2021 STAAR Grade 7 Math Rationales

Item#	Rationale	
1	Option B is correct	To determine the equation that can be used to find y, the student should have first understood that the expression "each month he will add 20 coins" is equivalent to 20 times the number of months and that the expression "his dad gave him 75 coins" represents the initial, or starting, value. The number of months is represented by x, so the total number of coins in George's collection, y, is $20x + 75$. Therefore, the equation is $y = 20x + 75$.
	Option A is incorrect	The student likely reversed the relationship between the number of coins George's dad gave him and the number of coins that he will add to the collection each month, resulting in the equation $y = 75x + 20$. The student needs to focus on understanding how to represent linear relationships using equations in the form $y = mx + b$.
	Option C is incorrect	The student likely reversed the relationship between the number of coins George's dad gave him and the number of coins that he will add to the collection each month and subtracted instead of adding, resulting in the equation $y = 75x - 20$. The student needs to focus on understanding how to represent linear relationships using equations in the form $y = mx + b$.
	Option D is incorrect	The student likely subtracted the number of coins that George's dad gave him instead of adding it, resulting in the equation $y = 20x - 75$. The student needs to focus on understanding how to represent linear relationships using equations in the form $y = mx + b$.

Item#	Rationale	
2	Option G is correct	To determine the length of the building on the scale drawing, the student could have set up and solved a proportion (comparison of two ratios) comparing the height and length of the building with the height and length of the building on the scale drawing. The height of the building is 125 meters, and the length of the building is 80 meters. The height of the building on the scale drawing is 25 centimeters. The student could have used the proportion $\frac{80}{125} = \frac{x}{25}$ to find the value of x, the height of the building on the scale drawing, by multiplying 80 by 25, resulting in 2,000, and then dividing 2,000 by 125, resulting in $x = 16$ cm. The rationale for the correct answer is an efficient way to solve the problem. However, other methods could be used to solve the problem correctly.
	Option F is incorrect	The student likely subtracted the value of 25 from 80 to determine the length of the building on the scale drawing, resulting in 55 cm. The student needs to focus on understanding how to solve problems involving scale drawings.
	Option H is incorrect	The student likely first subtracted the height of the building on the scale drawing, 25 cm, from the height of the building, 125 m, resulting in 100. Then the student used the height of the building on the scale drawing, 25 cm, to set up the proportion $\frac{100}{125} = \frac{x}{25}$. When solved for x, $100 \times 25 = 2{,}500$ and 2,500 divided by 125 is equal to 20. The student needs to focus on understanding how to set up proportions to solve problems involving scale drawings.
	Option J is incorrect	The student likely first subtracted the height of the building on the scale drawing, 25 cm, from the height of the building, 125 m, resulting in 100. Then the student used the length of the building, 80 m, to set up the proportion $\frac{100}{125} = \frac{x}{80}$. When solved for x, $100 \times 80 = 8{,}000$ and 8,000 divided by 125 is equal to 64. The student needs to focus on understanding how to set up proportions to solve problems involving scale drawings.

Item#	Rationale	
3	Option A is correct	To determine what percentage of Alberto's income is used to pay for his rent and groceries, the student could have added the amounts for rent and groceries, $896 + 384 = 1{,}280$, and divided this value by Alberto's monthly income, resulting in $\frac{1{,}280}{3{,}200} = 0.4$. The student should have then converted the decimal value to a percentage by moving the decimal point two places to the right, resulting in 40%. The rationale for the correct answer 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 only calculated the percentage used to pay for rent, $896, and divided this value by Alberto's monthly income, $\frac{896}{3{,}200} = 0.28$, resulting in 28%. The student needs to focus on attending to the details of the question in problems about calculating what percentage of a total budget each category comprises.
	Option C is incorrect	The student likely found the percentage based on the part of the budget given in the table without regard to the monthly income. The student added the categories in the budget, resulting in $896 + 384 + 165 + 428 + 120 = 1{,}993$. The student then divided the sum (total) of rent and groceries by the sum of the values in the table, $\frac{1{,}280}{1{,}993}$, and rounded to the nearest hundredth, resulting in 0.64, or 64%. The student needs to focus on attending to the details of the question in problems about calculating what percentage of a total budget each category comprises.
	Option D is incorrect	The student likely only calculated the percentage used to pay for groceries, $384, and divided this value by Alberto's monthly income, $\frac{384}{3{,}200} = 0.12$, resulting in 12%. The student needs to focus on attending to the details of the question in problems about calculating what percentage of a total budget each category comprises.

Item#	Rationale	
4	Option H is correct	To determine the total surface area (total amount of space covered by the surfaces) of the rectangular prism in square inches, the student should have identified the pairs of congruent (same shape and size) rectangles in the net (two-dimensional view of a three-dimensional figure). The rectangles on the left and right have a base of 3 inches and a height of 5 inches. The area of each of these rectangles ($A = bh$) is 15 square inches ($3 \times 5 = 15$). The top rectangle and the third rectangle from the top have a base of 7 inches and a height of 3 inches. The area of each of these rectangles is 21 square inches ($7 \times 3 = 21$). The second rectangle from the top and the bottom rectangle have a base of 7 inches and a height of 5 inches. The area of each of these rectangles is 35 square inches ($7 \times 5 = 35$). The combined area of these figures, $15 + 15 + 21 + 21 + 35 + 35$, is equal to the total surface area of the rectangular prism (142 square inches).
	Option F is incorrect	The student likely determined the area for one of each of the rectangular faces of the prism and only found the combined area of (amount of space covered by) these surfaces, $15 + 21 + 35 = 71$ square inches. The student needs to focus on understanding the steps and formulas needed to determine the total surface area of a prism.
	Option G is incorrect	The student likely determined the perimeter (distance around the outside) of the net and added the sides of the net, $3 + 3 + 7 + 3 + 5 + 3 + 3 + 5 + 3 + 7 + 5 + 3 + 3 + 5 = 58$ square inches. The student needs to focus on understanding the difference between surface area and perimeter and the steps and formulas needed to determine the total surface area of a prism.
	Option J is incorrect	The student likely multiplied one instance of each of the given dimensions, $7 \times 5 \times 3 = 105$ square inches. The student needs to focus on understanding the steps and formulas needed to determine the total surface area of a prism.

Item#	Rationale	
5	Option D is correct	To determine the most reasonable prediction about the preferred activity for the next 200 visitors to the park, the student could have found the number of visitors out of 200 who probably prefer each type of activity. Since the survey is of 80 visitors and 28 of those visitors prefer camping, the proportion (comparison of two ratios) to find the predicted number of visitors who prefer camping, w, out of 200 is $\frac{28}{80} = \frac{w}{200}$. To find the value of w, the student could have multiplied 28 by 200, resulting in 5,600, and then divided 5,600 by 80, resulting in $w = 70$ visitors who prefer camping. Similarly, proportions to find the predicted number of visitors who prefer hiking trails, x; the number of visitors who prefer water sports, y; and the number of visitors who prefer biking trails, z, are $\frac{22}{80} = \frac{x}{200}$, $\frac{14}{80} = \frac{y}{200}$, and $\frac{16}{80} = \frac{z}{200}$. Solving these proportions results in predicted numbers of 55 who prefer hiking trails, 35 who prefer water sports, and 40 who prefer biking trails. Therefore, the number of visitors who prefer camping will be 2 times the number of visitors who prefer water sports since $35 \times 2 = 70$. The rationale for the correct answer 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 predicted numbers of visitors who would prefer water sports (35) and biking trails (40) but reversed the relationship between the values. The student needs to focus on solving problems involving proportional relationships using quantitative predictions from simple experiments.
	Option B is incorrect	The student likely based the prediction on the values given in the table, instead of the future number of visitors, $22 - 14 = 8$. The student needs to focus on solving problems involving proportional relationships using quantitative predictions from simple experiments.
	Option C is incorrect	The student likely found the predicted numbers of visitors who would prefer camping (70) and water sports (55), and, since $70 - 55 = 15$, confused 15 times with 15 greater than. The student needs to focus on solving problems involving proportional relationships using quantitative predictions from simple experiments.

Item#	Rationale	
6	Option H is correct	To determine which statement is supported by the information in the dot plots (graphs that use dots to display data), the student should have calculated the stated measures of center and spread for each plot. The range (difference between the greatest and least values in a set of data) for Tour Group 1 is $10 - 1 = 9$, and the range for Tour Group 2 is $10 - 1 = 9$. Therefore, the range of the data is the same for both data sets.
	Option F is incorrect	The student likely used the values on the number lines instead of the data points on the number lines to calculate the median (middle number in a set of numbers when the set is ordered by value) number of apples picked by the two tour groups. The value 5.5 is the center value of the numbers on both number lines, but the median of Tour Group 1 is 5.5, and the median of Tour Group 2 is 6. The student needs to focus on understanding how to identify the median on a dot plot and how to compare information presented in two dot plots.
	Option G is incorrect	The student likely misinterpreted the mode (most frequent) of each data set (Tour Group 1 has a mode of 5, and Tour Group 2 has a mode of 7) as the range of each data set (9). The student needs to focus on understanding how to compare ranges and modes of sets of data presented in dot plots.
	Option J is incorrect	The student likely misunderstood how to determine symmetry (data on the right of the middle are approximately the same shape as the data on the left of the middle) in a data set. Neither data set is symmetrical. The student needs to focus on understanding how to compare information presented in two dot plots.

Item#	Rationale	
7	Option C is correct	To determine how much money the chess club members raised from the cookies that were sold, the student could have found the total number of cookies that were sold and multiplied that by \$0.50, the cost of each cookie. According to the given information, $\frac{2}{3}$ of the 288 items sold were cupcakes, so $\frac{1}{3}$ of the 288 items sold were cookies. To find the number of cookies sold, the total number of items, 288, could be multiplied by $\frac{1}{3}$. Since $288 \times \frac{1}{3} = 96$, 96 cookies were sold, and since $96 \times 0.5 = 48$, \$48.00 was raised. The rationale for the correct answer 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 disregarded the information in the fourth bullet, that $\frac{2}{3}$ of the items that were sold were cupcakes, and divided the total number of items sold, 288, by 2, resulting in 144 cupcakes and 144 cookies being sold ($288 \div 2 = 144$). The student then multiplied 144 by 0.5, $144 \times 0.5 = 72$, to find that chess club members raised \$72.00. The student needs to focus on what the values given in a problem represent and how to multiply rational numbers.
	Option B is incorrect	The student likely confused the number of cookies sold with the amount raised and determined that $\frac{1}{3}$ of $288 \left(288 \times \frac{1}{3} = 96\right)$ was the amount raised from the cookies (\$96.00) instead of the number of cookies that were sold. The student needs to focus on what the values given in a problem represent and how to multiply rational numbers.
	Option D is incorrect	The student likely did not regroup when multiplying the number of cookies sold, 96, by the price per cookie (\$0.50), resulting in a total of \$45.00 being raised. The student needs to focus on understanding how to regroup when multiplying.

Item#	Rationale	
8	Option F is correct	To determine the experimental probability (how likely it is that some event will occur based on the results of an experiment) that the next time the number cubes are rolled they will land with a 2 showing on the top face (side) of one number cube and a 4 showing on the top face of the other number cube, the student should have combined the number of times that 2 and 4 showed on the top faces according to the table (6) and divided by the total number of rolls (20). This is a total of 6 times out of 20 and written as the fraction $\frac{6}{20}$. When reduced, this fraction is equal to $\frac{3}{10}$.
	Option G is incorrect	The student likely determined the probability of the number 2 showing on the top face of either number cube. The number 2 appears on the top face of one of the cubes 11 times, so the probability is 11 out of 20. The student needs to focus on understanding how to determine experimental probabilities related to simple events.
	Option H is incorrect	The student likely determined the probability of the number of times the number 2 or the number 4 showed on the top face of one of the cubes (18) and divided that by the total number of rolls of both cubes (40), choosing 18 out of 40 or $\frac{18}{40}$, resulting in a reduced fraction of $\frac{9}{20}$. The student needs to focus on understanding how to determine experimental probabilities related to simple events.
	Option J is incorrect	The student likely determined the theoretical probability (how likely it is that some event will occur) instead of the experimental probability and only included the results in which the top face of the first cube showed 2 and the top face of the second cube showed 4. The student determined that this is a 1 out of 6 chance that the first cube would show a 2 and a 1 out of 6 chance the second cube would show 4. The student then calculated $\frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$ to determine the theoretical probability. The student needs to focus on understanding the difference between theoretical probability and experimental probability related to simple events.

Item#	Rationale	
9	Option C is correct	To determine the area (amount of space covered by a surface) of the figure, the student should have calculated the area of each shape. There are two congruent (same shape and size) squares and one parallelogram. The two squares are congruent, so the areas are equal. To find the area of each square ($A = bh$) and the area of the parallelogram ($A = bh$), the length of the base should be multiplied by the height (for the squares, $3 \times 3 = 9$, and for the parallelogram, $6 \times 2.8 = 16.8$). Combining the areas of the 3 shapes ($9 + 9 + 16.8$) results in 34.8 square meters.
	Option A is incorrect	The student likely calculated the area of the parallelogram and only one square but did not add the area of the second square ($9 + 16.8$), resulting in 25.8 square meters. The student needs to focus on understanding how to determine the area of composite figures.
	Option B is incorrect	The student likely calculated the perimeter (distance around the outside) of each square ($3 + 3 + 3 + 3 = 12$) instead of the area and added these values to the area of the parallelogram ($12 + 12 + 16.8$), resulting in 40.8 square meters. The student needs to focus on understanding how to determine the area of composite figures.
	Option D is incorrect	The student likely found the area of the squares by multiplying the base of the square by 2 (3×2) instead of multiplying the base times the height (3×3), resulting in an area of 6 square meters instead of 9 square meters. The student then added these values to the area of the parallelogram ($6 + 6 + 16.8$), resulting in 28.8 square meters. The student needs to focus on understanding how to determine the area of composite figures.

Item#	Rationale	
10	Option G is correct	To determine the value of $26.95 \div -5\frac{1}{2}$, the student could have changed the fractional value of $-5\frac{1}{2}$ to the decimal number -5.5. The student could have then divided 26.95 by -5.5 $(26.95 \div -5.5)$, resulting in -4.9. The rationale for the correct answer is an efficient way to solve the problem. However, other methods could be used to solve the problem correctly.
	Option F is incorrect	The student likely made a decimal error when dividing, resulting in -0.49 instead of -4.9. The student needs to focus on understanding how to divide rational numbers (numbers that can be represented by the division of two integers).
	Option H is incorrect	The student likely changed the fractional value of $-5\frac{1}{2}$ to the decimal number -5.5 correctly. The student then divided the whole number parts of the numbers (26 and -5) and the decimal parts of the numbers (0.95 and 0.5) and then added them $((26 \div -5) + (0.95 \div 0.5) = -5.2 + 1.9)$, resulting in -3.3. The student needs to focus on understanding how to divide rational numbers (numbers that can be represented by the division of two integers).
	Option J is incorrect	The student likely changed the fractional value of $-5\frac{1}{2}$ to the decimal number -5.12 instead of -5.5. The student then divided 26.95 by -5.12 $(26.95 \div -5.12)$ and rounded the answer to the nearest tenth, resulting in -5.3. The student needs to focus on understanding how to divide rational numbers (numbers that can be represented by the division of two integers).

Item#	Rationale	
11	Option D is correct	To determine the proportion (comparison of two ratios) that can be used to calculate the length of $\overline{LM}$, the student should have understood that, because the triangles are similar, the angle measures of one triangle are congruent to (the same as) the angle measures of the other triangle and the side lengths are in proportion to each other (able to be compared using two equivalent ratios). The student should have determined the corresponding (paired) sides of the similar triangles and set up the proportion accordingly. The proportion $\frac{9}{LM} = \frac{6}{4.5}$ compares corresponding side lengths of triangle *HJK* and triangle *LMN* and can be used to find the length of $\overline{LM}$.
	Option A is incorrect	The student chose a proportion comparing corresponding side lengths of the triangles but reversed the top and bottom numbers of the second ratio in the proportion. The student needs to focus on understanding how to represent the corresponding side lengths of similar figures in a proportion.
	Option B is incorrect	The student likely considered $\overline{LM}$ and $\overline{HK}$ to be corresponding side lengths of the triangles instead of $\overline{LM}$ and $\overline{HJ}$. The student then reversed the top and bottom numbers of the second ratio in the proportion. The student needs to focus on understanding how to represent the corresponding side lengths of similar figures in a proportion.
	Option C is incorrect	The student chose a proportion comparing corresponding side lengths of the triangles but reversed the top and bottom numbers of the second ratio in the proportion. The student needs to focus on understanding how to represent the corresponding side lengths of similar figures in a proportion.

Item#		Rationale
12	-5 and any equivalent values are correct	To determine the solution to the equation $-12x - 7 = 53$, the student should have first added 7 to both sides of the equation, resulting in $-12x = 60$. The student could have then divided both sides of the equation by -12, resulting in $x = -5$. The rationale for the correct answer is an efficient way to solve the problem. However, other methods could be used to solve the problem correctly.

Item#	Rationale	
13	Option C is correct	To determine the volume (amount of three-dimensional space taken up) of the rectangular pyramid in cubic feet, the student should have used the formula for the volume of a pyramid from the Volume section of the STAAR Grade 7 Mathematics Reference Materials page within the student's test booklet ($V = \frac{1}{3}Bh$, where V = the volume, B = the area (amount of space covered by a surface) of the base, and h = the height (vertical distance from top to bottom) of the pyramid). To determine B, the student should have multiplied 4 ft by 8 ft, resulting in $32\ \text{ft}^2$. Then the student should have substituted the values of $B = 32$ and $h = 6$ into the volume formula ($V = \frac{1}{3} \times 32 \times 6$), resulting in a volume of $64\ \text{ft}^3$.
	Option A is incorrect	The student likely used $\frac{1}{2}$ instead of $\frac{1}{3}$ when using the formula for volume, resulting in $\frac{1}{2} \times 32 \times 6 = 96\ \text{ft}^3$. The student needs to focus on understanding how to solve problems involving volumes of pyramids.
	Option B is incorrect	The student likely did not use the formula for volume and added the given dimensions of 4, 6, and 8 ($4 + 6 + 8$), resulting in $18\ \text{ft}^3$. The student needs to focus on understanding how to solve problems involving volumes of pyramids.
	Option D is incorrect	The student likely calculated 32×6 instead of $\frac{1}{3} \times 32 \times 6$, resulting in $192\ \text{ft}^3$. The student needs to focus on understanding how to solve problems involving volumes of pyramids.

Item#	Rationale	
14	Option F is correct	To determine the graph that best represents the relationship between x and y, the student could have recognized that the total number of new words learned by the student is represented by y, the number of weeks since the student has been in the program is represented by x, and the rate at which the student learned words is 15 words per week ($y = 15x$). The student then could have checked pairs of x- and y-values to find the graph in which each y-value was the result of multiplying the corresponding x-value by 15. The rationale for the correct answer is an efficient way to solve the problem. However, other methods could be used to solve the problem correctly.
	Option G is incorrect	The student likely misinterpreted the x-axis as the number of months instead of the number of weeks. The student needs to focus on how to represent a real-world situation with a graphical representation.
	Option H is incorrect	The student likely chose a graph with a one-to-one ratio on the axes without regard to the rate of change of 15 words per week. The student needs to focus on how to represent a real-world situation with a graphical representation.
	Option J is incorrect	The student likely misinterpreted the x-axis as the number of days instead of the number of weeks. The student needs to focus on how to represent a real-world situation with a graphical representation.

2021 STAAR Grade 7 Math Rationales

Item#	Rationale	
15	Option B is correct	To determine how many more students chose pizza than students who chose salad, the student could have determined the number of students who chose each type of food. To determine the number of people who chose pizza, 30% of 80 must be calculated. This is $0.30 \times 80 = 24$. To determine the number of people who chose salad, 10% of 80 must be calculated. This is $0.10 \times 80 = 8$. So the difference between pizza and salad is $24 - 8 = 16$. The rationale for the correct answer 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 the number of students who chose salad, $0.10 \times 80 = 8$. The student needs to focus on carefully comparing the parts of data represented by circle graphs.
	Option C is incorrect	The student likely determined the correct values for the numbers of students who chose pizza and salad but found the sum (total) ($24 + 8 = 32$) instead of the difference. The student needs to focus on understanding which key words indicate subtraction in real-world problems.
	Option D is incorrect	The student likely chose the number of students who chose pizza, $0.30 \times 80 = 24$. The student needs to focus on carefully comparing the parts of data represented by circle graphs.

Item#	Rationale	
16	Option F is correct	To determine the inequality that represents all possible values of x, the student should have first understood that the expression "boxes that weigh 50 pounds each" is equivalent to 50 times the number of boxes, x, and that the expression "the truck is loaded with a piano that weighs 400 pounds" represents the initial (beginning) value. Then the student should have understood that "the greatest weight a moving truck can carry is 1,600 pounds" indicates that the truck can carry at most 1,600 pounds, or a value of 1,600 ($\leq$ 1,600). Therefore, the inequality is $50x + 400 \leq 1{,}600$.
	Option G is incorrect	The student likely interpreted the relationship between the initial weight and the weight of each box correctly but chose the inequality with the symbol that represents "at least" instead of "at most." The student needs to focus on understanding how to write real-world problems based on inequalities.
	Option H is incorrect	The student likely reversed the relationship between the weight of each box and the initial weight, resulting in the inequality $400x + 50 \leq 1{,}600$. The student needs to focus on understanding how to write real-world problems based on inequalities.
	Option J is incorrect	The student likely reversed the relationship between the weight of each box and the initial weight and then chose the inequality with the symbol that represents "at least" instead of "at most," resulting in the inequality $400x + 50 \geq 1{,}600$. The student needs to focus on understanding how to write real-world problems based on inequalities.

Item#	Rationale	
17	Option D is correct	To determine which statement is true, the student could have found the probability of selecting a purple paper clip by finding the total number of paper clips in the container ($8 + 14 + 12 + 16 = 50$) and then finding the ratio of the number of purple paper clips in the container to the total number of paper clips in the container $\left(\frac{14}{50}\right)$, resulting in a reduced fraction of $\frac{7}{25}$. The student could have then subtracted the probability of selecting a purple paper clip from 1 to find the probability of selecting a paper clip that is not purple $\left(1 - \frac{7}{25}\right)$, resulting in $\frac{18}{25}$. The rationale for the correct answer 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 reversed the probability of choosing a purple paper clip based on purple being 1 of 4 colors $\left(\frac{1}{4}\right)$ with the probability of selecting a paper clip that is not purple $\left(1 - \frac{1}{4} = \frac{3}{4}\right)$. The student needs to focus on attending to the details of the question in problems that require determining the probability of an event and its complement.
	Option B is incorrect	The student likely found the probability of choosing a purple paper clip based on purple being 1 of 4 colors, writing the ratio of the number of paper clips in the container to the total number of paper clips in the container as $\frac{1}{4}$. Then the student subtracted this ratio from 1 to find the probability of selecting a paper clip that is not purple $\left(1 - \frac{1}{4}\right)$, resulting in $\frac{3}{4}$. The student needs to focus on attending to the details of the question in problems that require determining the probability of an event and its complement.

Item#	Rationale	
	Option C is incorrect	The student likely reversed the probability of selecting a purple paper clip from the container $\left(\frac{14}{50} = \frac{7}{25}\right)$ with the probability of selecting a paper clip that is not purple $\left(1 - \frac{7}{25} = \frac{18}{25}\right)$. The student needs to focus on attending to the details of the question in problems that require determining the probability of an event and its complement.

Item#	Rationale	
18	Option J is correct	To determine the price of a used book in the bookstore, the student could have found 400% of $1.50. The student could have converted 400% to a decimal by moving the decimal point two places to the left, resulting in 4.00. Then the student could have multiplied 1.50 by 4.00 to get 6.00. Since 400% of 1.50 is 6.00, the price of a used book in the bookstore is $6.00. The rationale for the correct answer is an efficient way to solve the problem. However, other methods could be used to solve the problem correctly.
	Option F is incorrect	The student likely converted 400% to a decimal (4.00) and used that amount ($4.00) as the amount the cost of a used book was increased and added $1.50 + 4.00$ to get the price of a used book, resulting in $5.50. The student needs to focus on understanding how to solve problems involving percents.
	Option G is incorrect	The student likely converted 400% to a decimal (4.00) and used that amount ($4.00) as the price of a used book. The student needs to focus on understanding how to solve problems involving percents.
	Option H is incorrect	The student likely found 40% instead of 400% of 1.5 (1.5×0.40), resulting in 0.60. Then the student added 0.60 to 1.50 to find the price of a used book ($1.50 + 0.60$), resulting in $2.10. The student needs to focus on understanding how to solve problems involving percents.

Item#	Rationale	
19	Option A is correct	To determine the value of x, the student could have set up and solved a proportion (comparison of two ratios) comparing corresponding (paired) side lengths of the similar figures (two figures with corresponding angle measures equal and corresponding side lengths proportional). Sides *KF* and *TM* are corresponding sides, and sides *JH* and *SQ* are corresponding sides. The student could have used the proportion $\frac{6}{9} = \frac{9}{x}$ to find the value of x by multiplying 9 by 9, resulting in 81, and then dividing 81 by 6, resulting in $x = 13.5$. The rationale for the correct answer 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 noticed that the length of side *TM* was 3 more than the length of side *KF* ($9 - 6 = 3$) and reasoned that the length of side *SQ* was 3 more than the length of side *JH*. The student then added 3 to 9 ($9 + 3$), resulting in 12. The student needs to focus on understanding how to solve problems involving similar shapes.
	Option C is incorrect	The student likely understood that the length of side *TM* was 1.5 times the length of side *KF* and multiplied the length of side *JH* (9) by 1.5 to find the length of side *SQ*. However, the student did not regroup when multiplying 9 by 1.5, resulting in 9.5. The student needs to focus on understanding how to regroup when multiplying.
	Option D is incorrect	The correct answer (13.5) was presented in one of the other answer options.

Item#	Rationale	
20	Option H is correct	To determine the equation representing the relationship between x and y in the graph, the student could have identified the rate of change (ratio of the change in y-values to the change in x-values) and the y-value when $x = 0$ of the graphed line and written the equation in the form $y = mx + b$, where m represents the rate of change and b represents the y-value when $x = 0$. To find the rate of change, the student could have used the points $(-2, 7)$ and $(1, 1)$ and found the ratio of the vertical distance (up and down) to the horizontal distance (left to right). The vertical distance between these two points is 6 units, and the horizontal distance between these two points is 3 units. Since the line is decreasing from left to right, the rate of change is negative. This results in a rate of change of $-\frac{6}{3} = -2$. The y-value is 3 when $x = 0$. Substituting -2 for m and 3 for b in the equation $y = mx + b$ results in the equation $y = -2x + 3$. The rationale for the correct answer is an efficient way to solve the problem. However, other methods could be used to solve the problem correctly.
	Option F is incorrect	The student likely confused the m- and b-values in the equation $y = mx + b$, thinking that m represented the y-value when $x = 0$ and b represented the rate of change. The student needs to focus on understanding how to determine the equation of a line from a graph.
	Option G is incorrect	The student likely found the correct y-value when $x = 0$ (3) but identified the rate of change as the ratio of the horizontal distance to the vertical distance $\left(-\frac{3}{6} = -\frac{1}{2}\right)$ instead of the ratio of the vertical distance to the horizontal distance $\left(-\frac{6}{3} = -2\right)$. The student needs to focus on understanding how to determine the equation of a line from a graph.
	Option J is incorrect	The student likely used the x-value when $y = 0$ $\left(\frac{3}{2}\right)$ instead of the y-value when $x = 0$ (3). The student also disregarded that the line was decreasing from left to right and thought the rate of change was positive instead of negative (2). The student needs to focus on understanding how to determine the equation of a line from a graph.

Item#	Rationale	
21	Option A is correct	The student should have determined the volume (amount of three-dimensional space taken up) of the triangular prism (three-dimensional figure with triangular bases) in cubic inches by using the formula for the volume of a prism from the Volume section of the STAAR Grade 7 Mathematics Reference Materials page within the student's test booklet ($V = Bh$, where $V =$ volume, B is the area (amount of space covered by a surface) of the base, and h is the height (distance between the two bases, in this case triangles) of the prism). The base is a triangle, so the area of the triangle can be found with the expression $\frac{1}{2} \times 10.8 \times 7.2$, which equals 38.88 square inches. The height of the triangular prism is 1.5 inches, so the volume of the triangular prism is determined by multiplying 38.88 square inches by 1.5 inches, which equals 58.32 cubic inches.
	Option B is incorrect	The student correctly identified the prism as having a triangular base but did not multiply the base and height of the triangle by $\frac{1}{2}$. The student therefore multiplied $10.8 \times 7.2 \times 1.5$, resulting in 116.64 cubic inches. The student needs to focus on understanding how to find the volume of triangular prisms.
	Option C is incorrect	The student likely found the volume of the triangular prism correctly $\left(\frac{1}{2} \times 10.8 \times 7.2 \times 1.5 = 58.32\right)$ but then incorrectly multiplied the volume by $\frac{1}{3}\left(\frac{1}{3} \times 58.32\right)$, which equals 19.44 cubic inches, confusing the formula for the volume of a triangular prism with the volume of a triangular pyramid. The student needs to focus on understanding how to solve problems involving volumes of pyramids.
	Option D is incorrect	The student likely added the given dimensions $7.2 + 10.8 + 1.5 + 9$, resulting in 28.5 cubic inches. The student needs to focus on understanding how to solve problems involving volumes of rectangular prisms.

Item#		Rationale
22	17.50 and any equivalent values are correct	To determine the cost of each ticket, the student should have divided the amount that Hector paid ($105) by the number of tickets (6). This results in $17.50.

Item#	Rationale	
23	Option C is correct	To determine which statement is NOT true based on the results in the table, the student could have used the data given in the table for pies sold during one day and could have used the assumption that the number of pies sold during one week would be seven times the number of pies sold during one day. The student could have determined that 35 apple pies, 21 pecan pies, 28 lemon pies, and 56 chocolate pies sold during one week. The student could have identified that the statement indicating that it is more likely for an apple or lemon pie ($35 + 28 = 63$) to be sold than for a pecan or chocolate pie ($21 + 56 = 77$) to be sold is NOT true based on the results in the table. The rationale for the correct answer 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 identified a statement that is supported by the results in the table instead of one that is NOT true. It is two times as likely for a chocolate pie to be sold (56) as for a lemon pie to be sold (28) because $56 = 28 \times 2$. The student needs to focus on attending to the details of the question in problems requiring quantitative predictions.
	Option B is incorrect	The student identified a statement that is supported by the results in the table instead of one that is NOT true. It is equally likely for an apple or pecan pie to be sold ($35 + 21$) as for a chocolate pie to be sold (56) because $35 + 21 = 56$. The student needs to focus on attending to the details of the question in problems requiring quantitative predictions.
	Option D is incorrect	The student identified a statement that is supported by the results in the table instead of one that is NOT true. It is less likely for a pecan pie to be sold (21) than for a lemon pie to be sold (28) because 21 is less than 28. The student needs to focus on attending to the details of the question in problems requiring quantitative predictions.

Item#	Rationale	
24	Option G is correct	To determine the total distance the student ran, the student could have multiplied the distance the student ran each of the first 5 days $\left(3\frac{1}{2}\right)$ by 5, resulting in $3\frac{1}{2} \times 5 = 17\frac{1}{2}$. Then the student could have multiplied the distance the student ran each of the next 5 days $\left(4\frac{1}{4}\right)$ by 5, resulting in $4\frac{1}{4} \times 5 = 21\frac{1}{4}$. The student could have then added the distances together to find the total distance the student ran, $17\frac{1}{2} + 21\frac{1}{4} = 38\frac{3}{4}$ miles. The rationale for the correct answer is an efficient way to solve the problem. However, other methods could be used to solve the problem correctly.
	Option F is incorrect	The student likely converted $3\frac{1}{2}$ and $4\frac{1}{4}$ to decimals (3.5 and 4.25) to solve the problem. The student then determined the total distance by correctly multiplying the distance the student ran each of the first 5 days by 5, resulting in $3.5 \times 5 = 17.5$, and the distance the student ran each of the next 5 days by 5, resulting in $4.25 \times 5 = 21.25$. However, when adding the distances together, the student misaligned place values and added 21.25 and 1.75 instead of 21.25 and 17.50, resulting in a sum (total) of 23 miles. The student needs to focus on understanding how to use place value to add rational numbers.
	Option H is incorrect	The student likely understood that the student ran for 10 days but found the total distance the student ran by multiplying $4\frac{1}{4}$ by 10 ($4\frac{1}{4} \times 10 = 42\frac{1}{2}$ miles), disregarding the fact that the student ran $3\frac{1}{2}$ miles for the first 5 days. The student needs to focus on attending to the details of a multi-step problem.

Item#	Rationale	
	Option J is incorrect	The student likely understood that the student ran for 10 days but found the total distance the student ran by multiplying $3\frac{1}{2}$ by 10 ($3\frac{1}{2} \times 10 = 35$ miles), disregarding the fact that the student ran $4\frac{1}{4}$ miles for the second 5 days. The student needs to focus on attending to the details of a multi-step problem.

Item#	Rationale	
25	Option D is correct	To determine the measurement that is closest to the area (amount of space covered by a surface) of the circle, the student should have measured the radius (distance from the center of the circle to a point on the circle) of the circle to the nearest half centimeter. The radius of the circle is closest to 3.5 centimeters. The student should then have used the formula for the area of a circle from the Area section of the STAAR Grade 7 Mathematics Reference Materials page within the student's test booklet ($A = \pi r^2$, where A = area and r = the radius). Substituting 3.5 for the value of the radius and 3.14 for π (from the Additional Information section of the STAAR Grade 7 Mathematics Reference Materials page within the student's test booklet) into the formula for area results in $A \approx 3.14 \times (3.5)^2 = 38.47$ square centimeters.
	Option A is incorrect	The student likely found the diameter (straight line going through the center of a circle connecting two points on the circle), 7 cm, and used it as the radius in the formula for area, resulting in $A \approx 3.14 \times 7^2 = 153.86$ square centimeters. The student needs to focus on understanding that the radius is needed to determine the area of a circle.
	Option B is incorrect	The student likely found the diameter (straight line going through the center of a circle connecting two points on the circle), 7 cm, and used it as the radius in the formula for area. The student then multiplied the value by 2 instead of squaring it, resulting in $A \approx 3.14 \times 7 \times 2 = 43.96$ square centimeters. The student needs to focus on understanding how to correctly apply the formula for the area of a circle.
	Option C is incorrect	The student likely used the radius in the formula for area and multiplied the value by 2 instead of squaring it, resulting in $A \approx 3.14 \times 3.5 \times 2 = 21.98$ square centimeters. The student needs to focus on understanding how to correctly apply the formula for the area of a circle.

Item#	Rationale	
26	Option F is correct	The student should have chosen the sample space (set of all possible outcomes) that is described by the tree diagram. Each time Spinner 1 is spun, the possible outcomes are 1, 2, or 3. Each time Spinner 2 is spun, the outcomes are R, T, or Z. So if Spinner 1 lands on 1, Spinner 2 will land on R, T, or Z, which results in the sample space $\{(1, R), (1, T)$, and $(1, Z)\}$. This scenario repeats when Spinner 1 lands on 2 and when Spinner 1 lands on 3. This results in nine total possible outcomes for spinning both spinners.
	Option G is incorrect	The student likely noticed that each outcome for Spinner 1 was paired with each outcome for Spinner 2 but did not realize that in the first nine outcomes, the outcomes for Spinner 1 were paired with each other. The student needs to focus on understanding how to identify the sample space for compound events.
	Option H is incorrect	The student likely noticed the correct outcomes of the two spinners but then chose the list of outcomes instead of pairing each outcome for Spinner 1 with each outcome for Spinner 2. The student needs to focus on understanding how to identify the sample space for compound events.
	Option J is incorrect	The student likely noticed the correct outcomes of the two spinners but then incorrectly paired each outcome for Spinner 1 with all of the outcomes for Spinner 2 as one possibility. The student needs to focus on understanding how to identify the sample space for compound events.

Item#	Rationale	
27	Option B is correct	To determine which store has the better sale price for a camera with an original price of \$80, the student should have calculated the sale price for a camera at each store using the information in the bullet statements. At Store X all cameras are on sale for 15% off the original price. To find the price of a camera with an original price of \$80, the student could have multiplied \$80 by 0.15 and subtracted the answer from \$80 ($\$80 - (\$80 \times 0.15)$), resulting in \$68. At Store Y all cameras are on sale for $\frac{1}{5}$ off the original price. To find the price of a camera with an original price of \$80, the student could have multiplied \$80 by $\frac{1}{5}$ and subtracted the answer from \$80 ($\$80 - \left(\$80 \times \frac{1}{5}\right)$), resulting in \$64. Comparing the sale price of a camera with an original price of \$80 at each store results in Store Y having a better sale price of \$64. The rationale for the correct answer 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 chose the store with a higher sale price instead of a lower sale price of a camera with an original price of \$80. The student needs to focus on analyzing all the information given in a problem to determine the better sale price of an item between two different stores.
	Option C is incorrect	The student likely identified the amount of the discount at Store X ($\$80 \times 0.15 = \$12$) as the sale price of the camera. The student needs to focus on analyzing all the information given in a problem to determine the better sale price of an item between two different stores.
	Option D is incorrect	The student likely identified the amount of the discount at Store Y $\left(\$80 \times \frac{1}{5} = \$16\right)$ as the sale price of the camera. The student needs to focus on analyzing all the information given in a problem to determine the better sale price of an item between two different stores.

Item#	Rationale	
28	Option J is correct	To determine which equation is true when $c = 3$, the student should have evaluated the equation using 3 for c in the equation to see if it makes a true statement. When 3 is substituted for c into $4(c + 2)$, the result is $4(3 + 2) = 4(5) = 20$.
	Option F is incorrect	The student likely combined 2 and 3 to make 23 instead of multiplying 2 by 3, resulting in $23 + 8 = 31$. The student needs to focus on understanding how to determine whether a given value makes an equation true.
	Option G is incorrect	The student likely distributed (multiplied) 5 to only the 7 in the parentheses, resulting in $5(7 - 3) = 35 - 3 = 32$. The student needs to focus on understanding how to determine whether a given value makes an equation true.
	Option H is incorrect	The student likely added 6 and 3 instead of multiplying 6 by 3, resulting in $9 - (6 + 3) = 9 - 9 = 0$. The student needs to focus on understanding how to determine whether a given value makes an equation true.

Item#	Rationale	
29	Option C is correct	To determine the number of liters of water Andre used during the month, the student could have used the ratio of 3.8 liters to 1 gallon and the variable (symbol used to represent an unknown number) g to represent the unknown quantity and then set up and solved the proportion (comparison of two ratios) $\frac{3.8 \text{ liters}}{1 \text{ gallon}} = \frac{g \text{ liters}}{785 \text{ gallons}}$. The student could have used 785 as a scale factor (a number used as a multiplier of a quantity), since $1 \times 785 = 785$, and then multiplied 3.8 by 785 to determine the number of liters, 2,983. The rationale for the correct answer 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 divided 785 by 3.8 instead of multiplying 785 by 3.8 and rounded the answer, resulting in 206.6 liters. The student needs to focus on understanding how to use proportions to convert between measurement systems.
	Option B is incorrect	The student likely used the correct scale factor but made an error when multiplying 785 by 3.8 by not carrying over the tens digit, resulting in 2,709 liters. The student needs to focus on understanding how to accurately multiply a three-digit number by a two-digit number.
	Option D is incorrect	The student likely identified 3.8 as 38, divided 785 by 38, and rounded the answer, resulting in 20.7 liters. The student needs to focus on accurately identifying decimal numbers and on understanding how to use proportions to convert between measurement systems.

Item#		Rationale
30	0.4 and any equivalent values are correct	To determine the theoretical probability (how likely it is that some event will occur) that the lollipop randomly selected from the bag will be either cherry flavored or watermelon flavored, the student could have written a fraction that has the total number of cherry-flavored and watermelon-flavored lollipops in the bag $(8 + 14 = 22)$ over the total number of lollipops in the bag $(17 + 8 + 14 + 16 = 55)$. The fraction $\frac{22}{55}$ reduces to $\frac{2}{5}$, which is equal to 0.4 when written in decimal form. The rationale for the correct answer is an efficient way to solve the problem. However, other methods could be used to solve the problem correctly.

Item#	Rationale	
31	Option D is correct	To determine the current value of Avery's car, the student should have added the values of the given items in the table and subtracted the sum (total) from Avery's net worth. The sum of the values in the table is $\$3{,}900 + (-\$2{,}950) + \$37{,}425 + (-\$1{,}700) + \$4{,}600 = \$41{,}275$. The student subtracted this value from Avery's net worth, $\$53{,}755 - \$41{,}275$, and the current value of Avery's car is $\$12{,}480$.
	Option A is incorrect	The student likely thought all the values given in the table were negative. This makes the sum of the values in the table $-\$3{,}900 + (-\$2{,}950) + (-\$37{,}425) + (-\$1{,}700) + (-\$4{,}600) = -\$50{,}575$. The sum of Avery's net worth and this value is $\$53{,}755 - \$50{,}575 = \$3{,}180$. The student needs to focus on understanding financial assets and liabilities in net worth statements.
	Option B is incorrect	The student likely calculated the sum of the assets ($\$3{,}900 + \$37{,}425 + \$4{,}600 = \$45{,}925$), combined the values of the liabilities to the net worth ($\$2{,}950 + \$1{,}700 + \$53{,}755 = \$58{,}405$), and did not reduce the previous number by 1 while borrowing when subtracting the sum of the assets from the combined liabilities and net worth. This makes the difference $\$58{,}405 - \$45{,}925 = \$13{,}580$. The student needs to focus on understanding financial assets and liabilities in net worth statements.
	Option C is incorrect	The student likely subtracted only the sum of the assets ($\$3{,}900 + \$37{,}425 + \$4{,}600 = \$45{,}925$) from the net worth ($\$53{,}755$). This makes the difference $\$53{,}755 - \$45{,}925 = \$7{,}830$. The student needs to focus on understanding financial assets and liabilities in net worth statements.

Item#	Rationale	
32	Option F is correct	To determine the area of (amount of space covered by) the figure, the student could have calculated the combined areas of the triangle, rectangle, and two semicircles (one whole circle). The base of the triangle is 6 centimeters, and the height of the triangle is 4 centimeters. The base of the rectangle is 8 centimeters, and the height of the rectangle is 6 centimeters. For each semicircle, the diameter (straight line going through the center of a circle connecting two points on the circle) is 3 centimeters. As a result, the radius (distance from the center of the circle to a point on the circle) of each semicircle is 1.5 centimeters, or half the length of the diameter. The student could have used the formulas for the areas of a triangle, rectangle, and circle from the Area section of the STAAR Grade 7 Mathematics Reference Materials page within the student's test booklet (triangle: $A = \frac{1}{2}bh$, where A = area of the triangle, b = the base, and h = the height; rectangle: $A = bh$, where A = area of the rectangle, b = the base, and h = the height; and circle: $A = \pi r^2$, where A = area of the circle, π = pi (approximately 3.14), and r = radius). The student could have combined the formulas to find the area of the figure, using A = (area of the triangle) + (area of the rectangle) + (area of the whole circle), or $A = \left(\frac{1}{2}bh\right) + (bh) + (\pi r^2)$. Substituting values into the formula results in $A \approx \left(\frac{1}{2} \times 6 \times 4\right) + (8 \times 6) + (3.14 \times (1.5)^2) \approx 12 + 48 + 7 = 67$, or approximately 67 square centimeters. The rationale for the correct answer is an efficient way to solve the problem. However, other methods could be used to solve the problem correctly.
	Option G is incorrect	The student likely calculated the areas of the triangle and rectangle correctly but calculated the area of two whole circles instead of two semicircles, resulting in $12 + 48 + 7 + 7 = 74$ square centimeters. The student needs to focus on understanding how to determine the area of composite figures.
	Option H is incorrect	The student likely calculated the areas of the rectangle and semicircles correctly but did not multiply by $\frac{1}{2}$ when calculating the area of the triangle. Instead of $\frac{1}{2}(6 \times 4)$, the student calculated (6×4), resulting in $24 + 48 + 7 = 79$ square centimeters. The student needs to focus on understanding how to calculate the area of a triangle.

Item#	Rationale	
	Option J is incorrect	The student likely calculated the areas of the triangle and rectangle correctly but calculated the areas of the two semicircles with a radius of 3. Instead of $\pi \times (1.5)^2$, the student calculated $\pi \times (3)^2$, resulting in $12 + 48 + 28 = 88$ square centimeters. The student needs to focus on understanding how to calculate the area of a circle.

Item#	Rationale	
33	Option D is correct	To determine the percentage of students that have 5 or more vowels in their first and last names, the student could have used the dot plot to write a fraction that has the total number of students with 5 or more vowels in their first and last names (21) over the total number of students (30). The fraction $\frac{21}{30}$ is equal to 0.70 and can be changed into a percentage by multiplying 0.70 by 100, resulting in 70%. The rationale for the correct answer 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 identified the number of students that have 5 or more vowels in their first and last names as a percentage, resulting in 21%. The student needs to focus on understanding how to determine a percentage when solving problems using data represented in dot plots.
	Option B is incorrect	The student likely identified the percentage of the fraction representing the total number of students with 5 or fewer vowels in their first and last names (19) over the total number of students (30). The fraction $\frac{19}{30}$ is approximately 0.63 and can be changed into a percentage by multiplying 0.63 by 100, resulting in 63%. The student needs to focus on understanding how to accurately solve problems using data represented in dot plots.
	Option C is incorrect	The student likely identified the percentage of the fraction representing the total number of students with more than 5 vowels in their first and last names (11) over the total number of students (30). The fraction $\frac{11}{30}$ is approximately 0.37 and can be changed into a percentage by multiplying 0.37 by 100, resulting in 37%. The student needs to focus on understanding how to accurately solve problems using data represented in dot plots.

Item#	Rationale	
34	Option F is correct	To determine the situation represented by the equation, the student should have reviewed the equation for key characteristics. The equation $250 + 65x = 575$ shows that 250 represents a fixed initial amount, 65 represents a rate, and 575 represents the total amount. This statement shows the total distance Jeremy is traveling to a location is 575 miles and the fixed amount that he has already traveled is 250 miles. The question shows the rate of Jeremy's travel to the location, which is 65 miles per hour. This situation is represented by the key characteristics of the equation $250 + 65x = 575$.
	Option G is incorrect	The student correctly identified the total amount and fixed initial amount of the situation but likely identified x as the number of additional miles instead of the number of hours traveled at the rate of 65 miles per hour. The student needs to focus on understanding how to write real-world problems based on equations.
	Option H is incorrect	The student correctly identified the total amount but likely reversed the fixed initial amount and rate of the situation, identifying the fixed initial amount as 65 pages and the rate as 250 pages per day $(65 + 250x = 575)$. The student needs to focus on understanding how to write real-world problems based on equations.
	Option J is incorrect	The student correctly identified the total amount but likely added the fixed initial amount, the rate, and the variable (symbol used to represent an unknown number) x on the right side of the equation, identifying the sum (total) of 250 pages and 65 pages with x pages $(315 + x = 575)$. The student needs to focus on understanding how to write real-world problems based on equations.

Item#		Rationale
35	45 and any equivalent values are correct	To determine the value of x, the student could have written and solved an equation representing the angle measures of the triangle shown in the diagram. The sum (total) of the angle measures of a triangle is equal to 180°, so the equation can be written as $30° + (2x + 10)° + 50° = 180°$, or $30 + 2x + 10 + 50 = 180$. Combining like terms results in $2x + 90 = 180$. Then 90 is subtracted from both sides of the equation, resulting in $2x = 90$. Finally, the terms on both sides of the equation are divided by 2, resulting in $x = 45$. The rationale for the correct answer is an efficient way to solve the problem. However, other methods could be used to solve the problem correctly.

Item#	Rationale	
36	Option G is correct	To determine the solution set for the inequality $4 - 5g > 39$, the student could have first subtracted 4 from both sides of the inequality, resulting in $-5g > 35$. The student could have then divided both sides of the inequality by -5. When an inequality is divided by a negative number, the inequality symbol is reversed. This step results in the solution to the inequality, which is $g < -7$. The rationale for the correct answer is an efficient way to solve the problem. However, other methods could be used to solve the problem correctly.
	Option F is incorrect	The student likely followed all the correct steps to solve the inequality but did not reverse the inequality symbol. The student needs to focus on how to represent the inequality symbol when solving an inequality.
	Option H is incorrect	The student correctly subtracted 4 from both sides of the inequality and reversed the inequality symbol but likely divided both sides of the inequality by 5 instead of -5, resulting in $g < 7$. The student needs to focus on how to isolate a variable (symbol used to represent an unknown number) when solving an inequality.
	Option J is incorrect	The student correctly subtracted 4 from both sides of the inequality but likely divided both sides of the inequality by 5 instead of -5 and did not reverse the inequality symbol, resulting in $g > 7$. The student needs to focus on how to isolate a variable (symbol used to represent an unknown number) and represent the inequality symbol when solving an inequality.

Item#	Rationale	
37	Option A is correct	To determine the difference between the circumferences of (distances around the circles) circle *X* and circle *Y*, the student should have used the formula for the circumference of a circle from the Circumference section and the approximation of pi (π) from the Additional Information section of the STAAR Grade 7 Mathematics Reference Materials page within the student's test booklet ($C = \pi d$, where C = the circumference, d = the diameter (straight line going through the center of a circle connecting two points on the circle), and $\pi \approx 3.14$) and subtracted the values of the circumferences. To find the circumference of circle *X*, the student could have multiplied 3.14 by the diameter, 15 centimeters, resulting in $3.14 \times 15 = 47.1$ centimeters. To find the circumference of circle *Y*, the student could have multiplied 3.14 by the diameter, 20 centimeters, resulting in $3.14 \times 20 = 62.8$ centimeters. Finally, the student should have subtracted 47.1 centimeters from 62.8 centimeters, resulting in 15.7 centimeters.
	Option B is incorrect	The student likely calculated the difference between each radius (distance from the center of the circle to a point on the circle) of the circles $(10 - 7.5 = 2.5)$ and multiplied the difference by 3.14, resulting in $2.5 \times 3.14 \approx 7.85$ centimeters. The student needs to focus on understanding how to correctly apply the formula for the circumference of a circle.
	Option C is incorrect	The student likely calculated the difference between the areas of (amounts of space covered by) circle *X* and circle *Y* instead of the difference between the circumferences. The student calculated (area of circle *Y*) – (area of circle *X*), resulting in $(3.14 \times (10)^2) - (3.14 \times (7.5)^2) = 314 - 176.625 = 137.375$, or approximately 137 square centimeters. The student needs to focus on understanding which formula to apply in calculations involving circles.
	Option D is incorrect	The student likely calculated the difference between the diameters of the circles $(20 - 15 = 5)$ and used the difference as the radius (distance from the center of the circle to a point on the circle) in the formula for the circumference of a circle ($C = 2\pi r$, where C = the circumference and r = the radius), resulting in $2 \times 3.14 \times 5 = 31.4$ centimeters. The student needs to focus on understanding how to correctly apply the formula for the circumference of a circle.

Item#	Rationale	
38	Option H is correct	To determine the amount of cups of grapes needed for 30 servings of the fruit salad, the student could have set up and solved a proportion (comparison of two ratios) equating ratios of cups of grapes to servings. Since the given ratio of cups of grapes to servings is $\frac{1}{3}$ to 4 and the number of needed servings of the fruit salad is 30, a proportion to find g, the amount of cups of grapes needed, is $\frac{\left(\frac{1}{3}\right)}{4} = \frac{g}{30}$. To find the value of g, the student could have first multiplied $\frac{1}{3}$ by 30 and 4 by g, resulting in $4g = 10$. The student could have then divided both sides of the equation by 4, resulting in $g = \frac{10}{4} = 2\frac{2}{4} = 2\frac{1}{2}$. Therefore, the amount of cups of grapes needed for 30 servings of the fruit salad is $2\frac{1}{2}$ cups. The rationale for the correct answer is an efficient way to solve the problem. However, other methods could be used to solve the problem correctly.
	Option F is incorrect	The student likely identified the given ratio of cups of grapes to servings as $\frac{1}{3}$ to 1 instead of $\frac{1}{3}$ to 4 and then solved the proportion $\frac{\left(\frac{1}{3}\right)}{1} = \frac{g}{30}$, resulting in $g = 10$, or 10 cups. The student needs to focus on understanding how to identify the given ratios when solving problems involving proportional relationships.
	Option G is incorrect	The student correctly identified the proportion $\frac{\left(\frac{1}{3}\right)}{4} = \frac{g}{30}$ but likely multiplied by 4 instead of dividing by 4 when solving for the value of g, resulting in $g = 10 \times 4 = 40$, or 40 cups. The student needs to focus on understanding how to solve problems involving proportional relationships.

Item#	Rationale	
	Option J is incorrect	The student likely identified the given ratio of cups of grapes to servings as 1 to 4 instead of $\frac{1}{3}$ to 4 and then solved the proportion $\frac{1}{4} = \frac{g}{30}$, resulting in $g = \frac{30}{4} = 7\frac{2}{4} = 7\frac{1}{2}$, or $7\frac{1}{2}$ cups. The student needs to focus on understanding how to identify the given ratios when solving problems involving proportional relationships.

Item#	Rationale	
39	Option B is correct	To determine which statement is supported by the information in the box plots (data displays that show the minimum, first quartile, median, third quartile, and maximum of sets of data), the student should have determined the median (middle number in a set of numbers when the set is ordered by value) for both box plots. The median of the data for School 1 is 5, and the median for the data for School 2 is 7. Therefore, the median of the data for School 2 (7) is greater than the median of the data for School 1 (5).
	Option A is incorrect	The student likely reversed the relationship between the ranges (difference between the maximum value and minimum value of each set of data) of the two data sets in the box plots. The student chose a statement that identified the range of the data for School 1 ($13 - 2$, or 11) being greater than the range of the data for School 2 ($13 - 1$, or 12). The student needs to focus on understanding the comparison of the ranges presented in comparative box plots.
	Option C is incorrect	The student likely identified the interquartile range (difference between the third quartile and the first quartile of a set of data) as representing the difference between the median and the first quartile of a set of data, resulting in the interquartile range of the data for School 1 as $5 - 4$, or 1, and the interquartile range of the data for School 2 as $7 - 4$, or 3. The student chose a statement that is supported by the interquartile range values of 1 and 3. The student needs to focus on understanding how to determine the interquartile ranges presented in comparative box plots.
	Option D is incorrect	The student likely compared the minimum (smallest) values of the two data sets in the box plots, identifying the minimum values as representing the completed lessons by the students. The minimum value of the data for School 1 is 2, and the minimum value of the data for School 2 is 1. The student chose a statement that is supported by the minimum values of 2 and 1. The student needs to focus on understanding the details of answer options that describe data presented in comparative box plots.

Item#	Rationale	
40	Option J is correct	To determine the equation that best represents the relationship between x and y, the student should have determined that "in 1 hour she put 42 letters in envelopes" is equivalent to 42 times the number of hours. The student should have then recognized that the number of hours is represented by x, so 42 times the number of hours can be represented by $42x$. The student should have then recognized that the total number of letters Natasha puts in envelopes, represented by y, is equal to 42 times the number of hours. Therefore, the equation is $y = 42x$.
	Option F is incorrect	The student likely reversed the relationship between x and y and added instead of multiplying 42, resulting in the equation $x = y + 42$. The student needs to focus on understanding how to represent real-world situations with algebraic equations.
	Option G is incorrect	The student likely added instead of multiplying 42, resulting in the equation $y = x + 42$. The student needs to focus on understanding how to represent real-world situations with algebraic equations.
	Option H is incorrect	The student likely reversed the relationship between x and y, resulting in the equation $x = 42y$. The student needs to focus on understanding how to represent real-world situations with algebraic equations.