. The student needs to focus on correctly applying formulas involving circles.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| Item Position | Rationales                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| 10            | <p>Selected 2 points on the line <math>y = 25x</math>, such as <math>(0, 0)</math> and <math>(2, 50)</math>. Any other points on the line <math>y = 25x</math> are correct.</p> | <p>To determine two points on the graph to represent <math>y</math>, the number of miles a pickup truck can travel on <math>x</math> gallons of gasoline, the student could have recognized that the pickup truck traveled 750 miles on 30 gallons of gasoline. The ratio 750 to 30 is equivalent to the ratio 25 to 1 and represents the rate of change (ratio of the change in <math>y</math>-values to the change in <math>x</math>-values) of 25 miles per gallon of gasoline. The student then could have then graphed ordered pairs in which each <math>y</math>-value is 25 times the corresponding <math>x</math>-value, satisfying the equation <math>y = 25x</math>. The line contains the points <math>(0, 0)</math>, <math>(2, 50)</math>, <math>(4, 100)</math>, <math>(6, 150)</math>, or any other points satisfying the equation <math>y = 25x</math>.</p> <p>This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.</p> |

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| 11            | Option A is correct   | To determine $h$ , the height (distance from top to bottom) of the box of cereal in inches, the student could have used the formula for the volume of a prism, $V = Bh$ , where $V$ represents the volume, $B$ represents the area (amount of space covered by a surface) of the base, and $h$ represents the height of the prism. The student could have calculated the area of the base, $B$ , as the length of the rectangular base multiplied by the width, or $(8)(2) = 16$ square inches. The student then could have substituted $V = 184$ and $B = 16$ into the volume formula, resulting in $184 = 16h$ . Last, the student could have divided both sides of the equation by 16, resulting in 11.5 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 added the length of the base of the box (8 inches) and the width of the base of the box (2 inches), resulting in $8 + 2 = 10$ inches. The student needs to focus on understanding how to apply the formula for the volume of a rectangular prism when given the dimensions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|               | Option C is incorrect | The student likely found the surface area of the prism, the sum (the result when two or more quantities are added together) of the areas of the faces, resulting in $(8)(2) + (8)(2) + (2)(h) + (2)(h) + (8)(h) + (8)(h)$ . The student then likely combined like terms and set the sum equal to the given volume, 184 cubic inches, resulting in $32 + 20h = 184$ . The student then likely subtracted 32 from both sides of the equation, resulting in $20h = 152$ , and then divided both sides of the equation by 20 to determine the height to be 7.6 inches. The student needs to focus on understanding how to apply the formula for the volume of a rectangular prism when given the dimensions.                                                                                                                                |
|               | Option D is incorrect | The student likely found the area of the base of the prism, $(8)(2) = 16$ square inches. The student needs to focus on understanding how to apply the formula for the volume of a rectangular prism when given the dimensions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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| 12            | Option C is correct   | To determine which statement about the eye color of the doctor's next patient is best supported by the data in the circle graph, the student could have recognized that the percentage of patients who had either green or hazel eyes is $16 + 11 = 27\%$ , which is equivalent to the percentage of patients that had blue eyes, $27\%$ . The student could have then reasonably determined that the next patient is equally likely to have either green or hazel eyes as to have blue eyes. 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 subtracted the percentage of patients with hazel eyes ( $16\%$ ) from the percentage of patients with blue eyes ( $27\%$ ), resulting in $11$ . The student then likely determined that the next patient is $11$ times as likely to have blue eyes as to have hazel eyes. The student needs to focus on solving problems involving proportional relationships using qualitative and quantitative predictions from simple experiments.                                                                                                                                                          |
|               | Option B is incorrect | The student likely recognized that the percentage of patients with brown eyes is the largest percentage shown in the graph and that the percentage of patients with blue eyes is the second largest percentage shown. The student then likely concluded the next patient is twice as likely to have brown eyes as to have blue eyes. The student needs to focus on solving problems involving proportional relationships using quantitative predictions from simple experiments.                                                                                                                                  |
|               | Option D is incorrect | The student likely assumed that 3 eye colors (hazel, blue, or green) represent 3 times as many people as 1 eye color (brown) and concluded that the next patient is 3 times as likely to have hazel, blue, or green eyes as to have brown eyes. The student needs to focus on solving problems involving proportional relationships using quantitative predictions from simple experiments.                                                                                                                                                                                                                       |

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| 13            | Option A is correct   | To determine the value of the expression $1\frac{1}{4} \div 5 - 3.5$ , the student could have evaluated it according to the order of operations. The student could have first divided $1\frac{1}{4}$ by 5 by converting the mixed number to an improper fraction, resulting in $\frac{5}{4} \div \frac{5}{1} = \frac{5}{4} \cdot \frac{1}{5} = \frac{5}{20} = \frac{1}{4}$ . The student then could have converted the decimal 3.5 to an equivalent mixed number with a common denominator of 4, which is $3\frac{2}{4}$ . Finally, the student could have subtracted $3\frac{2}{4}$ from $\frac{1}{4}$ by converting the mixed number to an improper fraction: $\frac{1}{4} - \frac{14}{4} = -\frac{13}{4} = -3\frac{1}{4}$ . 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 incorrectly by using the reciprocal (the number that, when multiplied by the original number, results in 1) of $1\frac{1}{4}$ instead of the reciprocal of 5. The student likely converted $1\frac{1}{4}$ to the improper fraction $\frac{5}{4}$ . The student then likely used the reciprocal of $\frac{5}{4}$ to divide, resulting in $\frac{4}{5} \cdot \frac{5}{1} = \frac{20}{5} = 4$ . The student then likely subtracted: $4 - 3.5 = 0.5$ , or $\frac{1}{2}$ . The student needs to focus on performing the mathematical operations (+, -, ×, ÷) that are required to solve a problem.                                                                                                                                                                                                                           |
|               | Option C is incorrect | The student likely first subtracted $5 - 3.5 = 1.5$ . The student then likely converted 1.5 to $1\frac{1}{2}$ and then to the improper fraction $\frac{3}{2}$ . The student then likely made this difference negative and divided $1\frac{1}{4}$ by $-\frac{3}{2}$ by first making $1\frac{1}{4}$ an improper fraction, $\frac{5}{4}$ , resulting in $\frac{5}{4} \div -\frac{3}{2}$ . The student then likely did not use the reciprocal of $-\frac{3}{2}$ when changing the division to multiplication, resulting in $\frac{5}{4} \cdot -\frac{3}{2} = -\frac{15}{8} = -1\frac{7}{8}$ . The student needs to focus on performing the mathematical operations (+, -, ×, ÷) that are required to solve a problem.                                                                                                                                  |
|               | Option D is incorrect | The student likely first subtracted $5 - 3.5 = 1.5$ . The student then likely converted 1.5 to $1\frac{1}{2}$ and then to the improper fraction $\frac{3}{2}$ . The student then likely divided $1\frac{1}{4}$ by $\frac{3}{2}$ by first making $1\frac{1}{4}$ an improper fraction, $\frac{5}{4}$ , resulting in $\frac{5}{4} \div \frac{3}{2} = \frac{5}{4} \cdot \frac{2}{3} = \frac{10}{12} = \frac{5}{6}$ . The student needs to focus on performing the mathematical operations (+, -, ×, ÷) that are required to solve a problem.                                                                                                                                                                                                                                                                                                           |

| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14            | Option B is correct   | <p>To determine the area (amount of space covered by a surface) of the backyard in square meters, the student could have first calculated the area as if the backyard were a rectangle. The student could have used the formula for the area of a rectangle, <math>A = bh</math>, where <math>A</math> represents the area, <math>b</math> represents the base, and <math>h</math> represents the height. This results in <math>A = (100)(50) = 5,000</math> square meters. The student then could have found the area of the missing trapezoid using the formula <math>A = \frac{1}{2}(b_1 + b_2)h</math>, where <math>A</math> represents the area, <math>b_1</math> and <math>b_2</math> represent the bases of the trapezoid, and <math>h</math> represents the height. The student could have used the base length shown, 20 meters, as <math>b_1</math>. The student could have calculated <math>b_2</math> by subtracting the sum of 30 meters and 10 meters from the base of the rectangle, 100 meters, resulting in <math>100 - (30 + 10) = 60</math> meters. The student then could have calculated the height of the trapezoid by subtracting the part of the height above the trapezoid, 35 meters, from the height of the rectangle, 50 meters, resulting in <math>50 - 35 = 15</math> meters. The student then could have substituted <math>b_1 = 20</math>, <math>b_2 = 60</math>, and <math>h = 15</math> into the area formula, resulting in <math>A = \frac{1}{2}(20 + 60)15 = 600</math> square meters. Finally, the student could have subtracted the area of the trapezoid from the area of the rectangle, resulting in <math>5,000 - 600 = 4,400</math> square meters. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.</p> |
|               | Option A is incorrect | <p>The student likely used incorrect values when substituting into the area formula for a trapezoid. The student likely substituted the value 35 meters for <math>b_1</math>, deleted <math>b_2</math> from the formula, and substituted the value 20 meters for <math>h</math>, resulting in <math>A = \frac{1}{2}(35)20 = 350</math> square meters. The student then likely subtracted 350 square meters from the area of the rectangle, 5,000 square meters, resulting in <math>5,000 - 350 = 4,650</math> square meters. The student needs to focus on understanding how to determine the area of a composite figure.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|               | Option C is incorrect | <p>The student likely did not include a value for <math>b_2</math> when finding the area of the trapezoid, resulting in <math>A = \frac{1}{2}(20)15 = 150</math> square meters. The student then likely subtracted 150 from the area of the rectangle, 5,000 square meters, resulting in <math>5,000 - 150 = 4,850</math> square meters. The student needs to focus on understanding how to determine the area of a composite figure.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|               | Option D is incorrect | <p>The student likely used the formula for the area of a rectangle when calculating the area of the trapezoid.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |



STAAR Spring 2026 Grade 7 Mathematics Rationales

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|  |  | <p>The student likely substituted 20 meters for the base and 15 meters for the height, resulting in <math>A = (20)(15) = 300</math> square meters. The student then likely subtracted 300 from the area of the rectangle, 5,000 square meters, resulting in <math>5,000 - 300 = 4,700</math> square meters. The student needs to focus on understanding how to determine the area of a composite figure.</p> |
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| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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| 15            | Option C is correct   | To determine which situation could NOT be represented by the inequality $2x + 5 \leq 25$ , the student could have reviewed the inequality for key characteristics. In the inequality $2x + 5 \leq 25$ , 2 represents a rate that is multiplied by $x$ , and 5 is added to that value. This sum (the result when two or more quantities are added together) must be less than or equal to 25. The statement in the option shows \$5 as the rate that is multiplied by $x$ , the number of notebooks Hannah can buy, and \$2 is added for one package of paper. This sum must be less than or equal to the total Hannah has to spend, \$25. This situation represents the inequality $5x + 2 \leq 25$ rather than $2x + 5 \leq 25$ . 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 interpreted \$5 as the amount Keisha began with and \$2 as the amount she spends on each ride, determining that the inequality that represents this situation is $5 - 2x \leq 25$ . The student needs to focus on understanding how to write real-world problems based on equations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|               | Option B is incorrect | The student likely interpreted the total of \$25 to be non-inclusive and determined that the situation can be represented by the inequality $2x + 5 < 25$ . The student needs to focus on understanding how to write real-world problems based on equations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|               | Option D is incorrect | The student likely interpreted the \$25 to be the minimum amount spent on school supplies and determined that the inequality that represents this situation is $2x + 5 \geq 25$ . The student needs to focus on understanding how to write real-world problems based on inequalities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| 16            | Option D is correct   | To determine which statement is best supported by the information in the dot plots (graphs that use dots to display data), the student could have analyzed the distribution (patterns of the values in the data set) for each plot. The student should have identified that the data for Elsa is not symmetric (balanced data where the two sides of the median [middle number in a set of data when the set is ordered by value] mirror each other). The student should have then identified that the data for Terrance is also not symmetric.                                                                                                                                                                                                                                                                                                                                                                                  |
|               | Option A is incorrect | The student likely calculated the interquartile range (IQR, the difference between the third and first quartiles in a set of data) instead of the range (difference between the greatest and least values in a set of data) for each data set. The student likely calculated quartile 1 (the point in a data set below which 25% of the data points fall) of the data for Elsa by first finding the median, 8, and then finding the median of the lower half of the data, 7, and the median for the upper half of the data, 10. To find the IQR of the data for Elsa, the student likely subtracted: $10 - 7 = 3$ . The student then likely found the IQR of the data for Terrance, $15 - 4 = 11$ , and concluded that, because $11 > 3$ , the range of the data for Terrance is greater than the range of the data for Elsa. The student needs to focus on understanding how to compare information presented in two dot plots. |
|               | Option B is incorrect | The student likely determined that the mode (the value that appears most frequently in a dataset) is 4 for both data sets because the mode for each data set has 4 dots. The student needs to focus on understanding how to compare information presented in two dot plots.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|               | Option C is incorrect | The student likely found the median of the data for Elsa, 8, and the median of the data for Terrance, 6, but transposed which median belonged to which data set, determining that the data for Terrance has a greater median than the data for Elsa. The student needs to focus on understanding how to compare information presented in two dot plots.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| 17            | Option A is correct   | To determine which equation represents $y$ , the number of cups of flour that is needed to make $x$ dozen corn muffins, the student could have determined that 3 cups of flour for 2 dozen corn muffins is equivalent to $\frac{3}{2}$ cups of flour per dozen corn muffins. The student then could have recognized that the number of cups of flour needed is equal to $\frac{3}{2}$ times the number of dozens of corn muffins. Therefore, the equation that represents the situation is $y = \frac{3}{2}x$ . 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 determined an equation for $y$ , the number of dozens of corn muffins that can be made with $x$ cups of flour, by recognizing that the number of dozens of corn muffins that can be made is equal to $\frac{2}{3}$ times the number of cups of flour used. The student likely determined that the equation that represents the situation is $y = \frac{2}{3}x$ . The student needs to focus on representing constant rates of change in real-world problems with equations.                                                                                                                                      |
|               | Option C is incorrect | The student likely added the given number of dozens of corn muffins and number of cups of flour to find the unit rate, resulting in $2 + 3 = 5$ . The student likely determined that the equation that represents the situation is $y = 5x$ . The student needs to focus on representing constant rates of change in real-world problems with equations.                                                                                                                                                                                                                                                                            |
|               | Option D is incorrect | The student likely multiplied the given number of dozens of corn muffins and number of cups of flour to find the unit rate, resulting in $(2)(3) = 6$ . The student likely determined that the equation that represents the situation is $y = 6x$ . The student needs to focus on representing constant rates of change in real-world problems with equations.                                                                                                                                                                                                                                                                      |

| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 18            | Option D is correct   | To determine which list includes all possible 2-digit numbers that the computer program can create, the student should have chosen the list that includes all the possible combinations of 2 digits from the set {2, 5, 7}. The tens digit of each 2-digit number could be 3 possible numbers, and the ones digit could be 3 possible numbers, resulting in 9 possible 2-digit numbers: {22, 25, 27, 52, 55, 57, 72, 75, 77}.                                          |
|               | Option A is incorrect | The student likely selected a list that includes only the 2-digit numbers that contain the same number in the tens place and the ones place. The student needs to focus on understanding how to identify the sample space for compound events.                                                                                                                                                                                                                         |
|               | Option B is incorrect | The student likely selected a list that includes three 2-digit numbers where the digits in the tens place and the ones place are not the same number. The student needs to focus on understanding how to identify the sample space for compound events.                                                                                                                                                                                                                |
|               | Option C is incorrect | The student likely selected a list that includes all the possible 2-digit numbers where the digits in the tens place and the ones place are the same (22, 55, 77) and three numbers formed with a pair of different digits (25, 27, 57). The student likely omitted the numbers that are formed when the two different digits in each pair are swapped (52, 72, 75). The student needs to focus on understanding how to identify the sample space for compound events. |

| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 19            | Option C is correct   | To determine how many more students prefer band than prefer theater, the student could have determined how many students prefer band and how many students prefer theater and then found the difference. To determine how many students prefer band, the student could have multiplied the percentage of students who prefer band from the circle graph, 56%, by the number of students surveyed, 350. This results in $(56\%)(350) = (0.56)(350) = 196$ students. To determine how many students prefer theater, the student could have multiplied the percentage of students who prefer theater from the circle graph, 8%, by the number of students surveyed, 350. This results in $(8\%)(350) = (0.08)(350) = 28$ students. The student then could have subtracted these values to find the difference, resulting in $196 - 28 = 168$ students. 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 calculated only the number of students who prefer band, 196. The student needs to focus on answering the question that is asked in a multistep scenario.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|               | Option B is incorrect | The student likely made a place value error when calculating the number of students who prefer theater. The student likely converted 8% to 0.8 and then multiplied by the total number of students, resulting in $(0.8)(350) = 280$ . The student then likely found the difference between 280 and 196, resulting in 84. The student needs to focus on understanding the part-to-whole relationship between percentage and sample size.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|               | Option D is incorrect | The student likely subtracted the percentages of students who prefer theater from the percentage of students who prefer band without multiplying by the total number of students surveyed, resulting in $56 - 8 = 48$ . The student needs to focus on understanding the part-to-whole relationship between percentage and sample size.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Item Position | Rationales      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| 20            | $9\pi$ , $6\pi$ | <p>To determine the area (amount of space covered by a surface) of the circular tablecloth in square feet, in terms of <math>\pi</math>, the student could have used the formula for the area of a circle: <math>A = \pi r^2</math>, where <math>A</math> is the area and <math>r</math> is the radius (distance from the center of the circle to a point on the circle). The student could have recognized that the radius of the circle is half the given diameter (length of a line segment that goes through the center of a circle and connects two points on the circle), <math>d = 6</math> feet, resulting in <math>r = \frac{6}{2} = 3</math> feet. The student then could have substituted <math>r = 3</math> into the formula for the area of a circle, resulting in <math>A = \pi(3)^2 = \pi(9)</math>, or <math>A = 9\pi</math> square feet.</p> <p>To determine the circumference (distance around a circle) of the circular tablecloth in feet, in terms of <math>\pi</math>, the student could have used the circumference formula: <math>C = \pi d</math>, where <math>C</math> is the circumference of a circle and <math>d</math> is the diameter. The student could have substituted <math>d = 6</math>, resulting in <math>C = \pi(6)</math>, or <math>C = 6\pi</math> feet.</p> <p>This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.</p> |

| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 21            | Option A is correct   | To determine which inference (a conclusion based on evidence) about the survey is best supported by the information in the bar graph, the student should have compared the number of students who prefer Company P to the number of teachers who prefer Company P. The number of students who prefer Company P is 17, and the number of teachers who prefer Company P is 19. The student should have determined that more teachers than students prefer Company P.                                                                                                                                                                                                                                                                   |
|               | Option B is incorrect | The student likely calculated the sum (the result when two or more quantities are added together) of the number of students and the number of teachers who prefer each company. The total number of people who selected Company M is $11 + 9 = 20$ . The total number of people who selected Company N is $15 + 11 = 26$ . The total number of people who selected Company P is $17 + 19 = 36$ . The total number of people who selected Company Q is $7 + 11 = 18$ . The student likely concluded that Company Q is preferred by fewer teachers than any other service. The student needs to focus on attending to the details of comparative bar graphs in problems that require the student to make an inference from a data set. |
|               | Option C is incorrect | The student likely compared the number of students who prefer Company M (11) to the number of students who prefer Company N (15) rather than comparing the number of students who prefer Company M (11) to the number of teachers who prefer Company N (11). The student likely concluded that there are more teachers who prefer Company N than students who prefer Company M. The student needs to focus on attending to the details of comparative bar graphs in problems that require the student to make an inference from a data set.                                                                                                                                                                                          |
|               | Option D is incorrect | The student likely compared the number of students to the number of teachers who prefer Company N rather than comparing the number of students who prefer Company N to the total number of students who prefer the other companies. The student likely determined that Company P is preferred by more teachers than any other service, while Company N is preferred by more students. The student needs to focus on attending to the details of comparative bar graphs in problems that require the student to make an inference from a data set.                                                                                                                                                                                    |



| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 22            | Option D is correct   | <p>To determine the equation that describes the relationship between the depth in feet, <math>y</math>, of an elephant seal and the number of minutes of diving, <math>t</math>, the student could have identified the rate of change (ratio of the change in <math>y</math>-values to the change in <math>x</math>-values) of the values and the initial value (the <math>y</math>-value when <math>x</math> equals 0). The student could have used the ordered pairs (10, -1,200) and (30, -3,200) from the table and calculated the change in <math>y</math> as <math>-3,200 - (-1,200) = -2,000</math> and the change in <math>x</math> as <math>30 - 10 = 20</math>. Therefore, the rate of change is represented by the ratio <math>\frac{-2,000}{20} = -100</math>. The student then could have recognized that the elephant seal started at 200 feet below the surface of the ocean before diving farther and determined that the initial value is -200. The student then could have recognized that the rate of change is multiplied by the number of minutes the seal dives, <math>t</math>, and the initial value is added to the product (the result of a multiplication expression) to find <math>y</math>, the depth of the seal in feet, resulting in the equation <math>y = -100t + (-200)</math>, or <math>y = -100t - 200</math>. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.</p> |
|               | Option A is incorrect | <p>The student likely made an error when subtracting the <math>y</math>-values to find the rate of change. The student likely used the ordered pairs (10, -1,200) and (30, -3,200) from the table and calculated the change in <math>y</math> as <math>-3,200 - 1,200 = -4,400</math> and the change in <math>x</math> as <math>30 - 10 = 20</math>, and concluded the rate of change as the ratio <math>\frac{-4,400}{20} = -220</math>. The student then likely determined that the initial value is positive and that the equation that represents the relationship is <math>y = -220t + 200</math>. The student needs to focus on understanding how to use equations to represent linear relationships presented in a table with real-world context.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|               | Option B is incorrect | <p>The student likely used the initial value as both the rate of change and the initial value, resulting in the equation <math>y = -200t - 200</math>. The student needs to focus on understanding how to use equations to represent linear relationships presented in a table with real-world context.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|               | Option C is incorrect | <p>The student likely used the ordered pair (10, -1,200) to find the rate of change by dividing the <math>y</math>-value by the <math>x</math>-value, resulting in <math>\frac{-1,200}{10} = -120</math>. The student then likely determined that the initial value is positive and that the equation that represents the relationship is <math>y = -120t + 200</math>. The student needs to focus on understanding how to use equations to represent linear</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

# STAAR Spring 2026 Grade 7 Mathematics Rationales

|  |  |                                                             |
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|  |  | relationships presented in a table with real-world context. |
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| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 23            | Option A is correct   | To determine the value of $x$ , the student could have set up an equation where the sum (the result when two or more quantities are added together) of the measures of the three angles in the triangle equals $180^\circ$ . The student should have recognized that the measure of the right angle is $90^\circ$ and determined that the equation to find the value of $x$ would be $x + (x + 6) + 90 = 180$ . The student then could have solved the equation by combining like terms, resulting in $2x + 96 = 180$ . The student then could have subtracted 96 from both sides of the equation, resulting in $2x = 84$ , and then divided both sides by 2 to find the solution $x = 42$ . 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 omitted the $90^\circ$ angle when finding the sum of the angle measures, resulting in $x + (x + 6) = 180$ . The student then likely solved by combining like terms, $2x + 6 = 180$ , and then subtracted 6 from both sides of the equation, resulting in $2x = 174$ . The student then likely divided both sides of the equation by 2 and determined that $x = 87$ . The student needs to focus on understanding how to write equations using geometric concepts, including triangle angle-sum.                                                                                                                                                                                                                                                                                               |
|               | Option C is incorrect | The student likely determined that the value of $x$ is equal to the measure of the right angle, 90. The student needs to focus on understanding how to write equations using geometric concepts, including triangle angle-sum.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|               | Option D is incorrect | The student likely correctly calculated the value of $x$ to be 42 but then substituted $x = 42$ into the expression $x + 6$ , resulting in $42 + 6 = 48$ . The student needs to focus on understanding how to write equations using geometric concepts, including triangle angle-sum.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                          |
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| 24            | Option C is correct   | To determine the amount of sales tax paid on the ladder, the student could have converted 7.5% to an equivalent decimal by moving the decimal point two places to the left, resulting in 0.075, and then multiplied the price of the ladder, \$84.00, by 0.075, resulting in \$6.30. 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 moved the decimal point one place to the left when converting 7.5% to a decimal and then divided the price of the ladder by 0.75, resulting in $\frac{84}{0.75} = \$112.00$ . The student needs to focus on understanding how to calculate the sales tax for a given purchase.                                                                                                        |
|               | Option B is incorrect | The student likely moved the decimal point one place to the left when converting 7.5% to a decimal and then multiplied by the price of the ladder, resulting in $(84.00)(0.75) = \$63.00$ . The student needs to focus on understanding how to calculate the sales tax for a given purchase.                                                                                                             |
|               | Option D is incorrect | The student likely divided the total price of the ladder, \$84.00, by 7.5, resulting in $\frac{84}{7.5} = \$11.20$ . The student needs to focus on understanding how to calculate the sales tax for a given purchase.                                                                                                                                                                                    |

| Item Position | Rationales   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| 25            | 2, 70, 84, 7 | <p>To determine the equation that can be used to find the number of full buckets needed to fill the pond, the student could have first recognized that the pond will contain 84 gallons of water when full. Next, the student could have determined that <math>x</math> represents the number of full buckets, and that each bucket holds 2 gallons of water; therefore, 2 will be multiplied by <math>x</math>. The student also could have recognized that the pond already contains 70 gallons of water, and therefore the initial value is 70. The student then could have determined that the equation that can be used to find the number of full buckets needed to fill the pond would be <math>2x + 70 = 84</math>.</p> <p>To determine the solution to <math>2x + 70 = 84</math>, the student could have subtracted 70 from both sides of the equation, resulting in <math>2x = 14</math>. The student then could have divided both sides of the equation by 2, resulting in <math>x = 7</math>. The student then should have determined that the gardener needs 7 more full buckets to fill the pond.</p> <p>This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.</p> |

| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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| 26            | Option B is correct   | To determine the scale of the model, the student could have set up a ratio of the model aircraft's wingspan, 140 millimeters, to the actual aircraft's wingspan, 10 meters, resulting in $\frac{140 \text{ mm}}{10 \text{ m}}$ . The student could have simplified the ratio by dividing the numerator (the top number of a fraction) and the denominator (the bottom number of a fraction) by a common factor of 10, resulting in $\frac{140 \div 10}{10 \div 10} = \frac{14}{1}$ . The student could have determined that the scale is 14 mm : 1 m. 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 that the ratio would be $\frac{10 \text{ m}}{140 \text{ mm}}$ and simplified by dividing only the denominator by 20 instead of 10, thinking that the 10 should be doubled because there are 2 wings, resulting in $\frac{10}{140 \div 20} = \frac{10}{7}$ . The student then likely transposed the labels and determined that the scale was 10 mm : 7 m. The student needs to focus on understanding how to solve problems involving scale factors.                                                                                                                                                                                         |
|               | Option C is incorrect | The student likely converted 10 meters to 10,000 millimeters before setting up the ratio. The student then likely determined that the ratio was $\frac{10,000 \text{ mm}}{140 \text{ mm}}$ and simplified by dividing the numerator and the denominator by 140, resulting in $\frac{10,000 \div 140}{140 \div 140} \approx \frac{71}{1}$ . The student then likely determined that the scale was 71 mm : 1 m. The student needs to focus on understanding how to solve problems involving scale factors.                                                                                                                                                                  |
|               | Option D is incorrect | The student likely converted 10 meters to 10,000 millimeters before setting up the ratio. The student then likely determined that the ratio was $\frac{10,000 \text{ mm}}{140 \text{ mm}}$ and simplified by dividing the numerator and the denominator by 100, resulting in $\frac{10,000 \div 100}{140 \div 100} = \frac{100}{1.4}$ . The student then likely determined that the scale was 100 mm : 1.4 m. The student needs to focus on understanding how to solve problems involving scale factors.                                                                                                                                                                  |

| Item Position | Rationales                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 27            | open circle at $-2$ , shaded to the left | <p>To create a number line that represents the solution to the inequality <math>-6x + 8 &gt; 20</math>, the student could have first subtracted 8 from both sides of the inequality, resulting in <math>-6x &gt; 12</math>. The student then could have divided both sides of the inequality by <math>-6</math>. When dividing by a negative number, the student should have reversed the inequality sign, resulting in the solution to the inequality, which is <math>x &lt; -2</math>. To represent this solution on a number line, the student should have plotted an open point at <math>-2</math>, because the solution set does not include the value of <math>-2</math>, and an arrow pointing to the left, because the solution set includes all values less than <math>-2</math>.</p> <p>This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.</p> |

| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| 28            | Option C is correct   | To determine the volume (amount of three-dimensional space) of the pyramid in cubic inches, the student could have first used the formula for the volume of a pyramid: $V = \frac{1}{3}Bh$ , where $V$ is the volume, $B$ is the area (amount of two-dimensional space covered by a surface) of the rectangular base, and $h$ is the height (vertical distance from top to bottom) of the pyramid. The student could have calculated $B$ as the length of the rectangular base multiplied by the width, or $(12)(12) = 144$ square inches. The student then could have substituted $B = 144$ and $h = 15$ into the volume formula, resulting in $V = \frac{1}{3}(144)(15) = 720$ cubic inches. 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 calculated the perimeter of the base by multiplying the side length by 4. The student likely substituted $s = 12$ , resulting in $(4)(12) = 48$ . The student then likely substituted the perimeter, instead of the area, of the base for $B$ in the formula for the volume of a pyramid, resulting in $V = \frac{1}{3}(48)(15) = 240$ cubic inches. The student needs to focus on understanding how to apply formulas to solve problems involving the volumes of three-dimensional figures.                                                                                                                                                                                                                                                                                                    |
|               | Option B is incorrect | The student likely used 15 as the side lengths of the base and 12 as the height of the pyramid. The student likely determined that the area of the base was $(15)(15) = 225$ square inches. The student then likely substituted $B = 225$ and $h = 12$ into the formula for the volume of a pyramid, resulting in $V = \frac{1}{3}(225)(12) = 900$ cubic inches. The student needs to focus on understanding how to apply formulas to solve problems involving the volumes of three-dimensional figures.                                                                                                                                                                                                                                                                                                           |
|               | Option D is incorrect | The student likely multiplied the side length of the base by the height of the pyramid, resulting in $(15)(12) = 180$ cubic inches. The student needs to focus on understanding how to apply formulas to solve problems involving the volume of three-dimensional figures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 29            | Option D is correct   | To determine how many more cups of fruit Sawyer needs to add to the bowl, the student could have determined the total amount of fruit already in the bowl and subtracted it from the amount of fruit needed, 12 cups. To determine the number of cups of fruit already in the bowl, the student could have first converted the mixed numbers to improper fractions and found a common denominator (the bottom number of the fraction) of 12. The student could have determined that there are $\frac{7}{2} \cdot \frac{6}{6} = \frac{42}{12}$ cups of blueberries, $\frac{11}{4} \cdot \frac{3}{3} = \frac{33}{12}$ cups of strawberries, and $\frac{13}{3} \cdot \frac{4}{4} = \frac{52}{12}$ cups of grapes. The student then could have added the numbers of cups of fruit already used, resulting in $\frac{42}{12} + \frac{33}{12} + \frac{52}{12} = \frac{127}{12}$ . Since Sawyer needs 12 cups of fruit, and the bowl already contains $\frac{127}{12}$ cups of fruit, the student could have subtracted $\frac{127}{12}$ from 12, resulting in $\frac{12}{1} - \frac{127}{12} = \frac{12}{1} \cdot \frac{12}{12} - \frac{127}{12} = \frac{144}{12} - \frac{127}{12} = \frac{17}{12} = 1\frac{5}{12}$ cups. 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 amount of fruit already used by adding the amounts of fruit already in the bowl, resulting in $\frac{127}{12} = 10\frac{7}{12}$ cups. The student needs to focus on performing mathematical operations (+, −, ×, ÷) that are required to solve a problem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|               | Option B is incorrect | The student likely added the amount of fruit already in the bowl to the total amount of fruit needed, resulting in $\frac{127}{12} + \frac{12}{1} = \frac{127}{12} + \frac{12}{1} \cdot \frac{12}{12} = \frac{127}{12} + \frac{144}{12} = \frac{271}{12} = 22\frac{7}{12}$ cups. The student needs to focus on performing mathematical operations (+, −, ×, ÷) that are required to solve a problem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|               | Option C is incorrect | The student likely added the amounts of fruit already in the bowl, resulting in $10\frac{7}{12}$ cups. The student then likely subtracted the whole number, 10, from 12, resulting in $12 - 10 = 2$ , and subtracted the fraction, $\frac{7}{12}$ , from 1, resulting in $1 - \frac{7}{12} = \frac{12}{12} - \frac{7}{12} = \frac{5}{12}$ . The student then likely added these two results and determined concluded that the number of cups of fruit still needed is $2\frac{5}{12}$ cups. The student needs to focus on performing mathematical operations (+, −, ×, ÷) that are required to solve a problem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Item Position | Rationales                 |                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 30            | Second option is correct   | To determine which statements about the figures are true, the student should have recognized that the figures are similar figures (two or more figures with corresponding angle measurements that are equal and corresponding side lengths that are proportional). Therefore, the corresponding angle measurements must be congruent. The student should have determined that angle $Y$ is congruent to angle $M$ and angle $T$ . |
|               | Fifth option is correct    | To determine which statements about the figures are true, the student should have recognized that the figures are similar figures. Therefore, the corresponding side lengths of the figures must be proportional (equal in ratio). The student should have determined that, since sides $QR$ and $WX$ are corresponding sides and sides $TU$ and $YZ$ are corresponding sides, $\frac{QR}{WX} = \frac{TU}{YZ}$ .                  |
|               | First option is incorrect  | The student likely recognized that sides $QR$ and $KL$ are corresponding, but determined that side $RT$ corresponds to side $KN$ instead of side $LM$ , resulting in the proportion $\frac{QR}{KL} = \frac{RT}{KN}$ . The student needs to focus on understanding that the corresponding side lengths of similar figures are proportional and the corresponding angle measures are equal.                                         |
|               | Third option is incorrect  | The student likely determined that corresponding side lengths of similar figures are congruent, and therefore segment $QU$ is congruent to corresponding segments $WZ$ and $KN$ . The student needs to focus on understanding that the corresponding side lengths of similar figures are proportional and the corresponding angle measures are equal.                                                                             |
|               | Fourth option is incorrect | The student likely recognized that angle $K$ corresponds to angle $W$ but determined that those angles correspond to angle $R$ instead of angle $Q$ . Therefore, the student concluded that angle $K$ is congruent to angles $W$ and $R$ . The student needs to focus on understanding that the corresponding side lengths of similar figures are proportional and the corresponding angle measures are equal.                    |

| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| 31            | Option D is correct   | To determine how much Jake will earn in one week if he works the same number of hours each week, the student could have first determined the amount Jake earned weekly before the raise, by multiplying the number of hours he worked each week by the amount he earned per hour, \$15.75. This results in $(40)(15.75) = \$630.00$ . The student then could have recognized that the amount he will earn in one week after the raise will be 100% plus the 4% raise, or 104%, of the previous amount earned. The student could have converted 104% to an equivalent decimal by moving the decimal point two places to the left, resulting in 1.04, and then multiplied 1.04 by the previous amount earned, resulting in $(1.04)(630.00) = \$655.20$ . 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 recognized that the amount earned after the raise would be 104%, or 1.04, of the amount earned before the raise, but added this value to the original weekly amount instead of multiplying, resulting in $1.04 + 630.00 = \$631.04$ . The student needs to focus on understanding how to use percent change relationships to solve real-world problems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|               | Option B is incorrect | The student likely decreased the previous amount earned rather than increasing it. The student likely determined that, with a 4% decrease, the new amount earned would be 96% of the previous amount earned. The student then likely converted 96% to a decimal and multiplied by the previous amount earned weekly, resulting in $(0.96)(630.00) = \$604.80$ . The student needs to focus on understanding how to use percent change relationships to solve real-world problems.                                                                                                                                                                                                                                                                                                                                                                                          |
|               | Option C is incorrect | The student likely multiplied 104%, or 1.04, by the hourly wage, \$15.75, resulting in $(1.04)(15.75) = \$16.38$ , and then added that value to the amount previously earned, resulting in $16.38 + 630.00 = \$646.38$ . The student needs to focus on understanding how to use percent change relationships to solve real-world problems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 32            | Option B is correct   | To determine which expression can be used to calculate the amount of money in dollars that the individual will need to pay the expenses in the monthly budget for 2 years, the student should have first recognized that the table represents a monthly budget and that there are 24 months in 2 years. Next, the student should have found the total of the individual's monthly budget by adding all the expenses, resulting in $1,100 + 300 + 250 + 120 = \$1,770$ . The student then should have determined that the total monthly budget must be multiplied by the number of months in 2 years, resulting in the expression $1,770 \cdot 24$ . |
|               | Option A is incorrect | The student likely multiplied the total monthly budget by 2, resulting in $1,770 \cdot 2$ . The student needs to focus on understanding how to determine the amount of money needed to pay the expenses in a monthly budget when given data in a table.                                                                                                                                                                                                                                                                                                                                                                                             |
|               | Option C is incorrect | The student likely multiplied only the amount spent on rent by 2, resulting in $1,100 \cdot 2$ . The student needs to focus on understanding how to determine the amount of money needed to pay the expenses in a monthly budget when given data in a table.                                                                                                                                                                                                                                                                                                                                                                                        |
|               | Option D is incorrect | The student likely multiplied only the amount spent on rent by 24, resulting in $1,100 \cdot 24$ . The student needs to focus on understanding how to determine the amount of money needed to pay the expenses in a monthly budget when given data in a table.                                                                                                                                                                                                                                                                                                                                                                                      |

| Item Position | Rationales                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 33            | $\frac{3}{2}$ as, equal to | <p>To determine the first true statement about the next classmate Chris surveys, the student could have compared the number of classmates who slept for more than 8 hours with the number of classmates who slept less than 5 hours from the survey results. The student could have recognized that the number of classmates who slept for more than 8 hours (9 classmates) was <math>\frac{3}{2}</math> times the number of classmates who slept less than 5 hours (6 classmates) and therefore that the next classmate surveyed is <math>\frac{3}{2}</math> as likely to have slept more than 8 hours as to have slept less than 5 hours.</p> <p>To determine the second true statement about the next classmate Chris surveys, the student could have compared the number of classmates who slept between 5 hours and 8 hours with the number of classmates who slept either less than 5 hours or more than 8 hours from the survey results. The student could have first found the total number of classmates who slept either less than 5 hours (6 classmates) or more than 8 hours (9 classmates), resulting in <math>6 + 9 = 15</math>. The student then could have recognized that the number of classmates who slept between 5 hours and 8 hours, 15 classmates, is equal to the number of classmates who slept either less than 5 hours or more than 8 hours, and therefore the likelihood that the next classmate slept between 5 hours and 8 hours is equal to the likelihood that the classmate slept either less than 5 hours or more than 8 hours.</p> <p>This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.</p> |

| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 34            | Option A is correct   | To determine which equation is true when $x = 11$ , the student could have evaluated the equation using 11 for $x$ to determine whether it makes a true statement. When 11 is substituted for $x$ in the equation $-2x + 18 = -4$ , the result is $-2(11) + 18 = -22 + 18 = -4$ , which is a true statement. 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 subtracted 5 from 11 instead of adding, resulting in $11 - 5 = 6$ . The student needs to focus on understanding how to determine whether a given value makes an equation true.                                                                                                                                                                                                                                |
|               | Option C is incorrect | The student likely subtracted 11 from 9, resulting in $9 - 11 = -2$ . The student needs to focus on understanding how to determine whether a given value makes an equation true.                                                                                                                                                                                                                                                 |
|               | Option D is incorrect | The student likely selected an equation where the value on the right side was equal to 11. The student needs to focus on understanding how to determine whether a given value makes an equation true.                                                                                                                                                                                                                            |

| Item Position | Rationales                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 35            | <p>Week 1 Is Less Than Week 2,<br/>Week 1 Is Equal to Week 2,<br/>Week 1 Is Less Than Week 2</p> | <p>To determine whether the median (middle number in a set of data when the set is ordered by value) is less for Week 1 than Week 2, equal for the two weeks, or greater for Week 1 than Week 2, the student could have used the box plots to determine the median number of minutes Juliette spent practicing free throws in Week 1 and in Week 2. The student could have recognized that the median for Week 1 is 9 and the median for Week 2 is 11, and therefore the median for Week 1 is less than the median for Week 2.</p> <p>To determine whether the minimum value is less for Week 1 than Week 2, equal for the two weeks, or greater for Week 1 than Week 2, the student could have recognized that the minimum for Week 1 is 7 and the minimum for Week 2 is also 7, and therefore the minimum for Week 1 is equal to the minimum for Week 2.</p> <p>To determine whether the interquartile range (the length of the box in a box plot) is less for Week 1 than Week 2, equal for the two weeks, or greater for Week 1 than Week 2, the student could have recognized that the length of the box for Week 1 (<math>10 - 8 = 2</math>) is less than the length of the box for Week 2 (<math>12 - 9 = 3</math>) and therefore the interquartile range for Week 1 is less than the interquartile range for Week 2.</p> <p>This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.</p> |

| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 36            | Option D is correct   | To determine which equation can be used to find $y$ , the total number of nonfiction books that will have been moved $x$ days after the librarians begin moving the additional books, the student should have recognized that the librarians already moved 800 books, so this would be the initial value (starting value). The student then should have recognized that the librarians move 200 books each day, so this would be the rate of change (ratio of the change in $y$ -values to the change in $x$ -values) and would be multiplied by the number of days, $x$ . The student should have then determined that the equation that represents the situation is $y = 200x + 800$ . |
|               | Option A is incorrect | The student likely determined that 800 is the rate of change, that 200 is the initial value, and that the initial value should be subtracted. The student likely determined that the equation that represents the situation is $y = 800x - 200$ . The student needs to focus on understanding how to represent verbal descriptions of linear relationships using equations.                                                                                                                                                                                                                                                                                                              |
|               | Option B is incorrect | The student likely subtracted the initial value instead of adding it. The student likely determined that the equation that represents the situation is $y = 200x - 800$ . The student needs to focus on understanding how to represent verbal descriptions of linear relationships using equations.                                                                                                                                                                                                                                                                                                                                                                                      |
|               | Option C is incorrect | The student likely determined that 800 is the rate of change and 200 is the initial value. The student likely determined that the equation that represents the situation is $y = 800x + 200$ . The student needs to focus on understanding how to represent verbal descriptions of linear relationships using equations.                                                                                                                                                                                                                                                                                                                                                                 |



| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 37            | Option C is correct   | <p>To determine the area (amount of space covered by a surface) of the kite in square inches, the student could have calculated the areas of the shapes that make up the figure and added them. The student could have recognized that the kite is made up of 4 triangles, 2 of which have a base of 9 inches and a height of 6 inches, and 2 of which have a base of 9 inches and a height of 14 inches. The student could have calculated the areas of the triangles using the formula <math>A = \frac{1}{2}bh</math>, where <math>A</math> is the area, <math>b</math> is the length of the base, and <math>h</math> is the height. To find the area of each of the two triangles in the top part of the figure, the student could have substituted <math>b = 9</math> and <math>h = 6</math> into the formula, resulting in <math>A = \frac{1}{2}(9)(6) = 27</math> square inches. The student then could have multiplied the area by 2 since there are 2 triangles with a base of 9 inches and a height of 6 inches, resulting in <math>(27)(2) = 54</math> square inches. The student then could have calculated the area of each of the triangles with a base of 9 inches and a height of 14 inches by substituting <math>b = 9</math> and <math>h = 14</math> into the formula, resulting in <math>A = \frac{1}{2}(9)(14) = 63</math> square inches. The student then could have multiplied this area by 2 since there are 2 triangles with a base of 9 inches and a height of 14 inches, resulting in <math>(63)(2) = 126</math> square inches. The student then could have added the calculated areas, 54 square inches and 126 square inches, resulting in <math>54 + 126 = 180</math> square inches. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.</p> |
|               | Option A is incorrect | <p>The student likely multiplied the total width of the kite by the total height of the kite, resulting in <math>(9 + 9)(6 + 14) = 360</math> square inches. The student needs to focus on understanding how to determine the area of a composite figure.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|               | Option B is incorrect | <p>The student likely calculated the total area of the 2 triangles with a base of 9 inches and a height of 6 inches (54 square inches) and then subtracted the height of the bottom part of the kite, 14, resulting in <math>54 - 14 = 40</math> square inches. The student needs to focus on understanding how to determine the area of a composite figure.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|               | Option D is incorrect | <p>The student likely did not multiply the areas of the triangles by 2 and found only the sum (the result when two or more quantities are added together) of the area of 1 triangle with a base of 9 inches and a height of 6 inches (27 square inches) and the area of 1 triangle with a base of 9 inches and a height of 14 inches (63 square inches). This results in <math>27 + 63 = 90</math> square</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

STAAR Spring 2026 Grade 7 Mathematics Rationales

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|  |  | inches. The student needs to focus on understanding how to determine the area of a composite figure. |
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| Item Position | Rationales            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| 38            | Option D is correct   | To determine the probability (how likely it is that an event will occur) that Paxton randomly chooses to mow the lawn or vacuum the rug, the student could have first found the probability of each event and then added the probabilities together. Since mowing the lawn appears 1 time in a list of 5 chores, the probability of randomly selecting mowing the lawn is $\frac{1}{5}$ . Since vacuuming the rug appears 1 time in a list of 5 chores, the probability of randomly selecting vacuuming the rug is $\frac{1}{5}$ . The student then could have determined that the probability of either event being chosen would be $\frac{1}{5} + \frac{1}{5} = \frac{2}{5}$ . This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly. |
|               | Option A is incorrect | The student likely multiplied the probabilities of the two events and then multiplied the product (the result of a multiplication expression) by 2, resulting in $\left(\frac{1}{5}\right)\left(\frac{1}{5}\right)(2) = \frac{2}{25}$ . The student needs to focus on understanding how to determine the probability of a simple event.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|               | Option B is incorrect | The student likely determined the probability of only one of the two events, $\frac{1}{5}$ . The student needs to focus on understanding how to determine the probability of a simple event.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|               | Option C is incorrect | The student likely multiplied the probabilities of the two events, resulting in $\left(\frac{1}{5}\right)\left(\frac{1}{5}\right) = \frac{1}{25}$ . The student needs to focus on understanding how to determine the probability of a simple event.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |