| Item # | | Rationale |
|---|---|---|
| 1 | Option C is correct | To determine which information is NOT included in a credit report, the student should have recalled that late payments, number of credit cards, and previous employers are all included in a credit report. High-school grades are not included in a credit report. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly. |
| | Option A is incorrect | The student likely misunderstood what is in a credit report and did not recall that late payments are included. The student needs to focus on knowing the information contained in a credit report. |
| | Option B is incorrect | The student likely misunderstood what is in a credit report and did not recall that the number of credit cards is included. The student needs to focus on knowing the information contained in a credit report. |
| | Option D is incorrect | The student likely misunderstood what is in a credit report and did not recall that previous employers are included. The student needs to focus on knowing the information contained in a credit report. |

| Item # | | Rationale |
|---|---|---|
| 2 | Option A is correct | To determine the amount of the spice in the jar in milligrams (mg), the student could have converted 75 grams by multiplying 75 by 1,000 (1 gram = 1,000 milligrams), resulting in 75,000 milligrams. 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 by 1,000 instead of multiplying, resulting in 0.075 mg. The student needs to focus on converting units within a measurement system. |
| | Option C is incorrect | The student likely divided by 100 instead of multiplying by 1,000, resulting in 0.75 mg. The student needs to focus on converting units within a measurement system. |
| | Option D is incorrect | The student likely multiplied by 100 instead of 1,000, resulting in 7,500 mg. The student needs to focus on converting units within a measurement system. |

| Item # | | Rationale |
|--------|---|-----------|
| 3 | Option B is correct | To determine the percentage that is equivalent to 8 out of 25, the student could have divided 8 by 25, resulting in 0.32. Then the student could have multiplied by 100, resulting in 32%. 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 made a decimal placement error, resulting in 3.2%. The student needs to focus on generating equivalent forms of fractions and percentages in real-world problems. |
| | Option C is incorrect | The student likely divided 25 by 8 and added a percent symbol, resulting in 3.125%. The student needs to focus on generating equivalent forms of fractions and percentages in real-world problems. |
| | Option D is incorrect | The student likely divided 25 by 8 and created a percentage from the digits of the quotient (answer to a division problem), resulting in 31.25%. The student needs to focus on generating equivalent forms of fractions and percentages in real-world problems. |

| Item # | | Rationale |
|--------|--|-----------|
| 4 | Option C is correct | To determine the total cost of the cherries Jamal bought, the student could have multiplied \$3.50 by $1\frac{1}{2}$, which results in the product (answer to a multiplication problem) of \$5.25. 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 added 3.50 and $1\frac{1}{2}$, resulting in 5, and misinterpreted that as \$5.00. The student needs to focus on multiplying positive rational numbers fluently. |
| | Option B is incorrect | The student likely added 3.50 and 1, using only the whole number part (1) of the mixed number $1\frac{1}{2}$ without using the fractional part $\left(\frac{1}{2}\right)$, resulting in 4.5, and misinterpreted that as \$4.50. The student needs to focus on multiplying positive rational numbers fluently. |
| | Option D is incorrect | The student likely subtracted $1\frac{1}{2}$ from 3.50, resulting in 2, and misinterpreted that as \$2.00. The student needs to focus on multiplying positive rational numbers fluently. |

| Item # | | Rationale |
|---|---|---|
| 5 | soccer, 25% | To determine the sport or pair of sports that represents the mode (result chosen most often) of the data, the student should have determined that the sport chosen by the greatest number of campers is soccer. It was chosen by 15 campers, while no other sport was chosen by more than 10 campers.<br><br>To determine the percentage of campers who chose basketball, the student could have divided 10, the number of campers who chose basketball, by 40, the total number of campers, resulting in 0.25. Then the student could have multiplied by 100, resulting in 25%. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly. |

| Item # | | Rationale |
|---|---|---|
| 6 | Option C is correct | To determine which graph represents the relationship between $x$ and $y$ in the equation $y = 3x$, the student could have first determined that when $x = 0$, $y = 3 \cdot 0 = 0$, which can be represented by the ordered pair $(0, 0)$. The student then could have determined that when $x = 1$, $y = 3 \cdot 1 = 3$, which can be represented by the ordered pair $(1, 3)$. The student then could have determined that, based on the labels and the locations of the points, this graph shows the relationship. 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 when $x = 0$, $y = 3 \cdot 0 = 0$, giving the ordered pair $(0, 0)$. The student then likely determined that when $x = 1$, $y = 3 \cdot 1 = 3$, but reversed the values in the ordered pair $(3, 1)$. The student needs to focus on understanding how to show a relationship in the form $y = kx$ on a graph and how to graph ordered pairs on a coordinate grid. |
| | Option B is incorrect | The student likely did not understand that the equation $y = 3x$ means that each $x$-value is multiplied by 3 to obtain the corresponding $y$-value. Instead, the student likely interpreted the equation as an additive relationship, adding 3 to each $x$-value to obtain the corresponding $y$-value. The student needs to focus on understanding how to show a relationship in the form $y = kx$ on a graph. |
| | Option D is incorrect | The student likely did not understand that the equation $y = 3x$ means that each $x$-value is multiplied by 3 to obtain the corresponding $y$-value. Instead, the student likely used $x = 3$ for all values. The student needs to focus on understanding how to show a relationship in the form $y = kx$ on a graph. |

| Item # | | Rationale |
|---|---|---|
| 7 | Option B is correct | To determine which statement best describes the data represented in the dot plot, the student should have noticed that the numbers of dots above 0, 1, and 2 trips to a movie theater add up to 8: 3 + 2 + 3 = 8. |
| | Option A is incorrect | The student likely mistook the 10 (greatest number shown on the number line) for the total number of people. The student needs to focus on understanding how to interpret information displayed in a dot plot. |
| | Option C is incorrect | The student likely did not correctly interpret the 3 dots above the 0 to mean that 3 people had made 0 trips to a movie theater. The student needs to focus on understanding how to interpret information displayed in a dot plot. |
| | Option D is incorrect | The student likely concluded that since 5 is the median (middle number of an ordered list) of the values on the number line (0 through 10), half the people who responded to the survey took 5 or more trips to a movie theater. The student needs to focus on understanding how to interpret information displayed in a dot plot. |

| Item # | | Rationale |
|---|---|---|
| 8 | 578 and any equivalent values are correct. | To determine how many of the people did NOT have an annual pass, the student could have subtracted 32% from 100%, resulting in 68%. Then the student could have multiplied 850 people by 68% (0.68), resulting in 578 people. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly. |

| Item # | | Rationale |
|---|---|---|
| 9 | Option C is correct | To determine which model can best be used to justify why the formula for the area of a triangle is $\frac{1}{2}bh$ (where *b* represents the length of the base and *h* represents the height of the triangle), the student could have recognized that the base of the parallelogram is equal to the base of the triangle and that the heights of the figures are also equal. Next, the student could have recognized that the formula for the area of a parallelogram is *A = bh*. The student could then have realized that the triangle on the right is congruent to the triangle on the left and therefore concluded that the area of a triangle must be half the area of a parallelogram with the same measurements for the base and height. Finally, the student could have recognized that the formula for the area of a triangle is $A = \frac{1}{2}bh$. 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 misidentified the $\frac{1}{2}$ in the formula as meaning to take both half the base and half the height. The student needs to focus on modeling area formulas for triangles by decomposing and rearranging their parts. |
| | Option B is incorrect | The student likely misidentified the $\frac{1}{2}$ in the formula as meaning to section the triangle in halves. The student needs to focus on modeling area formulas for triangles by decomposing and rearranging their parts. |
| | Option D is incorrect | The student likely misidentified the $\frac{1}{2}$ in the formula as meaning to multiply by 2, or double, the height. The student needs to focus on modeling area formulas for triangles by decomposing and rearranging their parts. |

| Item # | | Rationale |
|---|---|---|
| 10 | Option A is correct | To determine which values are represented by the points on the number line, the student could have determined the least and greatest labels on the number line and then used the tick marks on the number line to determine the intervals (distance between the tick marks) used. The student could have determined that the least value shown is zero and the greatest value shown is 1. The student could have also determined that there are 10 tick marks following zero, so the interval for the number line is $\frac{1}{10}$. The student could have used the number line to count each tick mark to find that one point (the rightmost) is $\frac{6}{10}$ (6 tick marks past zero), which is equivalent to $\frac{3}{5}$. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly. |
| | Option E is correct | The other point (the leftmost) is $\frac{2}{10}$ (2 tick marks past zero), which is equivalent to 0.2. |
| | Option B is incorrect | The student likely determined that one point is 6 tick marks from zero but did not interpret the interval used for the number line correctly. The student needs to focus on representing benchmark fractions and percentages and multiples of those values using a number line. |
| | Option C is incorrect | The student likely determined that one point is 2 tick marks from zero but did not interpret the interval used for the number line correctly. The student needs to focus on representing benchmark fractions and percentages and multiples of those values using a number line. |
| | Option D is incorrect | The student likely determined that one point is 7 tick marks from zero. The student needs to focus on representing benchmark fractions and percentages and multiples of those values using a number line. |

| Item # | | Rationale |
|---|---|---|
| 11 | Option C is correct | To determine the value of the expression 35 − (−110) ÷ 5 • 2, the student should have first divided −110 by 5, resulting in −22. Then the student should have multiplied −22 by 2, resulting in −44. Finally, the student should have subtracted −44 from 35, resulting in 79: [35 − (−44) = 35 + 44 = 79]. |
| | Option A is incorrect | The student likely added −44 to 35 instead of subtracting in the last step, resulting in −9. The student needs to focus on adding and subtracting integers fluently. |
| | Option B is incorrect | The student likely multiplied 5 • 2, resulting in 10. The student then likely made a sign error in dividing −110 by 10 to get 11. Finally, the student likely added 35 + 11 to get 46. The student needs to focus on dividing integers fluently. |
| | Option D is incorrect | The student likely added 35 to −110, resulting in −75. The student then likely divided −75 by 5, resulting in −15. Finally, the student likely multiplied −15 by 2, resulting in −30. The student needs to focus on adding and subtracting integers fluently. |

| Item # | | Rationale |
|---|---|---|
| 12 | Option B is correct | To determine which description represents an equation, the student should have understood that the structure of the statement "A number minus ten is thirty-seven" can be represented as an equation. "A number" ($x$) "minus" (–) "ten" (10) could represent the left side of the equation, $x - 10$. The "is" represents equals (=). Therefore, the statement represents the equation $x - 10 = 37$. 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 confused an equation with an inequality. The phrase "is less than or equal to" means ≤, not =, which is needed in an equation. The student needs to focus on distinguishing between inequalities and equations verbally. |
| | Option C is incorrect | The student likely confused an equation with an expression. "Seven times a number minus sixty" represents only the expression $7x - 60$.<br>The student needs to focus on distinguishing between expressions and equations verbally. |
| | Option D is incorrect | The student likely confused an equation with an expression. "A number to the third power" represents only the expression $x^3$. The student needs to focus on distinguishing between expressions and equations verbally. |

| Item # | | Rationale |
|---|---|---|
| 13 | Option D is correct | To determine how many dogs at the dog show are small dogs, the student should have interpreted the ratio of the number of small dogs to the number of large dogs to mean that for every 3 small dogs, there were 4 large dogs at the dog show. This also implies that the ratio of the number of small dogs to the total number of dogs at the show is $3:(3+4) = 3:7$. The student could have set up the ratio as a fraction $\left(\frac{3}{7}\right)$. Then the student could have found an equivalent fraction based on the total number of dogs at the show being 63. To get from 7 to 63, the student could have determined that multiplying by 9 was necessary. Then the student could have multiplied 3 by 9 as well $\left(\frac{3 \text{ small dogs} \times 9}{7 \text{ total dogs} \times 9} = \frac{27 \text{ small dogs}}{63 \text{ total dogs}}\right)$. The student then should have understood that out of the 63 dogs at the show, there are 27 small dogs. 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 found the number of large dogs at the dog show $\left(\frac{4 \text{ large dogs} \times 9}{7 \text{ total dogs} \times 9} = \frac{36 \text{ large dogs}}{63 \text{ total dogs}}\right)$. The student needs to focus on understanding how to determine equivalent ratios. |
| | Option B is incorrect | The student likely divided 63 by 3; 63 ÷ 3 = 21. The student needs to focus on understanding how to determine equivalent ratios. |
| | Option C is incorrect | The student likely divided 63 by the sum of 4 and 3; 63 ÷ (4 + 3) = 63 ÷ 7 = 9. The student needs to focus on understanding how to determine equivalent ratios. |

| Item # | Rationale |
|--------|-----------|
| 14 | Plotted a point at (−0.5, −1) | To determine the location of a point in Quadrant III at a horizontal distance of $2\frac{1}{2}$ units from point *R*, the student should have started at point *R*, which has coordinates (two numbers usually written in parentheses, which can be used to show the position of a point on a coordinate grid, where the horizontal value, *x*, is first, and the vertical value, *y*, is second) of (2, −1). Quadrant III is to the left of point *R*. Moving a horizontal distance of $2\frac{1}{2}$ units to the left places the point at (−0.5, −1). |

| Item # | | Rationale |
|---|---|---|
| 15 | Option B is correct | To determine which equation represents the relationship between $g$, Gabriela's age, and $m$, her mother's age, the student should have identified $g$ as the independent variable (symbol used to represent an unknown number). The student should have also recognized that when each value of $g$, Gabriela's age, is added to a constant (number) of 27, the result is the corresponding (paired) value of $m$, her mother's age. The student then should have determined that the equation $m = g + 27$ represents this relationship and can be used to find all the values in the table ($30 = 3 + 27$; $32 = 5 + 27$; $36 = 9 + 27$; $37 = 10 + 27$). 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 the first row of the table as a direct proportion, representing the mother's age, $m$, as being 10 times greater than Gabriela's age, $g$. The student needs to focus on writing an equation that represents the relationship between all independent and dependent quantities from a table. |
| | Option C is incorrect | The student likely used the first entry in the table as a direct proportion, representing the mother's age, $m$, as being 3 times Gabriela's age, $g$. The student needs to focus on writing an equation that represents the relationship between independent and dependent quantities from a table. |
| | Option D is incorrect | The student likely did not recognize any relationship in the table. The student needs to focus on writing an equation that represents the relationship between independent and dependent quantities from a table. |

| Item # | | Rationale |
|---|---|---|
| 16 | Option D is correct | To determine which value is equivalent to the expression $5^2 - 6(4^2 - 10) - 3$, the student should have used the order of operations, or PEMDAS. The student should have completed the operations in this order: (1) operations contained in Parentheses or brackets, (2) Exponents (numbers raised to a power), (3) Multiplication/Division from left to right, and (4) Addition/Subtraction from left to right. The student should have begun by completing the operations contained in the parentheses: first the exponent, $4^2 = 16$, and then the subtraction, $16 - 10 = 6$, resulting in the expression $5^2 - 6(6) - 3$. Then the student should have determined that $5^2 = 25$, resulting in the expression $25 - 6(6) - 3$. Next, the student should have multiplied $6 \cdot 6 = 36$, resulting in the expression $25 - 36 - 3$. Finally, the student should have subtracted from left to right $25 - 36 = -11$; $-11 - 3 = -14$. |
| | Option A is incorrect | The student likely evaluated the expression by using exponents as factors and incorrectly simplifying $5^2$ to 10 and $4^2$ to 8, resulting in the expression $10 - 6(8 - 10) - 3$. Following the order of operations, the expression simplifies to $10 + 12 - 3$, resulting in the value of 19. The student needs to focus on generating equivalent numerical expressions using the order of operations, including whole number exponents. |
| | Option B is incorrect | The student likely evaluated the expression by first using exponents as factors, resulting in the expression $10 - 6(8 - 10) - 3$. Then the student likely simplified from left to right: $10 - 6 = 4$ and $8 - 10 = -2$, resulting in the expression $4(-2) - 3 = -11$. The student needs to focus on generating equivalent numerical expressions using the order of operations, including whole number exponents. |
| | Option C is incorrect | The student likely evaluated the expression by first correctly completing the computation in the parentheses and exponents to find 6, resulting in the expression $25 - 6(6) - 3$. Then the student likely incorrectly subtracted 3 from 6 before multiplying, resulting in the expression $25 - 6(3) = 7$. The student needs to focus on generating equivalent numerical expressions using the order of operations, including whole number exponents. |

| Item # | | Rationale |
|---|---|---|
| 17 | Option B is correct | To determine the solution to the inequality $9w < 108$, the student should have divided both sides of the given inequality by 9, resulting in $w < 12$. |
| | Option A is incorrect | The student likely divided 9 by 108 instead of dividing 108 by 9, and reversed the direction of the inequality symbol, using > instead of <. The student needs to focus on solving one-variable, one-step inequalities. |
| | Option C is incorrect | The student likely divided 9 by 108 instead of dividing 108 by 9. The student needs to focus on solving one-variable, one-step inequalities. |
| | Option D is incorrect | The student likely divided both sides of the given inequality by 9 but reversed the direction of the inequality symbol, using > instead of <. The student needs to focus on solving one-variable, one-step inequalities. |

| Item # | | Rationale |
|---|---|---|
| 18 | Belton, Bonham, Arlington, Athens, Cedar Creek | To determine how to order the names of the lakes by water level increase from greatest (largest) to least (smallest), the student could have changed the values in the list to the same form of a number, resulting in a list of either all decimals or all fractions. The value of $1\frac{1}{4}$ as a decimal is 1.25, the value of $2\frac{1}{2}$ as a decimal is 2.5, and the value of $\frac{3}{4}$ as a decimal is 0.75. The numbers written in decimal form are listed in order from greatest to least as 5.2, 2.5, 2.2, 1.25, and 0.75. The original numbers listed in order from greatest to least are 5.2, $2\frac{1}{2}$, 2.2, $1\frac{1}{4}$, and $\frac{3}{4}$. The names of the lakes in order from greatest to least are Belton, Bonham, Arlington, Athens, and Cedar Creek. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly. |

| Item # | | Rationale |
|---|---|---|
| 19 | Option C is correct | To determine which expression is represented by the model, the student could have identified that the number line shows 4 equal increments, where each increment represents +2, and that adding a value four times is the same as +2 • 4 or 2(4). The student could have also identified that the increments start at –8; therefore, the expression represented by the model is (–8) + 2(4). 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 confused the endpoint of the model (0) with the starting point of the model (–8) and made a sign error where each increment represents –2. Therefore, the student chose the expression –2(–4). The student needs to focus on representing integer operations with concrete models. |
| | Option B is incorrect | The student likely confused the endpoint with the starting point and chose the expression –2(4). The student needs to focus on representing integer operations with concrete models. |
| | Option D is incorrect | The student likely focused only on the starting point (–8) and the size of each increment, 2, but used –2 since the increments were all on the negative side of the number line. Therefore, the student chose the expression (–8) ÷ (–2). The student needs to focus on representing integer operations with concrete models. |

| Item # | | Rationale |
|---|---|---|
| 20 | Option A is correct | To determine which statement about debit cards and credit cards is NOT true, the student should have recalled that when a debit card is used for purchases, money is withdrawn directly from a bank account; that the total amount of money that can be spent on credit card purchases depends on a customer's credit limit; and that when a credit card is used, money is borrowed. The statement that is not true is that interest is charged on debit card purchases. Interest is charged only on credit card purchases. 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 confused a debit card with a credit card. It is true that when a debit card is used for purchases, money is withdrawn directly from a bank account. The student needs to focus on distinguishing between debit cards and credit cards. |
| | Option C is incorrect | The student likely confused a credit card with a debit card. It is true that the total amount of money that can be spent on credit card purchases depends on a customer's credit limit. The student needs to focus on distinguishing between debit cards and credit cards. |
| | Option D is incorrect | The student likely confused a credit card with a debit card. It is true that when a credit card is used, money is borrowed. The student needs to focus on distinguishing between debit cards and credit cards. |

2023 STAAR Grade 6 Math Rationales

| Item # | | Rationale |
|---|---|---|
| 21 | Less Than 25, Greater Than 25, Greater Than 25, Less Than 25 | To determine whether the value of each expression is greater than 25 or less than 25, the student should notice that 25 is being multiplied by different fractions. Some of the fractions $\left(\frac{15}{7} \text{ and } \frac{98}{25}\right)$ are greater than 1, and some of the fractions $\left(\frac{12}{13} \text{ and } \frac{100}{181}\right)$ are less than 1. The student should have understood that when a whole number is multiplied by a fraction that is greater than 1, the product is greater than the whole number, and that when a whole number is multiplied by a fraction that is less than 1, the product is less than the whole number. Therefore, $25 \cdot \frac{15}{7}$ and $25 \cdot \frac{98}{25}$ are both greater than 25, and $25 \cdot \frac{12}{13}$ and $25 \cdot \frac{100}{181}$ are both less than 25. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly. |

| Item # | | Rationale |
|---|---|---|
| 22 | Option B is correct | To determine which point best represents a location that is $3\frac{1}{2}$ units away from point *Z*, the student should have first determined point *Z*, the point that is $3\frac{1}{2}$ units to the left of the origin (point where the *x*-axis [horizontal] and the *y*-axis [vertical] on a coordinate grid intersect, which is represented by the ordered pair (0, 0)) and 3 units above the origin. Then the student should have determined that point *R* is located $3\frac{1}{2}$ units down from point *Z*. |
| | Option A is incorrect | The student likely chose a point that is $2\frac{1}{2}$ units away from point *Z*, not $3\frac{1}{2}$ units away. The student needs to focus on graphing points in all four quadrants using ordered pairs of rational numbers. |
| | Option C is incorrect | The student likely chose a point that is $4\frac{1}{2}$ units away from point *Z*, not $3\frac{1}{2}$ units away. The student needs to focus on graphing points in all four quadrants using ordered pairs of rational numbers. |
| | Option D is incorrect | The student likely chose a point that is 3 units away from point *Z*, not $3\frac{1}{2}$ units away. The student needs to focus on graphing points in all four quadrants using ordered pairs of rational numbers. |

| Item # | | Rationale |
|---|---|---|
| 23 | Option A is correct | To determine which equation is true when $y = \frac{6}{5}$, the student should have substituted the value of $\frac{6}{5}$ for $y$ in the equation $y + \frac{4}{5} = 2$ and determined that $\frac{6}{5} + \frac{4}{5} = \frac{10}{5} = 2$. 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 substituted the value of $1\frac{1}{6}$ for $\frac{6}{5}$, instead of $1\frac{1}{5}$, for $y$ in the equation $1\frac{1}{6} - y = 0$. The student needs to focus on determining whether a given value makes one-variable, one-step equations true. |
| | Option C is incorrect | The student likely calculated $\frac{(8-2)}{5}$, using values from the equation $0.2 + y = \frac{8}{5}$. The student needs to focus on determining whether a given value makes one-variable, one-step equations true. |
| | Option D is incorrect | The student likely added instead of multiplying and substituted the value of $1\frac{1}{6}$ in for $\frac{6}{5}$, instead of $1\frac{1}{5}$, for $y$ in the equation $\frac{5}{6}y = 2$. The student needs to focus on determining whether a given value makes one-variable, one-step equations true. |

| Item # | | Rationale |
|---|---|---|
| 24 | Option B is correct | To determine which group of three side lengths in centimeters can form a triangle when the side lengths are attached at the endpoints, the student should have determined that the combined length of the two shortest sides must be greater than the length of the longest side. Since 7 + 5 = 12 and 12 > 11, the side lengths 7, 11, 5 can form a triangle. 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 6 + 14 > 8 but did not recognize that 6 + 8 is equal to 14, not greater than 14. The student needs to focus on extending previous knowledge of triangles and their properties, including determining when three lengths form a triangle. |
| | Option C is incorrect | The student likely recognized that 9 + 20 > 9 but did not recognize that 9 + 9 is less than, not greater than, 20. The student needs to focus on extending previous knowledge of triangles and their properties, including determining when three lengths form a triangle. |
| | Option D is incorrect | The student likely recognized that 4 + 15 > 10 but did not recognize that 4 + 10 is less than, not greater than, 15. The student needs to focus on extending previous knowledge of triangles and their properties, including determining when three lengths form a triangle. |

| Item # | | Rationale |
|---|---|---|
| 25 | Both triangles (top left and bottom center) and the 5.1-inch by 2-inch rectangle (middle left) | To determine which THREE shapes have equal areas, the student should have first recognized that there are 2 triangles and 3 rectangles. To determine the area of each shape, the student should have substituted the given values into the formula for the area of a triangle or for the area of a rectangle from the Area section in the STAAR Grade 6 Mathematics Reference Materials. The formula for the triangles is $A = \frac{1}{2}bh$, where *A* represents the area, *b* represents the base, and *h* represents the height (vertical distance from top to bottom). For the triangle in the top left, substituting *b* = 3.4 inches (in.) and *h* = 6 in., the student should have multiplied 3.4 and 6 and then multiplied by $\frac{1}{2}$, resulting in 10.2 square inches. For the triangle at the bottom, substituting *b* = 12 in. and *h* = 1.7 in., the student should have multiplied 12 and 1.7 and then multiplied by $\frac{1}{2}$, also resulting in 10.2 square inches. The formula for the area of a rectangle is *A* = *bh*, where *A* represents the area, *b* represents the base, and *h* represents the height. Substituting *b* = 2 in. and *h* = 5.1 in. for the rectangle in the middle left, the student should have multiplied 2 and 5.1, resulting in 10.2 square inches. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly. |

| Item # | | Rationale |
|---|---|---|
| 26 | Option D is correct | To determine the total number of points scored by Nathan in his 4 throws, the student should have added the four values in the second column of the table together. The sum (answer to an addition problem) would be the total number of points. The student could have recognized that –1 and 1 are additive inverses (numbers that sum to 0), so only 2 and –4 need to be added. The sum of 2 and –4 is –2; therefore, "None of these" is correct. 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 2 – 4 as –6 and calculated the remaining portion correctly. The student needs to focus on adding and subtracting integers fluently. |
| | Option B is incorrect | The student likely subtracted the last entry instead of adding. The student needs to focus on adding and subtracting integers fluently. |
| | Option C is incorrect | The student likely simplified 2 – 4 – 1 + 1 incorrectly as 2 – 1 + 1. The student needs to focus on adding and subtracting integers fluently. |

| Item # | | Rationale |
|---|---|---|
| 27 | 151–200: 4 bowlers, 201–250: 5 bowlers, 251–300: 3 bowlers | To determine how to complete the histogram to represent the bowling scores, the student should have categorized the values by the ranges shown in the histogram (scores of 151–200, 201–250, and 251–300). The student should have noted that there were four values from the table in the 151–200 category, five values in the 201–250 category, and three values in the 251–300 category. The student then should have selected a height for the bar that represents the number of values in each of the categories. |

| Item # | | Rationale |
|---|---|---|
| 28 | Option A is correct | To determine how many students can perform the experiment, the student should have divided 18 by $\frac{2}{3}$: $\frac{18}{\left(\frac{2}{3}\right)} = 18 \cdot \left(\frac{3}{2}\right) = 27$. 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 multiplied 18 by $\frac{2}{3}$ instead of dividing: $18 \cdot \left(\frac{2}{3}\right) = 12$. The student needs to focus on multiplying and dividing positive rational numbers fluently. |
| | Option C is incorrect | The student likely divided 18 by $\frac{1}{3}$ instead of by $\frac{2}{3}$: $\frac{18}{\left(\frac{1}{3}\right)} = 18 \cdot \left(\frac{3}{1}\right) = 54$. The student needs to focus on multiplying and dividing positive rational numbers fluently. |
| | Option D is incorrect | The student likely added the 2 and 3 together to find a sum of 5 and then added it to 18: 2 + 3 = 5; 18 + 5 = 23. The student needs to focus on multiplying and dividing positive rational numbers fluently. |

| Item # | | Rationale |
|---|---|---|
| 29 | 5, 25, 25, 5 | To determine the value of each number, the student should determine the absolute value (positive distance from zero on the number line) of each number. The student should then have determined that $|5| = 5$ because 5 is 5 units from zero. Similarly, the student should have determined that $|-25| = 25$, $|25| = 25$, and $|-5| = 5$. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly. |

| Item # | | Rationale |
|---|---|---|
| 30 | Option A is correct | To determine what percentage of the 50-acre farm has crops growing on it, the student should have divided the number of acres with crops (29) by the total number of acres on the farm (50), resulting in 0.58. Then the student should have converted the decimal to a percentage by multiplying by 100: 0.58 • 100 = 58%. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly. |
| | Option B is incorrect | The student likely chose the number of acres with crops. The student needs to focus on solving real-world problems to find the percentage given the part and the whole, including the use of concrete and pictorial models. |
| | Option C is incorrect | The student likely counted 10 for each of the first 5 shaded columns in the model and 4 for the last. The student needs to focus on solving real-world problems to find the percentage given the part and the whole, including the use of concrete and pictorial models. |
| | Option D is incorrect | The student likely found the percentage of the total acres without crops, instead of with crops. The student needs to focus on solving real-world problems to find the percentage given the part and the whole, including the use of concrete and pictorial models. |

| Item # | | Rationale |
|---|---|---|
| 31 | Option D is correct | To determine which expression is equivalent to $(3p + 2) \bullet 7$, the student should have applied the distributive property, $a(b + c) = ab + ac$, multiplying 7 by each term within the parentheses, resulting in $(3p + 2) \bullet 7 = (3p)(7) + (2)(7) = 21p + 14$. |
| | Option A is incorrect | The student likely added the constant terms instead of multiplying and did not distribute the 7 to the $3p$, the first term in the parentheses. The student needs to focus on generating equivalent expressions using the distributive property. |
| | Option B is incorrect | The student likely distributed 7 to 2: $(7 \bullet 2 = 14)$ but did not distribute 7 to $3p$. The student needs to focus on generating equivalent expressions using the distributive property. |
| | Option C is incorrect | The student likely distributed 7 to $3p$: $(7 \bullet 3p = 21p)$ but did not distribute 7 to 2. The student needs to focus on generating equivalent expressions using the distributive property. |

| Item # | | Rationale |
|---|---|---|
| 32 | 36, 72 | To determine how to complete the table to show the relationship between the number of limes sold and the number of lemons sold, the student could have solved a proportion using the given ratio of 2:3. To determine how many lemons were sold when 24 limes were sold, the student could have used $\frac{2}{3} = \frac{24}{x}$ and found that 36 lemons would be sold. To determine how many limes were sold when 108 lemons were sold, the student could have used $\frac{2}{3} = \frac{y}{108}$ and found that 72 limes would be sold. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly. |

| Item # | | Rationale |
|---|---|---|
| 33 | Option D is correct | To determine which value is equivalent to 5%, the student could have interpreted the % symbol as the word "percent," which means "per hundred," and then converted 5% to a fraction by dividing 5 by 100, resulting in $5\% = \frac{5}{100} = \frac{1}{20}$. 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 misinterpreted 5% as $\frac{5}{10}$ instead of $\frac{5}{100}$. The student needs to focus on generating equivalent forms of fractions, decimals, and percentages using real-world problems, including problems that involve money. |
| | Option B is incorrect | The student likely misinterpreted 5% as $\frac{1}{5}$ instead of $\frac{5}{100}$. The student needs to focus on generating equivalent forms of fractions, decimals, and percentages using real-world problems, including problems that involve money. |
| | Option C is incorrect | The student likely divided 100% by 5% (100 ÷ 5 = 20) and then divided 20 by 100 and interpreted the result as a decimal. The student needs to focus on generating equivalent forms of fractions, decimals, and percentages using real-world problems, including problems that involve money. |

| Item # | | Rationale |
|---|---|---|
| 34 | Option A is correct | To determine the median number of heartbeats per minute for the data in the list, the student should have recognized that the median (middle number in a set of numbers that is ordered by value) of a set of data with an even number of values is the mean (average) of the middle two numbers. The 12 numbers in order are: 70, 72, 73, 75, 75, 80, 81, 82, 82, 82, 84, and 86. The student should have found the sum of the two middle numbers (80 + 81 = 161). The student should then have divided 161 by 2, resulting in 80.5. |
| | Option B is incorrect | The student likely determined the mean (average of a set of numbers, found by adding the numbers in the set and dividing the sum [total] by how many numbers are in the set) of the entire data set. The 12 numbers sum to 942, and 942 ÷ 12 = 78.5. The student needs to focus on summarizing numeric data with numerical summaries, including the mean, the median, and the range. |
| | Option C is incorrect | The student likely determined the range (least [lowest] value in a set of numbers subtracted from the greatest [highest] value in the set) of the data. The greatest value in the data set is 86, and the least value in the data set is 70, so the range of the data is represented by 86 − 70 = 16. The student needs to focus on summarizing numeric data with numerical summaries, including the mean, the median, and the range. |
| | Option D is incorrect | The student likely determined the mode (value in a set of numbers that repeats most often) of the data. The student needs to focus on summarizing numeric data with numerical summaries, including the mean, the median, and the range. |

| Item # | Rationale | |
|---|---|---|
| 35 | Option C is correct | To determine the value of $k$, the number of degrees in each section of the clock, the student should have solved $12k = 360$ by dividing each side of the equation by 12, resulting in 30. |
| | Option A is incorrect | The student likely used the number of sections, 12, as the degree measure. The student needs to focus on modeling and solving one-variable, one-step equations that represent geometric concepts. |
| | Option B is incorrect | The student likely solved $k + 12 = 360$, resulting in 348, and ignored the 300. The student needs to focus on modeling and solving one-variable, one-step equations that represent geometric concepts. |
| | Option D is incorrect | The student likely solved $k - 12 = 360$, resulting in 372, and ignored the 300. The student needs to focus on modeling and solving one-variable, one-step equations that represent geometric concepts. |

| Item # | | Rationale |
|---|---|---|
| 36 | Option A is correct | To determine which statement is true based on the stem and leaf plot, the student should have identified that there are a total of 14 roller coaster riders between 10 and 38 years of age and a total of only 10 roller coaster riders between 42 and 74 years of age (14 > 10). 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 did not identify 21 as the age that occurs most and instead identified that 4 occurs most of any leaf and that 1 is the first stem. The student needs to focus on interpreting numeric data summarized in stem and leaf plots. |
| | Option C is incorrect | The student likely counted 24 leaves and 7 stems to arrive at 31 riders on the roller coaster. The student needs to focus on interpreting numeric data summarized in stem and leaf plots. |
| | Option D is incorrect | The student likely counted only the 3 riders in the 6-leaf and 7-leaf, omitting 3 roller coaster riders in the 5-leaf who were over 50 years old. The student needs to focus on interpreting numeric data summarized in stem and leaf plots. |