Item #	Rationale	
1	Option D is correct	To determine which shapes appear to have only one line of symmetry (an imaginary line that divides a figure into halves that are reflections of each other), the student should have visualized the different ways to draw a line through each figure to create two shapes that are mirror images of each other. Shape J and Shape L each have only 1 line of symmetry, while Shape K has 4 lines of symmetry.
	Option A is incorrect	The student likely chose Shape K (square) based on the presence of vertical lines and confused vertical lines with lines of symmetry. The student needs to focus on attending to the details of the question being asked in a problem.
	Option B is incorrect	The student likely thought only quadrilaterals (figures with 4 sides) could have one line of symmetry. The student needs to focus on identifying lines of symmetry, if they exist, for all two-dimensional figures.
	Option C is incorrect	The student likely thought only triangles (figures with 3 sides) could have one line of symmetry. The student needs to focus on identifying lines of symmetry, if they exist, for all two-dimensional figures.

Item #	Rationale	
2	Option C is correct	To determine which number fits the three clues, the student should have evaluated each of the clues: 8 × 0.01 = 0.08, 5 × 10 = 50, and 3 × 1,000 = 3,000. Given these values, the student should have realized that in the number 3,652.48, the 8 is in the hundredths place (3,652.48), the 5 is in the tens place (3,652.48), and the 3 is in the thousands place (3,652.48). Since the conditions of the problem were met, the student should have chosen 3,652.48.
	Option A is incorrect	The student likely confused the tenths place with the hundredths place. The student needs to focus on understanding the place values of digits in a number.
	Option B is incorrect	The student likely confused the hundredths place with the hundreds place, and the tens place with the hundredths place. The student needs to focus on understanding the place values of digits in a number.
	Option D is incorrect	The student likely confused the thousands place with the hundred thousands place. The student needs to focus on understanding the place values of digits in a number.

Item #	Rationale	
3	Option D is correct	To determine the total length of the 24 train tracks, the student should have realized that the number of tracks (24) could be multiplied by the length in centimeters of each track (15), resulting in 24 × 15 = 360. 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 considered the word “total” to indicate only the operation of addition and, therefore, added 24 + 15 = 39 instead of multiplying. The student needs to focus on understanding the mathematical operations (+, −, ×, ÷) needed to represent the solution to a real-life word problem.
	Option B is incorrect	The student likely forgot to regroup when multiplying 24 × 5 to get 100, and then multiplied 24 × 1 to get 24 and added 100 + 24 = 124. The student needs to focus on accurately multiplying two-digit by two-digit numbers.
	Option C is incorrect	The student likely found the product of 4 and 15 as 40 instead of 60 and the product of 20 and 15 as 200 instead of 300. The student needs to focus on accurately multiplying two-digit by two-digit numbers.

Item #	Rationale	
4	Option A is correct	To determine whether a statement is true about the number, the student should have compared the values of the digits in 2,222. The student should have found that the digit in the thousands place has a value of (2 × 1,000 = 2,000), the digit in the hundreds place has a value of (2 × 100 = 200), the digit in the tens place has a value of (2 × 10 = 20), and the digit in the ones place has a value of (2 × 1 = 2). The digit in the hundreds place represents 200, and the digit in the tens place represents 20; 20 is $\frac{1}{10}$ as much as 200.
	Option C is correct	To determine whether a statement is true about the number, the student should have compared the values of the digits in 2,222. The student should have found that the digit in the thousands place has a value of (2 × 1,000 = 2,000), the digit in the hundreds place has a value of (2 × 100 = 200), the digit in the tens place has a value of (2 × 10 = 20), and the digit in the ones place has a value of (2 × 1 = 2). The digit in the hundreds place represents 200, and the digit in the thousands place represents 2,000; 2,000 is ten times 200.
	Option B is incorrect	The student likely understood the relationship between the hundreds and thousands places but reversed the relationship. The student needs to focus on understanding that the value of each place-value position is 10 times the value of the position to the right and $\frac{1}{10}$ the value of the position to the left.
	Option D is incorrect	The student likely understood the relationship between the hundreds and the tens places but reversed the relationship. The student needs to focus on understanding that the value of each place-value position is 10 times the value of the position to the right and $\frac{1}{10}$ the value of the position to the left.
	Option E is incorrect	The student likely understood the relationship between the ones and the tens place but reversed the relationship. The student needs to focus on understanding that the value of each place-value position is 10 times the value of the position to the right and $\frac{1}{10}$ the value of the position to the left.

Item #	Rationale	
5	Option C is correct	To determine the set of equations that can be used to find *r*, the number of roses the shop got on Monday, the student should have first identified a set of equations where the number of roses decreased by 128, since that many roses were sold Saturday. This decrease is expressed by the equation 242 – 128 = 114. Then the student should have recognized that the shop now has 150 after it received more roses on Monday, meaning that the number of roses, *r*, that the shop received on Monday would be the difference between the number of roses it has now and the number of roses it had after selling some roses on Saturday. This difference is expressed by the equation 150 – 114 = *r*.
	Option A is incorrect	The student likely added the number of roses the shop has now and the number of roses it had after selling some roses on Saturday, as expressed by the equation 150 + 114 = *r*. The student needs to focus on attending to the details in the problem and identifying the correct mathematical operations (+, −, ×, ÷) needed to represent the solution to a multistep problem using equations.
	Option B is incorrect	The student likely subtracted 150 from 242 instead of subtracting 128 from 242. The student needs to focus on attending to the details in the problem and identifying the correct mathematical operations (+, −, ×, ÷) needed to represent the solution to a multistep problem using equations.
	Option D is incorrect	The student likely added 242 and 128 instead of subtracting 128 from 242. The student needs to focus on attending to the details in the problem and identifying the correct mathematical operations (+, −, ×, ÷) needed to represent the solution to a multistep problem using equations.

Item #	Rationale	
6	Option A is correct	To determine how much lemonade the school has left over in gallons and quarts, the student could have regrouped 30 gallons to 29 gallons and 4 quarts. The student then could have subtracted 24 gallons from the initial 29 gallons (29 – 24 = 5 gallons) and then subtracted 1 quart from 4 quarts (4 – 1 = 3 quarts). There is 5 gallons 3 quarts of lemonade remaining. 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 the gallons without regrouping from the quarts. The student needs to focus on identifying relative sizes of measurement units within customary and metric systems. The student also needs to focus on understanding when to regroup in subtraction problems.
	Option C is incorrect	The student likely added the quantities instead of subtracting. The student needs to focus on identifying relative sizes of measurement units within customary and metric systems. The student also needs to focus on attending to the details of the question.
	Option D is incorrect	The student likely forgot to include the 4 quarts when regrouping the 30 gallons to 29 gallons and 4 quarts and used the 1 quart from the problem. The student needs to focus on identifying relative sizes of measurement units within customary and metric systems. The student also needs to focus on attending to the details of the question.

Item #	Rationale	
7	Option D is correct	To determine which rule shows how to find the value when given the position, the student should have considered the relationship between each position and each value listed in the table. Since each output value is 0.5 greater than its input value, the expression involves adding 0.5 to the position number (1 + 0.5 = 1.5; 2 + 0.5 = 2.5; 3 + 0.5 = 3.5; 4 + 0.5 = 4.5). The student should have chosen the rule + 0.5.
	Option A is incorrect	The student likely focused only on the first row of the table, recognizing that the first output value in the table is 1.5. The student did not check to see whether this relationship was true for the other positions and values in the table. The student needs to focus on understanding that the relationship between the position of a number in a pattern and its value must be true for all the numbers in the pattern.
	Option B is incorrect	The student likely focused only on the first row of the table and chose a rule that only works for the first row of the table and disregarded place value when adding (added 1.4 + 1 to get 1.5). The student did not check to see whether this relationship was true for the other positions and values in the table. The student needs to focus on understanding that the relationship between the position of a number in a pattern and its value must be true for all the numbers in the pattern.
	Option C is incorrect	The student likely understood that the value was increasing but misrepresented 0.5 as 0.05. The student needs to focus on using place value to compare and order numbers.

Item #	Rationale	
8	Option A is correct	To determine which fractions are less than the fraction represented in the model shown, the student could have first identified that the model shows 8 shaded squares out of a total of 10 squares, which is represented by the fraction $\frac{8}{10}$. Since the fractions $\frac{8}{10}$ and $\frac{3}{5}$ have denominators (bottom numbers) of 5 and 10, the student could have recognized that a common denominator for the fractions could be 10, since 5 × 2 = 10 and 10 × 1 = 10. The student then could have written the fraction $\frac{3}{5}$ in its equivalent form based on the common denominator of 10, resulting in $\frac{3\times2}{5\times2} = \frac{6}{10}$. The student then could have compared the numerators (top numbers) of the two fractions. Since 6 is less than 8, $\frac{6}{10} < \frac{8}{10}$, which is equivalent to $\frac{3}{5} < \frac{8}{10}$. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.
	Option D is correct	To determine which fractions are less than the fraction represented in the model shown, the student could have first identified that the model shows 8 shaded squares out of a total of 10 squares, which is represented by the fraction $\frac{8}{10}$. Since the fractions $\frac{8}{10}$ and $\frac{7}{10}$ have the same denominator (bottom numbers), the student could have compared the numerators of the two fractions. Since 7 is less than 8, $\frac{7}{10} < \frac{8}{10}$. 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 selected a value greater than $\frac{8}{10}$ instead of less than $\frac{8}{10}$. The student needs to focus on understanding how to compare fractions with the same denominator.
	Option C is incorrect	The student likely compared the numerators of the two fractions without finding a common denominator first. The student needs to focus on understanding how to compare fractions with different numerators and denominators.
	Option E is incorrect	The student likely selected a value greater than $\frac{8}{10}$ instead of less than $\frac{8}{10}$. The student needs to focus on understanding how to compare fractions with the same denominator.

Item #	Rationale	
9	Option C is correct	To determine which type of shape can have exactly 1 pair of parallel sides and no right angles, the student could have compared the figures. A hexagon has more than one pair of parallel lines and no right angles; a parallelogram has two pairs of parallel lines and may have right angles; a trapezoid has exactly one pair of parallel lines and may have no right angles; a rhombus has two pairs of parallel sides and no right angles. A trapezoid is the only shape on the list that can have exactly 1 pair of parallel sides and no right angles.
	Option A is incorrect	The student likely identified a shape that meets only one of the listed attributes. Hexagons may have more than one set of parallel lines. The student needs to focus on understanding the attributes of two-dimensional figures.
	Option B is incorrect	The student likely identified a shape that does not match the attributes on the list. Parallelograms have two pairs of parallel lines and may have right angles. The student needs to focus on understanding the attributes of two-dimensional figures.
	Option D is incorrect	The student likely confused a rhombus with a trapezoid. A rhombus has two pairs of parallel sides and may have right angles. The student needs to focus on understanding the attributes of two-dimensional figures.

Item #	Rationale	
10	Option C is correct	To determine which stem and leaf plot (a stem and leaf plot displays the data with each number split into a stem [the first digit or digits of the number] and a leaf [the last digit of the number]) correctly adds a kick of 42 yards to the data, the student could have written the data in order from least to greatest and systematically checked each data point until identifying the data point that would complete the stem and leaf plot. The student should have recognized that the given stem and leaf plot already has a 42, since 4|2 means 42, and that the stem and leaf plot needs an additional 42. This answer choice is the only stem and leaf plot showing two 42s. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.
	Option A is incorrect	The student likely chose a stem and leaf plot where 24 was added instead of 42. The student needs to focus on representing data in stem and leaf plots.
	Option B is incorrect	The student likely chose a stem and leaf plot where 42 was removed instead of added. The student needs to focus on representing data in stem and leaf plots.
	Option D is incorrect	The student likely chose a stem and leaf plot where 24 was removed instead of one where 42 was added. The student needs to focus on representing data in stem and leaf plots.

Item #	Rationale	
11	Option A is correct	To determine the area of (amount of space covered by) a square that has a perimeter of 36 meters, the student first should have used the formula for the perimeter of a square from the perimeter section of the STAAR Grade 4 Mathematics Reference Materials page within the student's test booklet ($P = 4s$, where P = perimeter and s = side length). The student should have solved $36 = 4s$ to determine the value of one side length ($36 \div 4 = 9$ meters). Next, the student should have used the formula for the area of a square ($A = s \times s$, where A = area and s = side length). Since all sides of a square are equal, the student should have calculated the area as 9×9, resulting in 81 square meters.
	Option B is incorrect	The student likely divided 36 by 4 and then multiplied the result by 2, resulting in 18. The student needs to focus on understanding that the area of a square is determined by multiplying the side length of the square by itself.
	Option C is incorrect	The student likely confused area and perimeter and first divided 36 by 2, and then multiplied the result by 4, representing the 4 sides needed to find the perimeter ($36 \div 2 = 18$; $18 \times 4 = 72$). The student needs to focus on understanding the difference between area and perimeter calculations and when to use each to solve problems.
	Option D is incorrect	The student likely confused area and perimeter. The student likely thought the side length was 36 and multiplied 36 by 4, resulting in 144. The student needs to focus on understanding the difference between area and perimeter calculations and when to use each to solve problems.

Item #	Rationale	
12	625 ÷ 5 = 125	To determine an equation that could be used to show how many apples are in each container, the student should have concluded that the total amount of apples (625) should be divided by the number of containers (5), resulting in 625 ÷ 5 = 125.

Item #	Rationale	
13	79, 4, 100	To determine a mixed number that is equivalent to the decimal 79.04, the student should have kept the whole number, 79, and then used place value to write .04 as a fraction. Because the 4 is in the hundredths place, the student should have rewritten .04 as $\frac{4}{100}$ to make $79\frac{4}{100}$.

Item #	Rationale	
14	Option A is correct	To determine how many people went to football games in the stadium in October, the student should have determined that fewer people went to the stadium in October than in November. By determining this, the student could have realized that a subtraction problem needed to be solved to find the difference between 92,721 and 14,629. The equation 92,721 – 14,629 = 78,092 represents this difference. 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 set up the correct subtraction problem but, instead of regrouping as necessary, subtracted the smaller digit in each place value from the larger digit. The student needs to focus on accurately subtracting whole numbers using the standard algorithm.
	Option C is incorrect	The student likely found the total number of people who went to football games in both months instead of finding the difference, resulting in 92,721 + 14,629 = 107,350. The student needs to focus on attending to the details of the information presented in the problem and the question being asked.
	Option D is incorrect	The student likely found the total number of people who went to football games in both months instead of finding the difference but did not regroup when adding. The student needs to focus on attending to the details of the information presented in the problem and the question being asked.

Item #	Rationale	
15	Option D is correct	To determine the equation that shows two different ways to represent the mixed number as a sum, the student should have determined that the model represents the fraction of $\frac{7}{5}$ or $1\frac{2}{5}$. Each side of the equation should show a different way to represent $\frac{7}{5}$ or $1\frac{2}{5}$. Because the denominators (bottom numbers) of the fractions are all 5, the student should have added the numerators (top numbers) to find the total on each side of the equation. The student should have calculated that $\frac{5}{5} + \frac{2}{5} = \frac{7}{5}$ and $\frac{4}{5} + \frac{3}{5} = \frac{7}{5}$.
	Option A is incorrect	The student likely chose the equation that shows the top portion of the fraction model represented on the left $\left(\frac{2}{5} + \frac{3}{5}\right)$ and the bottom portion of the fraction model represented on the right $\left(\frac{1}{5} + \frac{1}{5}\right)$. The student needs to focus on understanding how to decompose (break down) a fraction in different ways.
	Option B is incorrect	The student likely chose the equation that shows the mixed number represented on the left $\left(\frac{7}{5}\right)$ and only the top portion of the fraction model represented on the right $\left(\frac{5}{5}\right)$. The student needs to focus on understanding how to decompose (break down) a fraction in different ways.
	Option C is incorrect	The student likely chose the equation that represents only the top portion of the fraction model $\left(\frac{5}{5}\right)$. The student needs to focus on understanding how to decompose (break down) a fraction in different ways.

Item #	Rationale	
16	Option B is correct	To determine a reasonable estimate of the total amount of ham and turkey Johann bought, the student should have used benchmark (commonly known) fractions to estimate the value of $\frac{3}{16}$ as $\frac{1}{4}$ and the value of $\frac{7}{16}$ as $\frac{1}{2}$. Since the sum of $\frac{1}{4}$ and $\frac{1}{2}$ is close to $\frac{3}{4}$, the student should have estimated that the total amount of ham and turkey is about $\frac{3}{4}$ lb.
	Option A is incorrect	The student likely added the numerators and the denominators, resulting in $\frac{3+7}{16+16} = \frac{10}{32}$. The student then likely simplified $\frac{10}{32}$ to $\frac{5}{16}$ by dividing both the numerator and the denominator by 2. The student could have then compared $\frac{5}{16}$ to the benchmark fraction $\frac{1}{4}$, determining that $\frac{5}{16}$ is very close to $\frac{1}{4}$. The student needs to focus on attending to the details of problems that involve using benchmark fractions such as $\frac{1}{4}$ and $\frac{1}{2}$ to estimate sums.
	Option C is incorrect	The student likely added the two fractions $\left(\frac{3}{16} + \frac{7}{16} = \frac{10}{16}\right)$ and estimated that the sum was between $\frac{3}{4}$ and 1. The student needs to focus on attending to the details of problems that involve using benchmark fractions such as $\frac{1}{4}$ and $\frac{1}{2}$ to estimate sums.
	Option D is incorrect	The student likely compared the value of $\frac{3}{16}$ to $\frac{1}{4}$ and the value of $\frac{7}{16}$ to $\frac{1}{2}$ instead of finding the total of the estimates. The student needs to focus on attending to the details of problems that involve using benchmark fractions such as $\frac{1}{4}$ and $\frac{1}{2}$ to estimate sums.

Item #	Rationale	
17	Option B is correct	To determine which number has a 2 with a value of 2 × 0.1, the student should have evaluated 2 × 0.1 = 0.2. The student then could have identified the value with the digit 2 in the tenths place (the first digit to the right of the decimal point). The number “forty-one and two tenths,” written as 41.2, has the digit 2 in the tenths place, with a value equivalent to 2 × 0.1 = 0.2.
	Option E is correct	To determine which number has a 2 with a value of 2 × 0.1, the student should have evaluated 2 × 0.1 = 0.2. The student then could have identified the value with the digit 2 in the tenths place. The number 10.26 has the digit 2 in the tenths place, with a value equivalent to 2 × 0.1 = 0.2.
	Option A is incorrect	The student likely confused the tenths place and the hundredths place (the second digit to the right of the decimal point). The student needs to focus on understanding the positions of digits to the left and right of the decimal point.
	Option C is incorrect	The student likely multiplied 2 × 1 = 2 and then added the 0.1 to that value (2 + 0.1 = 2.1). The student needs to focus on representing the value of each digit in a number.
	Option D is incorrect	The student likely multiplied 2 × 1 = 2 instead of multiplying by 0.1. The student needs to focus on representing the value of each digit in a number.

Item #	Rationale	
18	Option B is correct	To determine which strip diagram shows a way to find *c*, the cost in dollars of each child ticket, the student should have first recognized that the total cost, \$44, is represented by the entire length of the strip in the diagram. Next, since the total cost of 2 adult tickets is \$20, the student should have realized that one box of 20 represents the cost of the adult tickets. Finally, the student should have realized that there should be 3 boxes with *c* inside to represent the three child tickets.
	Option A is incorrect	The student likely confused the number of child tickets, 3, with the number of adult tickets, 2. The student needs to focus on understanding how to use a strip diagram to represent a multistep problem involving the four operations (+, −, ×, ÷). The student also needs to focus on attending to the details of the question.
	Option C is incorrect	The student likely thought each adult ticket cost \$20 and also confused the number of child tickets, 3, with the number of adult tickets, 2. The student needs to focus on understanding how to use a strip diagram to represent a multistep problem involving the four operations (+, −, ×, ÷). The student also needs to focus on attending to the details of the question.
	Option D is incorrect	The student likely thought \$20 was the cost of one adult ticket. The student needs to focus on attending to the details of the question.

Item #	Rationale	
19	Option A is correct	To determine the true statement about Adam’s expenses, the student should have first decided whether each expense was a fixed expense (the same amount each month) or a variable expense (changing from month to month). The student should have determined that the school lunch expense was fixed, because Adam paid the same amount each month, and that book fair expense was variable, because he paid a different amount each month.
	Option B is incorrect	The student likely thought the book fair expense was fixed because the list contains a repeated value. The student needs to focus on analyzing information presented in a problem to distinguish between fixed and variable expenses.
	Option C is incorrect	The student likely considered that because each row of Adam’s expenses had different values, the term to use to describe the expenses was “variable.” The student needs to focus on analyzing information presented in a problem to distinguish between fixed and variable expenses.
	Option D is incorrect	The student likely confused the definitions of fixed expense and variable expense. The student needs to focus on analyzing information presented in a problem to distinguish between fixed and variable expenses.

Item #	Rationale	
20	20, 10, 5	To determine which numbers complete the area model (model representing the amount of space covered) that represents 23 × 15 = 345, the student should have first decomposed (broken apart) each of the factors, resulting in 23 = 20 + 3 and 15 = 10 + 5. The student should have interpreted each shape in the model to represent a multiplication problem, leading to the total of 345 square units. The area of each large square is 100 square units because the area is found by multiplying the side lengths (10 × 10). The area of each bar is 10 square units because the area is found by multiplying the side lengths (10 × 1). The area of each small square is 1 square unit because the area is found by multiplying the side lengths (1 × 1). Since there are two large squares, the student should have recognized that the total horizontal length of the large squares is 10 + 10 = 20 units and the total vertical length of the large square is 10 units. Since there are fifteen small squares, the student should have recognized that the total horizontal length of the small squares is 1 + 1 + 1 = 3 (as shown in the model), and the total vertical length of the small squares is 1 + 1 + 1 + 1 + 1 = 5.

Item #	Rationale	
21	a right triangle, a right angle and two acute angles	To determine whether the triangle is an acute, obtuse, or right triangle, the student should have first understood that perpendicular lines are lines that intersect (cross each other) at a right angle (90° angle). Then the student should have understood that an obtuse triangle has an obtuse angle (an angle that is greater than 90°) and so cannot have a right angle, an acute triangle has three acute angles (angles that are less than 90°) and so cannot have a right angle, and a right triangle has a right angle. With this information, the student should have determined that the triangle is a right triangle because it has a right angle and two acute angles.

Item #	Rationale	
22	Option C is correct	To determine how many feet of the combined distance each member ran, the student should have divided 7,500 by 4, resulting in 7,500 ÷ 4 = 1,875 feet.
	Option A is incorrect	The student likely divided 7,500 by 4 but made a computational error when dividing 35 by 4. The student needs to focus on understanding how to accurately carry out the steps in the division algorithm when solving a real-life word problem.
	Option B is incorrect	The student likely multiplied instead of dividing (7,500 × 4 = 30,000). The student needs to focus on understanding the mathematical operations (+, −, ×, ÷) needed to represent the solution to a real-life word problem.
	Option D is incorrect	The student likely added instead of dividing (7,500 + 4 = 7,504). The student needs to focus on understanding the mathematical operations (+, −, ×, ÷) needed to represent the solution to a real-life word problem.

Item #	Rationale	
23	Option C is correct	To determine the difference between the weights of the two boxes in pounds and ounces, the student could have recognized that there are 16 ounces in 1 pound and converted 4 pounds 1 ounce to 3 pounds 17 ounces. Then the student could have subtracted the numbers of ounces (17 – 9) to get 8 ounces. Next, the student could have subtracted the numbers of pounds (3 – 1) to get 2 pounds. The student could then have combined the pounds and ounces for a difference of 2 lb 8 oz. 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 total weight of the two boxes (4 lb 1 oz + 1 lb 9 oz = 5 lb 10 oz). The student needs to focus on understanding how to choose the correct operation to solve problems.
	Option B is incorrect	The student likely subtracted the lesser number of pounds from the greater number of pounds (4 – 1 = 3 pounds) and subtracted the lesser number of ounces from the greater number of ounces (9 – 1 = 8 ounces), for a difference of 3 lb 8 oz. The student needs to focus on understanding how to solve problems involving subtracting pounds and ounces.
	Option D is incorrect	The student likely thought that 1 pound is equal to 10 ounces rather than to 16 ounces. The student then likely thought that 4 pounds 1 ounce was equal to 3 pounds 11 ounces. Next, the student likely subtracted the ounces (11 – 9 = 2) to get 2 ounces and subtracted the pounds (3 – 1 = 2) to get 2 pounds. The student needs to focus on understanding how to solve problems involving converting (changing) ounces to pounds.

Item #	Rationale	
24	Option D is correct	To determine which frequency table (table that shows how often each value in a set of data occurs) completes the representation of the data in the list, the student should have determined the number of times each number occurs in the list. Then the student should have matched the counts of the numbers in the list to the numbers of tally marks shown in each row on the table. The list has 4 values less than 4, 3 values from 4 to less than 8, 3 values from 8 to less than 12, and 2 values from 12 and greater.
	Option A is incorrect	The student likely did not understand where to place the values on the border of categories and therefore chose a frequency table that omits data points 4, 8, and 12. The student needs to focus on accurately representing given data in a frequency table.
	Option B is incorrect	The student likely did not understand where to place the values on the border of categories and therefore chose a frequency table that included tallies for the value 4 in both the first and second rows, the value 8 in both the second and third rows, and the value 12 in both the third and fourth rows. The student needs to focus on accurately representing given data in a frequency table.
	Option C is incorrect	The student likely did not understand that the value 0 needs to be represented with a tally and therefore chose a frequency table that omits the value 0. The student needs to focus on accurately representing given data in a frequency table.

Item #	Rationale	
25	Option A is correct	To determine which angles appear to have a measure (amount of turn between two lines around their common point) of 160°, the student could have found the two measures on the same scale (the measurement values shown on the protractor) through which the two rays (→, part of a line with only one endpoint) of the angle pass. The student then could have subtracted the smaller measure from the larger measure. On the outside scale, the left ray passes through 20° and the right ray passes through 180°, so the measure of the angle is 160° (180° − 20° = 160°). This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.
	Option D is correct	To find the other angle with a measure of 160°, the student could have used the outside scale to find that the left ray passes through 10° and the right ray passes through 170°, so the measure of the angle is 160° (170° − 10° = 160°).
	Option B is incorrect	The student likely selected a supplementary angle (one of two angles whose sum is 180°) of 160°. The student likely identified the angle as having a measure of 20° and added the given angle measure 160° (20° + 160° = 180°). The student needs to focus on using a protractor to find approximate measures of angles.
	Option C is incorrect	The student likely selected an angle with one ray at 160° but the other at 20°, so the angle measures 140° (160° – 20° = 140°). The student needs to focus on using a protractor to find approximate measures of angles.
	Option E is incorrect	The student likely selected an angle with one ray at 140° but read the measure on the other scale for the other ray to get 20°. The student likely added these to get 160° (140° + 20° = 160°). The student needs to focus on using a protractor to find approximate measures of angles.

Item #	Rationale	
26	Option B is correct	To determine which fraction is greater than $1\frac{4}{9}$, the student could have changed $1\frac{4}{9}$ to an improper fraction (a fraction where the numerator [top number] is larger than the denominator [bottom number]) by multiplying the denominator by the whole number (1 × 9 = 9) and adding the numerator (9 + 4 = 13), resulting in an equivalent fraction of $\frac{13}{9}$. The student then could have created equivalent fractions by finding a common denominator (bottom number that is the same) for each fraction. To compare $\frac{13}{9}$ with $\frac{11}{6}$, 9 and 6 can each be multiplied by a number to get 18 $\left(\frac{13 \times 2}{9 \times 2} = \frac{26}{18} \text{ and } \frac{11 \times 3}{6 \times 3} = \frac{33}{18}; \frac{26}{18} < \frac{33}{18}\right)$. 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 converted $1\frac{4}{9}$ to $\frac{13}{9}$, but then chose a statement indicating that $\frac{13}{9} > \frac{13}{9}$, instead of recognizing the two fractions as equivalent. The student needs to focus on understanding inequality symbols.
	Option C is incorrect	The student likely converted $1\frac{4}{9}$ to $\frac{13}{9}$ and then compared $\frac{13}{9}$ with $\frac{13}{11}$. The student likely considered the fraction with a greater denominator to have a greater value. The student needs to focus on understanding how to compare fractions that have different numerators and denominators.
	Option D is incorrect	The student likely converted $1\frac{4}{9}$ to $\frac{13}{9}$ and then compared $\frac{13}{9}$ to $\frac{4}{3}$. The student likely considered the fraction with a lesser denominator to have a greater value because each piece $\left(\frac{1}{3}\right)$ would be larger in size. The student needs to focus on understanding how to compare fractions that have different numerators and denominators.

Item #	Rationale	
27	Option D is correct	To determine how many crates of flour the baker should order, the student could have first found the total number of bags needed, by multiplying the number of batches of doughnuts by the number of sacks of flour needed for each batch (15 × 7 = 105 sacks). The student then could have divided the total number of sacks of flour by the number of sacks in each crate (105 ÷ 4 = 26 crates with 1 sack remaining). The student then should have realized the baker cannot order partial crates and therefore needed to round 26 crates and 1 sack up to the nearest whole number, determining that the baker needs to order 27 crates of flour. 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 number of batches of doughnuts by the number of sacks in a crate (15 × 4 = 60), divided the product by 7 (60 ÷ 7 ≈ 8.6), and rounded up to the nearest whole number. The student needs to focus on attending to the details of the question being asked in a two-step problem.
	Option B is incorrect	The student likely rounded the quotient without considering the meaning of the remainder in context of the problem. The student needs to focus on attending to the details of the question being asked in a two-step problem.
	Option C is incorrect	The student likely completed the correct steps and arrived at an answer of 26 crates with 1 sack remaining. The student then likely chose the value of the remainder as the answer. The student needs to focus on attending to the details of the question being asked in a two-step problem.

Item #	Rationale	
28	Option B is correct	To determine the decimal equivalent to $\frac{170}{100}$, the student could have rewritten the fraction as the mixed number $1\,\frac{70}{100}$ and then reduced (put in simplest form) the fraction to $1\,\frac{7}{10}$. Then the student could have placed the 7 to the right of the decimal point, in the tenths place, to make 1.7 (one and seven-tenths). 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 reduced the fraction to $\frac{17}{10}$ and inferred that because 17 has a 1 in the tens place, the decimal should also have a 1 in the tens place. The student needs to focus on understanding how to relate fractions to decimals that name hundredths.
	Option C is incorrect	The student likely rewrote the fraction as $1\frac{70}{100}$ and misinterpreted $\frac{70}{100}$ as seven hundredths instead of $\frac{7}{10}$. The student needs to focus on understanding how to relate fractions to decimals that name hundredths.
	Option D is incorrect	The student likely thought all the zeros canceled out, leaving a value of 17. The student needs to focus on understanding how to relate fractions to decimals that name hundredths.

Item #	Rationale	
29	$\frac{7}{11}$ and any equivalent values are correct.	To determine what fraction of the books are mystery or sports books, the student should have first looked at the key (one book image = 1 book). The total number of books in the pictograph, 11, is the denominator (bottom number), and the number of mystery and sports books, 7 (2 + 5 = 7), is the numerator (top number) of the fraction.

Item #	Rationale	
30	Option A is correct	To determine which object holds more than 3 fluid ounces but less than 1 pint of liquid when full, the student should have recognized that there are 8 ounces of liquid in 1 cup and that there are 16 ounces in one pint. The juice box will likely contain about one cup of liquid, which is more than 3 fluid ounces but less than 1 pint. 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 pint with a gallon and chose an object that would hold about 1 gallon. The student needs to focus on identifying relative sizes of measurement units within the customary and metric systems.
	Option C is incorrect	The student chose an object that could hold several gallons. The student needs to focus on identifying relative sizes of measurement units within the customary and metric systems.
	Option D is incorrect	The student chose an object that could hold less than 3 ounces of liquid. The student needs to focus on identifying relative sizes of measurement units within the customary and metric systems.

Item #	Rationale	
31	Option A is correct	To determine which thing will hold onto your money for you and also lend out money, the student should have recognized that banks provide both services to their customers.
	Option B is incorrect	The student likely misunderstood the function of a school. The student needs to focus on understanding the primary services of a bank.
	Option C is incorrect	The student likely confused a paycheck with lending money and did not realize that a job does not hold onto money. The student needs to focus on understanding the primary services of a bank.
	Option D is incorrect	The student likely considered the fact that a loan means lending money but did not realize that a loan does not hold onto money. The student needs to focus on understanding the primary services of a bank.

Item #	Rationale	
32	Option B is correct	To determine the perimeter (distance around the outside of a shape) of the rectangle, the student could have used one of the rectangle formulas from the Perimeter section of the STAAR Grade 4 Mathematics Reference Materials page within the student's test booklet ($P = l + w + l + w$ or $P = 2l + 2w$, where P = perimeter, l = length, and w = width). Because this rectangle has two sides that are 12 inches long and two sides that are 8 inches long, the perimeter is 40 inches (12 + 8 + 12 + 8 = 40). This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.
	Option A is incorrect	The student likely added one length and one width, resulting in 12 + 8 = 20 inches. The student needs to focus on solving problems related to perimeter of rectangles.
	Option C is incorrect	The student likely confused perimeter with area (amount of space covered by a figure, $A = l \times w$) and did not regroup when multiplying 8 × 12 to find area. The student needs to focus on solving problems related to perimeter of rectangles.
	Option D is incorrect	The student likely used the area formula for a rectangle instead of finding perimeter, resulting in 12 × 8 = 96 inches. The student needs to focus on solving problems related to perimeter of rectangles.