Item #	Rationale	
1	Option A is correct	To determine which inequality (a number sentence in which an inequality symbol such as > [greater than] or < [less than] indicates that two quantities are not equal) or equation (a number sentence in which an equal sign [=], indicates that the two sides have an equal value) is true, the student could have recognized that the numerator (number above the fraction bar) of the two fractions was the same number, 2, so what needed to be compared were the denominators (numbers below the fraction bars). The denominator indicates the total number of equal-sized parts in the whole, so $\frac{2}{4}$ has four equal-sized parts and $\frac{2}{6}$ has six equal-sized parts. A fraction that represents 2 out of 4 equal-sized parts of a whole is greater than a fraction that represents 2 out of 6 equal-sized parts of a whole; therefore, $\frac{2}{4}$ is greater than $\frac{2}{6}$. 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 looked only at the numerators of the two fractions, which are both equal to 2, recognized that they were the same, and so considered the fractions to be equal without determining whether the denominators were the same. The student needs to focus on comparing the denominators of fractions to determine whether the fractions are equal when the numerators are the same.
	Option C is incorrect	The student likely looked only at the numerators of the two fractions, which are both equal to 2, recognized that they were the same, and then recognized that the denominators were different and therefore needed to be compared. The student may not have considered that the denominator indicates the number of equal-sized parts in the whole, may have recognized that 6 is greater than 4, and so may have determined that $\frac{2}{6}$ is greater than $\frac{2}{4}$. The student needs to focus on comparing the denominators of fractions to determine whether the fractions are equal when the numerators are the same.
	Option D is incorrect	The student likely looked only at the numerators of the two fractions, which are both equal to 2, recognized that they were the same, and then recognized that the denominators were different and therefore needed to be compared. The student may not have considered that the denominator indicates the number of equal-sized parts in the whole, may have recognized that 3 is less than 8, and so may have determined that $\frac{2}{3}$ is less than $\frac{2}{8}$. The student needs to focus on comparing the denominators of fractions to determine whether the fractions are equal when the numerators are the same.

Item #	Rationale	
2	Option D is correct	To determine the number of bags Lupita needs, the student should have realized that the candy needed to be divided equally into bags. The student could have calculated that Lupita has to put 2 pieces of the 26 pieces of candy into each of 13 bags in order to use all the candy, because 26 ÷ 2 = 13. The student could have also crossed off 2 pieces of candy in the picture until there were no pieces of candy remaining and counted the number of times that had to be done, 13. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.
	Option A is incorrect	The student likely did not recognize that the 26 pieces of candy needed to be divided equally into bags and chose the number of pieces of candy, 2, that were to go in each bag. The student needs to focus on determining the correct steps and calculations to solve a word problem.
	Option B is incorrect	The student likely did not understand which operation needed to be used to solve the problem and chose subtraction, therefore calculating 26 – 2 = 24. The student needs to focus on determining the correct operation to use in a word problem.
	Option C is incorrect	The student likely did not recognize that the 26 pieces of candy needed to be divided by 2, counted the 3 rows of candy in the picture (without recognizing that the third row did not have the same number of pieces of candy as the first two rows), and determined that each row of candy would be put into its own bag, resulting in a total of 3 bags of candy. The student needs to focus on determining the correct steps and calculations to solve a word problem.

Item #	Rationale	
3	Option D is correct	To determine the area (the number of unit squares that cover a two-dimensional figure) the student could have used the Key (square = 1 square foot) to find the unit of measure and how much area one unit square was equal to and then counted 16 shaded squares on the grid. The student also could have split the figure into two rectangles and counted 12 + 4 = 16 or 6 + 10 = 16. 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 split the figure into two rectangles (a 3-by-4 and a 2-by-2), counted 12 squares in the 3 × 4 rectangle, and neglected to add the squares in the second rectangle. The student needs to focus on understanding how to determine the area of a two-dimensional figure by counting all unit squares in the figure.
	Option B is incorrect	The student likely split the figure into two rectangles (a 2-by-5 and a 2-by-3), counted 10 squares in the 2 × 5 rectangle, and neglected to add the squares in the second rectangle. The student needs to focus on understanding how to determine the area of a two-dimensional figure by counting all unit squares in the figure.
	Option C is incorrect	The student likely included the 4 squares in the top right corner of the figure to create a 4-by-5 rectangle, resulting in 20 square feet. The student needs to focus on recognizing which squares on the grid make up the figure whose area will be found.

Item #	Rationale	
4	Option B is correct	To determine the model that can be used to find the number of magnets attached to each cabinet, the student should have recognized that the number within the brackets below the model, 32, represents the whole. The student should have understood that an equal number of those 32 magnets were attached to 8 cabinets and found the model with 8 equal-sized sections.
	Option A is incorrect	The student likely did not recognize this as an equal-parts situation and chose a model that represents 32 × 8. The student needs to focus on determining the whole and then understanding that the whole is divided into equal sections that represent parts of the whole.
	Option C is incorrect	The student likely did not recognize equal parts as division and chose a model that represents 8 + 32. The student needs to focus on associating equal groups with division and determining the whole in a model.
	Option D is incorrect	The student likely did not recognize equal parts as division and chose a model that represents 32 – 8. The student needs to focus on associating equal groups with division.

Item #	Rationale	
5	Option C is correct	To determine the benefits of saving money (planning ahead for future costs), the student could have recognized that debt refers to loss of money and that interest refers to the percentage of money added to a purchase. The student also could have recognized the difference between spending money and saving money. The student should have recognized that preparing to pay for college is a situation in which money is set aside for a particular purpose.
	Option E is correct	To determine the benefits of saving money, the student could have recognized that debt refers to loss of money and that interest refers to the percentage of money added to a purchase. The student also could have recognized the difference between spending money and saving money. The student should have recognized that unplanned needs are situations in which the consumer is not expecting a cost and will need to have money saved.
	Option A is incorrect	The student likely did not recognize that debt is money owed to someone else by the consumer, making it a loss of money for the consumer. The student needs to focus on understanding which situations add money to an account and which situations subtract money from an account.
	Option B is incorrect	The student likely misunderstood the meaning of interest in this situation and considered that earning interest on a bank account adds money to an account; therefore, the student likely concluded that increasing interest on a bill must add money to an account as well. The student needs to focus on understanding the difference between earning interest and paying interest.
	Option D is incorrect	The student likely did not recognize that saving money implies spending less money. The student needs to focus on understanding which situations refer to spending money and which refer to saving money.

Item #	Rationale	
6	Option B is correct	To determine the measurement closest to the amount of juice in a full juice box, the student could have compared the size of the juice box to the tray and to the other items on the tray. The student could have thought about the relative amount for each option, recognizing that 2 milliliters would only be a tiny drop of the juice, 2 liters would be as much as a large bottle of soda, and 200 liters would be as much as a large fish tank; therefore, 200 milliliters is the most reasonable estimate. 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 2 milliliters because milliliters are small units of liquid but did not consider the size of the juice box compared to the other items in the picture. The student needs to focus on determining the relative volume of objects.
	Option C is incorrect	The student likely chose 2 liters, focusing only on the 2 instead of recognizing the size of the units. The student may have realized that 2 milliliters was too small a volume, making 2 liters seem like the most reasonable estimate. The student needs to focus on determining the relative volume of objects.
	Option D is incorrect	The student likely confused liters with milliliters. The student needs to focus on understanding the scale of the metric system.

Item #	Rationale	
7	Option D is correct	To determine which answer choice represents a way to find the number of ice-cream bars sold during lunch, the student should have recognized 280 as the total number of ice-cream bars the cafeteria had, so if 130 were left over, the number sold had to be less than 280. The student should have found the model that represented 280 as the total number of ice-cream bars and showed the number of ice-cream bars sold at lunch being subtracted from 280, resulting in 130 bars left over.
	Option A is incorrect	The student likely confused the total number of ice-cream bars with the number of ice-cream bars sold during lunch, therefore reversing the left side of a correct equation (280 – [box] = 130) to get the equation "[box] – 280 = 130." The student needs to focus on determining the whole in a word problem.
	Option B is incorrect	The student likely determined that this was an addition problem and figured that the unknown number (box) had to be the whole and 280 and 130 should be added to find the unknown number. The student needs to focus on determining the whole in a word problem.
	Option C is incorrect	The student likely recognized that the whole was 280 but added the unknown number instead of subtracting. The student needs to focus on determining the correct operation to use in a word problem.

Item #	Rationale	
8	Option B is correct	To determine which statement is true, the student could have understood that polygons are two-dimensional, closed figures in which all sides are line segments. The student likely understood that only the first figure has four sides with two sets of parallel sides and is therefore a parallelogram, that only the second and fourth figures have equal side lengths, and that none of the figures are prisms (which are three-dimensional).
	Option A is incorrect	The student likely considered only the first figure in the group, a rectangle, which is a parallelogram since it has four sides with two sets of parallel lines. The student needs to focus on examining each figure in a set.
	Option C is incorrect	The student likely considered only the second and fourth figures in the group (the hexagon and the triangle, which both have sides of equal length). The student needs to focus on examining each figure in a set.
	Option D is incorrect	The student likely confused prisms with polygons. The student needs to focus on understanding the definitions of geometric figures.

Item #	Rationale	
9	Option B is correct	To determine how many yards of fabric Ms. Green started with, the student could have recognized that the total number of yards of fabric she started with would be equal to the sum (the result of adding numbers) of the numbers of yards of fabric used in the three plays plus the number of yards of fabric she had left over, which is represented by the equation (69 + 48 + 53) + 27 = 197. 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 sum of only the numbers of yards of fabric used in the three plays, neglecting to include the 27 yards of fabric that was left over, and used the equation 69 + 48 + 53 = 170. The student needs to focus on determining the correct steps to take when solving a word problem.
	Option C is incorrect	The student likely found the sum of the numbers of yards of fabric used in the three plays but subtracted the 27 yards of fabric left over instead of adding, resulting in the equation (69 + 48 + 53) – 27 = 143. The student needs to focus on understanding the difference between the result of adding and the result of subtracting.
	Option D is incorrect	The student likely recognized that the total number of yards of fabric Ms. Green started with would be equal to the sum of the numbers of yards of fabric used in the three plays plus the yards of fabric she had left over, which is represented by the expression (69 + 48 + 53) + 27, but made an error when regrouping to the tens place, resulting in a total of 177. The student needs to focus on regrouping when adding.

Item #	Rationale	
10	Option C is correct	To determine which statement is true about the number 510, the student should have recognized that the number ends in a zero. Numbers that end with 0, 2, 4, 6, or 8 are even numbers because those digits can be divided by 2 evenly.
	Option A is incorrect	The student likely recognized that when the digits in the number 510 are added (5 + 1 + 0) the result is a number that can be evenly divided by 3, an odd number. The student needs to focus on understanding divisibility rules and how they are used to determine whether a number is even or odd.
	Option B is incorrect	The student likely identified the first digit as an odd number and considered the entire number to be odd. The student needs to focus on the difference between even and odd numbers and on which place value determines whether a number is even or odd.
	Option D is incorrect	The student recognized 510 as an even number because it can be divided by 2 evenly but did not understand that the digit in the tens place does not affect whether a number is odd or even. The student also likely confused even and odd numbers. The student needs to focus on the difference between even and odd numbers and on which place value determines whether a number is even or odd.

Item #	Rationale	
11	Option D is correct	To determine which list of numbers represents Miyoung's results, the student should have interpreted the dot plot as showing the generated numbers on the number line and the dots as representing the number of times each number was generated. The student should have recognized that each dot meant 1 number (or 1 time generated) by interpreting the key and then counted the number of dots above each number (1 was generated 1 time, 2 was generated 1 time, 3 was generated 0 times, 4 was generated 2 times, 5 was generated 2 times, 6 was generated 0 times, 7 was generated 2 times, 8 was generated 1 time, 9 was generated 1 time, and 10 was generated 0 times); therefore, the list of numbers that represents Miyoung's results is 1, 2, 4, 4, 5, 5, 7, 7, 8, 9.
	Option A is incorrect	The student likely did not interpret the key correctly and listed each number that was generated only once. The student needs to focus on interpreting the key for a dot plot.
	Option B is incorrect	The student likely misunderstood the meaning of the numbers and the dots and chose a list that contains every number on the number line. The student needs to focus on understanding how to interpret a dot plot.
	Option C is incorrect	The student likely did not interpret the key correctly and listed each number that was generated at least once but also included the 10, since it is the greatest number on the dot plot. The student needs to focus on interpreting the key for a dot plot and interpreting a dot plot.

Item #	Rationale	
12	plus, 1	To determine the correct choices from the drop-down menus (the answer choices), the student should have used the table to determine the relationship between the numbers in the “Items Ordered” column and the numbers in the “Items Sent” column. These pairs of numbers are (5, 6), (3, 4), and (6, 7). Then the student should have determined that the number in the “Items Sent” column is always 1 more than the number in the “Items Ordered” column, because 5 + 1 = 6, 3 + 1 = 4, and 6 + 1 = 7, making the relationship “plus 1”; “plus” for the first drop-down menu and “1” for the second drop-down menu.

Item #	Rationale	
13	Option D is correct	To determine which list contains only numbers between 5,090 and 6,300, the student should have determined that 5,746 is between 5,090 and 6,300 because the digit in the hundreds place, 7, is greater than the 0 in the hundreds place in 5,090, and 5,746 is less than 6,300 because the digit in the thousands place, 5, is less than 6. Then the student should have determined that 6,099 is greater than 5,090 because the digit in the thousands place, 6, is greater than the 5 in 5,090, and that 6,099 is less than 6,300 because the digit in the hundreds place, 0, is less than 3. Finally, the student should have determined that 6,211 is greater than 5,090 because the digit in the thousands place, 6, is greater than 5, and 6,211 is less than 6,300 because the digit in the hundreds place, 2, is less than 3.
	Option A is incorrect	The student likely confused numbers in the ten-thousands with numbers in the thousands. The student needs to focus on place value.
	Option B is incorrect	The student likely determined that 5,894 is greater than 5,090 because the digit in the hundreds place in 5,894, 8, is greater than the 0 in the hundreds place in 5,090, and that 6,132 is less than 6,300 because the digit in the hundreds place, 1, is less than 3. Then the student likely determined that both 5,090 and 5,009 have a 0 in the hundreds place and have the digit 9 in the number and assumed that they were the same number. The student needs to focus on determining which place value needs to be compared according to the given numbers.
	Option C is incorrect	The student likely determined that 5,450 was greater than 5,090 because the digit in the hundreds place, 4, is greater than the 0 in the hundreds place in 5,090, and that 6,215 is less than 6,300 because the digit in the hundreds place, 2, is less than 3. Then the student likely determined that 6,381 was less than 6,300 because both numbers have a 3 in the hundreds place, but the student did not consider the digit 8 in the tens place or the digit 1 in the ones place. The student needs to focus on determining which place value needs to be compared according to the given numbers.

Item #	Rationale	
14	Option A is correct	To determine the area of the figure, the student should have recognized that each unit square in the figure has an area of 1 square inch and then counted the number of squares along the length of the figure, 8, and the number of squares along the width of the figure, 3. The student should have then recognized that multiplying 8 x 3 would give the number of unit squares in the rectangle. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.
	Option E is correct	To determine the area of the figure, the student should have recognized that each unit square in the figure has an area of 1 square inch and then counted the number of squares along the length of the figure, 6, and the number of squares along the width of the figure, 4. The student should have then recognized that multiplying 6 x 4 would give the number of unit squares in the rectangle.
	Option B is incorrect	The student likely confused area with perimeter (the distance around the figure) and counted 24 squares around the perimeter, counting 2 for each corner piece because the outside edges of the corner pieces represent 1 unit each. The student needs to focus on recognizing area as the number of unit squares that make up a figure.
	Option C is incorrect	The student likely confused area with perimeter and counted 24 squares around the perimeter, counting 2 for each corner piece because the outside edges of the corner pieces represent 1 unit each. The student needs to focus on recognizing area as the number of unit squares that make up a figure.
	Option D is incorrect	The student likely confused area with perimeter and counted 24 squares around the perimeter, counting 2 for each corner piece because the outside edges of the corner pieces represent 1 unit each. The student needs to focus on recognizing area as the number of unit squares that make up a figure.

Item #	Rationale	
15	Option B is correct	To determine the greatest number of birds Martin can add to his cages, the student could have recognized that the greatest number of birds could be determined by multiplying the number of cages, 11, by the number of birds each cage can hold, 7, and then subtracting 21 from the product (the result of multiplying numbers), creating the equation $(11 \times 7) - 21 = 77 - 21 = 56$. 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 number of cages multiplied by the number of birds a cage can hold is 77 but added the 21 birds in cages instead of subtracting them, resulting in $(11 \times 7) + 21 = 98$. The student needs to focus on understanding the correct operations to use in a word problem.
	Option C is incorrect	The student likely subtracted 7 from 11 instead of multiplying, resulting in $21 - (11 - 7) = 17$. The student needs to focus on understanding the correct operations to use in a word problem.
	Option D is incorrect	The student likely added the number of cages to the number of birds that can fit in each cage and then added the 21 birds that are in cages to the sum, resulting in $21 + (11 + 7) = 39$. The student needs to focus on understanding the correct operations to use in a word problem.

Item #	Rationale	
16	7 and any equivalent values are correct	To determine how many of the shapes are polygons with more than three sides, the student should have remembered that a polygon is defined as a two-dimensional, closed figure in which all sides are line segments. Therefore, the student could eliminate any of the figures that are not made of all line segments. Then the student could have eliminated any of the remaining polygons if they only had 3 sides, leaving 7 polygons: the third and fourth polygons in the top row, the second and third polygons in the middle row, and all three polygons in the bottom row.

Item #	Rationale	
17	Option A is correct	To determine how many more T-shirts were sold than sweatshirts, the student could have subtracted the number of sweatshirts sold, 88, from the number of T-shirts sold, 107, resulting in the equation 107 – 88 = 19. 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 number of sweatshirts sold, 88, from the number of T-shirts sold, 107, but made an error (changing the 0 to 10 instead of 9) when regrouping in the tens place, resulting in 29. The student needs to focus on accurately solving one- and two-step problems with subtraction.
	Option C is incorrect	The student likely added the number of sweatshirts sold, 88, to the number of T-shirts sold, 107, and did not regroup to the tens place after adding 8 + 7 in the ones place, resulting in 185. The student needs to focus on understanding the correct operations to use in solving a word problem, as well as adding and subtracting accurately.
	Option D is incorrect	The student likely added the number of sweatshirts sold, 88, to the number of T-shirts sold, 107, resulting in the equation 107 + 88 = 195. The student needs to focus on understanding the correct operations to use in solving a word problem.

Item #	Rationale	
18	$\frac{3}{6}$, $\frac{1}{2}$, are exactly halfway between zero and 1	To determine what is true about point *U*, the student should have recognized that the intervals on the number line represent sixths because there are 6 tick marks after the zero, making sixths the denominator (bottom number of a fraction) or the number of parts in the whole. Then the student should have counted to find that point *U* is plotted 3 tick marks from zero, making the numerator (top number of a fraction) 3. Therefore, point *U* represents $\frac{3}{6}$, the correct answer to the first drop-down menu (answer choices). Next, the student should have simplified $\frac{3}{6}$ (divided the numerator and the denominator by the same number) to determine that point *U* also represents the fraction $\frac{1}{2}$, the correct answer to the second drop-down menu. Finally, the student should have determined why $\frac{3}{6}$ and $\frac{1}{2}$ are equal, which is the answer to the third drop-down menu. The two fractions are equal because they both "are exactly halfway between zero and 1."

Item #	Rationale	
19	multiply, 6	To determine the correct choices from the drop-down menus (the answer choices), the student should have used the table to determine the relationship between the numbers in the "Number of Aquariums" row and the numbers in the "Number of Fish" row, finding the pairs (3, 18), (5, 30), (9, 54), and (12, 72). Next, the student should have determined the relationship to be that the number of fish is 6 times the number of aquariums, because $3 \times 6 = 18$, $5 \times 6 = 30$, $9 \times 6 = 54$, and $12 \times 6 = 72$. Therefore, the answers to the drop-down menus would be, first, "multiply," and second, "6."

Item #	Rationale	
20	Option C is correct	To determine which models represent the same number, the student should have used base ten blocks to find that the value of a large square (a flat) is 100, the value of a column of squares (a rod) is 10, and the value of a small square (a unit) is 1. Then the student should have evaluated each student's model to find that Anne has 1 flat, 1 rod, and 10 units, which represents 100 + 10 + 10 = 120; Kareena has 1 flat and 2 units, which represents 100 + 2 = 102; and Zane has 12 rods, which represent 12 × 10 = 120, therefore determining that Anna's model and Zane's model both represent the number 120.
	Option A is incorrect	The student likely confused the numbers 120 and 102 by counting Kareena's 2 units (2) as 2 rods (20). The student needs to focus on understanding the value of base ten blocks.
	Option B is incorrect	The student likely confused the numbers 102 and 120 by counting Kareena's 2 units (2) as 2 rods (20). The student needs to focus on understanding the value of base ten blocks.
	Option D is incorrect	The student likely did not understand how to use base ten blocks to represent numbers. The student needs to focus on understanding the value of flats, rods, and units when using base ten blocks.

Item #	Rationale	
21	Option A is correct	To determine the width of the garden, the student should have recognized that the perimeter of the rectangular garden, 26 feet, is the distance around the garden. The student then could have recognized that a rectangle has two pairs of parallel lines (lines that are an equal distance apart and never meet), so one pair of opposite sides of the rectangle represent the length of the garden, 8 feet the other pair of opposite sides represent the width of the garden. Then the student could have added 8 + 8 = 16 to get the total length of the two given sides and subtracted that sum from the perimeter: 26 – 16 = 10. Since the measurement for the width of the garden will be the same on opposite sides, the student could have divided 10 (the number of feet left) by 2 to get 5 feet. 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 the number of feet, 10, that are still needed to make the total perimeter of 26 feet but did not divide that number by 2 for the pair of equal, opposite sides. The student needs to focus on understanding the attributes of a rectangle and how to use those to determine a missing side length of the rectangle.
	Option C is incorrect	The student likely understood that the length of the rectangle, 8 feet, would be the same for one pair of opposite sides and so found the opposite side to also be 8 feet. The student needs to focus on understanding how to determine a missing side length of a rectangle.
	Option D is incorrect	The student likely understood that the length of the rectangle, 8 feet, would be the same for one pair of opposite sides and so found the opposite side to also be 8 feet. The student likely then found the sum of the two sides, 16 feet, but neglected to find the length of the other two sides of the rectangle. The student needs to focus on understanding how to determine a missing side length of a rectangle.

Item #	Rationale	
22	6, 12, 9	To determine the height of the bar for each type of science report, the student should have used the numbers in the table to find that Rocks = 6, Animals = 12, and Oceans = 9. Next, the student should have examined the empty bar graph and found that "Type of Report" was along the *x*-axis, or the line going from left to right, and the "Number of Reports" was along the *y*-axis, or the line going from 0 to 14. The student then should have determined the scale (how the horizontal lines were numbered) on the graph and found that the scale counted by twos from 0 to 14, but there was a line for each odd number as well. Finally, the student should have selected the line for 6 as the top of the bar for Rocks, the line for 12 as the top of the bar for Animals, and the line for 9 (between the lines marked 8 and 10) as the top of the bar for Oceans.

Item #	Rationale	
23	Option C is correct	To determine which answer choice is NOT a way Hector could divide and shade a circle to represent a fraction less than $\frac{4}{6}$, the student should have recognized that in the fraction $\frac{4}{6}$, the denominator, 6, is the number of equal-sized parts of the circle and the numerator, 4, is the number of shaded parts. Then the student should have recognized that creating 4 equal parts of a circle and shading 4 parts would be $\frac{4}{4}$, which is the entire circle and therefore is not less than $\frac{4}{6}$.
	Option A is incorrect	The student likely did not understand that $\frac{1}{6}$ is less than $\frac{4}{6}$ because 1 shaded part of 6 is less than 4 shaded parts of 6 or misinterpreted the question and found a way to make a fraction that was greater than $\frac{4}{6}$. The student needs to focus on comparing fractions with the same denominator.
	Option B is incorrect	The student likely did not understand that $\frac{4}{8}$ is less than $\frac{4}{6}$ because the size of the parts would be greater for $\frac{4}{6}$, or the student misinterpreted the question and found a way to make a fraction that was greater than $\frac{4}{6}$. The student needs to focus on comparing fractions with the same numerator.
	Option D is incorrect	The student likely did not understand that $\frac{3}{6}$ is less than $\frac{4}{6}$ because 3 shaded parts of 6 is less than 4 shaded parts of 6, or the student misinterpreted the question and found a way to make a fraction that was greater than $\frac{4}{6}$. The student needs to focus on comparing fractions with the same denominator.

Item #	Rationale	
24	Option D is correct	To determine which strip diagram can be used to find the total number of points both friends scored, the student should have recognized that the total number of points is represented by the "?" Therefore, the model should show the "?" in its own row, and the other row should show the numbers being added to equal that total. Then the student should have recognized that the first number to be added is the first friend's 339 points, the second number to be added is the second friend's 339 points, and the third number to be added is the extra 75 points the second friend scored.
	Option A is incorrect	The student likely confused the total number of points scored with only one instance of 339 points, and then added the extra 75 points the second friend scored to the "?" instead of the total number of points scored. The student needs to focus on understanding the word problem and how to represent it in a model.
	Option B is incorrect	The student likely included the extra 75 points with the unknown value instead of with both scores of 339. The student needs to focus on using models to represent addition problems.
	Option C is incorrect	The student likely concluded that both friends scored a total of 339 points, and then added the extra 75 points the second friend scored to 339. The student needs to focus on understanding the word problem and how to represent it in a model.

Item #	Rationale	
25	Option B is correct	To determine which list represents the areas of the states ordered from least to greatest, the student should have used the rules of place value to determine that the least area would be the number with the digit with the least value in the thousands place, 4, (since all four numbers are in the thousands) and the second-least would be the number with the digit 6 in the thousands place. Since 9,624 and 9,350 each have the same digit in the thousands place, the student should have looked at the digit in the hundreds place of each number to determine which number is less. The student then should have recognized that the 3 in 9,350 is less than the 6 in 9,624, making 9,350 the second-greatest number and 9,624 the greatest number. Therefore, the states ordered from least to greatest area are Connecticut (4,845); Hawaii (6,423); New Hampshire (9,350); Vermont (9,624).
	Option A is incorrect	The student likely listed the states in order from greatest to least area. The student needs to focus on understanding the question that is being asked.
	Option C is incorrect	The student likely interpreted the number 9,624 (Vermont) as being less than 9,350 (New Hampshire). The student needs to focus on understanding place value.
	Option D is incorrect	The student likely ordered the states from least to greatest area based on the digit in the ones place of each number. The number with the digit with the least value in the ones place is 9,350 (New Hampshire), followed by 6,423 (Hawaii), then 9,624 (Vermont), and finally 4,845 (Connecticut). The student needs to focus on understanding which digits to compare to determine the value of numbers.

Item #	Rationale	
26	Sara, 3, times as many points as, Alex	To determine how the number of points scored by Alex compared to the number of points scored by Sara, the student should have recognized from the first sentence that Alex scored 8 points and then determined that if 8 × 3 represents the number of points Sara scored, then Sara scored 3 times as many points as Alex. Therefore, the correct statement is, "Sara (first box) scored 3 (second box) times as many points as (third box) Alex (fourth box) did."

Item #	Rationale	
27	Option B is correct	To determine which equation can be used to find the total number of feeders Ms. Morales filled with sugar water, the student should have recognized that 28 is the total number of fluid ounces Ms. Morales began with and that she put 7 fluid ounces into each hummingbird feeder, and therefore the equation 7 × ? = 28 would represent the situation. Then the student should have determined that 4 is the number that, when multiplied by 7, equals 28. Therefore, the correct equation is 7 × 4 = 28.
	Option A is incorrect	The student likely determined this to be a subtraction problem, thinking that Ms. Morales started with 28 fluid ounces of sugar water and put 7 fluid ounces into only one hummingbird feeder. The student needs to focus on reading the entire question carefully and understanding the correct steps to take to solve a word problem.
	Option C is incorrect	The student likely found the number of hummingbird feeders, 4, correctly but added that number to 28 (the starting number of fluid ounces). The student needs to focus on reading the entire question carefully and understanding the correct steps to take to solve a word problem.
	Option D is incorrect	The student likely confused dividing 28 by 7 with multiplying 28 by 7. The student needs to focus on understanding the difference between division and multiplication scenarios.

Item #	Rationale	
28	Option C is correct	To determine which answer choice describes the number 9,140, the student should have used place value to find the value of each digit in the number, recognizing that the digit 9 = 9 thousands, the digit 1 = 1 hundred, the digit 4 = 4 tens, and the digit 0 = 0 ones.
	Option A is incorrect	The student likely considered the digits 1 and 4 to be equivalent to 14 ones instead of using place value to determine the value of each digit. The student needs to focus on understanding place value to put numbers into word form correctly.
	Option B is incorrect	The student likely confused the value of 40 tens, which is 400, with the value of 40 ones, which is 40. The student needs to focus on understanding place value to put numbers into word form correctly.
	Option D is incorrect	The student likely confused the tens place with the ones place, resulting in 4 ones instead of 4 tens. The student needs to focus on understanding place value to put numbers into word form correctly.

Item #	Rationale	
29	Option A is correct	To determine which equation can be used to find the total number of flowers the artist painted on these skateboards, the student should have recognized that the total number of skateboards is 20 and that each skateboard contains 4 flowers. The student should have determined that the two values would be multiplied to find the total number of flowers, which is represented by the equation $20 \times 4 = 80$.
	Option B is incorrect	The student likely determined this to be a division problem, dividing the number of skateboards, 20, by the number of flowers painted on each skateboard, 4. The student needs to focus on determining the correct steps to take and the correct operation to use when creating an equation.
	Option C is incorrect	The student likely determined this to be an addition problem, adding the number of skateboards, 20, to the number of flowers painted on each skateboard, 4. The student needs to focus on determining the correct steps to take and the correct operation to use when creating an equation.
	Option D is incorrect	The student likely determined this to be a subtraction problem, subtracting the number of flowers painted on each skateboard, 4, from the number of skateboards, 20. The student needs to focus on determining the correct steps to take and the correct operation to use when creating an equation.

Item #	Rationale	
30	Option B is correct	To determine which two models are shaded to show equivalent fractions, the student should have recognized that the models have the same-sized whole divided into different numbers of parts, and then looked at each model to find the two that have the same amount of the model shaded. Finally, the student could have confirmed that the fractions shaded are equivalent by recognizing that Model X has 2 parts out of 4 shaded, or $\frac{2}{4}$, and Model Z has 4 parts out of 8 shaded, or $\frac{4}{8}$, and that when those fractions are simplified, they both have a value of $\frac{1}{2}$. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.
	Option A is incorrect	The student likely determined that Model W and Model X are equivalent because they both have 2 parts out of the whole shaded. The student needs to focus on understanding that both the numerator (number of parts shaded) and the denominator (number of parts in the whole) must be considered when finding equivalent fractions.
	Option C is incorrect	The student likely determined that Model W and Model Z are equivalent because they both have 8 equal-sized parts. The student needs to focus on understanding that both the numerator and the denominator must be considered when finding equivalent fractions.
	Option D is incorrect	The student likely determined that Model X and Model Y are equivalent because they both have 4 equal-sized parts. The student needs to focus on understanding that both the numerator and the denominator must be considered when finding equivalent fractions.