



## 2022 STAAR Grade 4 Mathematics Rationales

Item #	Rationale
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## 2022 STAAR Grade 4 Mathematics Rationales

Item #	Rationale
4	Option F is correct



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Item #	Rationale	
	Option C is incorrect	<p>The student likely tried to find the sum of the given fractions, <math>\frac{1}{3}</math> and <math>\frac{3}{5}</math>, without using a common denominator. The student then added the numerators correctly, but incorrectly added the denominators <math>\frac{1}{3} + \frac{3}{5} = \frac{4}{8}</math>. The student then likely determined that 4 is half of 8 and therefore <math>\frac{4}{8}</math> is equal to <math>\frac{1}{2}</math>. Based on this calculation, the student likely concluded that the remaining portion <math>\frac{1}{2}</math> is plain chips. The student needs to focus on attending to the details of problems involving the reasonableness of sums and differences involving benchmark fractions such as <math>\frac{1}{4}</math> and <math>\frac{1}{2}</math>.</p>

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6	Option F is correct







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Item #	Rationale	
9	Option B is correct	To determine the number represented by point $J$ , the student could have first identified that the whole number 8 was represented by the darker tick mark halfway between the numbers 7 and 9. The student then could have counted the sections on the number line between 7 and 8 and between 8 and 9 to confirm that each section represents one-tenth. The student could have determined that since there are two sections between 8 and point $J$ , point $J$ represents 8.2 (eight and two-tenths).
	Option A is incorrect	The student likely confused the tenths and hundredths places, writing eight and two-tenths as 8.02 instead of 8.2. The student needs to focus on understanding the difference between tenths and hundredths when writing decimal numbers.
	Option C is incorrect	The student likely (t)JD-5.4nted the number oti (t)k marks (the lines) from 7 to point indicating the whole number, 8.
	Option D is incorrect	The student I 7 to point $J$ , understanding ow to eer7 (o)2.2 (n)-1.8 (.004 T)-4.4 g 7 (o)2.2 ( -9.8 (ow)-4m (e))-4.l



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11	Option B is correct	To determine the number of flowers made by each fourth-grade class, the students divided 195 hives (1) by 480 (4) - 7.9

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12	Option F is correct	To determine which expenses were variable expenses, the student should have identified the expenses that vary from month to month. The student should have identified the water and electricity payments as the only expenses that were different amounts each month.
	Option G is incorrect	The student likely confused variable expenses with necessary expenses (rent, water, electricity). The student needs to focus on understanding that variable expenses can represent both needs and wants and are expenses that change from month to month.
	Option H is incorrect	The student likely confused the definitions of variable expenses (expenses that change from month to month) and fixed expenses (expenses that stay the same from month to month). The student needs to focus on understanding the definition of variable expenses.
	Option J is incorrect	The student likely confused variable expenses with unnecessary expenses (such as cable TV). The student needs to focus on understanding that variable expenses can represent both needs and wants and are expenses that change from month to month.



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14	Option F is correct	To determine which strip diagram represents the total number of pictures Erin has, the student should have first recognized that the total number of pictures, $p$ , is represented by the entire length of the strip in the diagram. Next, since Erin has twice as many vacation pictures as she does field trip pictures (12), the student could have multiplied 12 by 2 to find the number of vacation pictures. Finally, the student could have realized that 12 plus 24 equals the total number of pictures, which is represented by $p$ .
	Option G is incorrect	The student likely divided the number of field trip pictures by 2 instead of multiplying. The student needs to focus on understanding how to use a strip diagram to represent a multistep problem involving the four operations (+, -, ×, ÷). The student also needs to focus on attending to the details of the question.
	Option H is incorrect	The student likely represented only







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19	Option C is correct	To determine which stores have a price greater than \$1.60 but less than \$1.90 for a pound of grapes, the student should have recognized that each model has one whole (100 small squares within the large square) shaded. The student then should have found the model that has 61 to 89 small squares shaded (each small square represents 1 hundredth). Store L represents 1 whole and 88 hundredths (\$1.88), and Store N represents 1 whole and 78 hundredths (\$1.78).
	Option A is incorrect	The student likely found all the stores that sell a pound of grapes for more than \$1.60 (the lower limit) but did not check to see if the stores exceeded the upper limit (\$1.90). The model for Store P has 1 whole and

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20	Option J is correct	To determine the equation represented by the incomplete array, the student could have counted the number of circles in the row (horizontal, 14) and the number of circles in the column (vertical, 13). The student then could have recognized that the completed array would model the equation $13 \times 14 = 182$ . This 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 excluded the circle shared by both the row and the column of the array (the circle in the top left-hand corner). The student needs to focus on understanding how an array models the product of a multiplication problem.
	Option G is incorrect	The student likely counted the number of circles in the row but excluded the first circle when counting the number of circles in the row. The student needs to focus on understanding how an array models the product of a multiplication problem.
	Option H is incorrect	The student likely counted the number of circles in the column but excluded the first circle when counting the number of circles in the column. The student needs to focus on understanding how an array models the product of a multiplication problem.

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Item #	Rationale	
22	Option G is correct	<p>To determine which comparison is true, the student could have found a common denominator (bottom number of the fraction that is the same) for each fraction listed. Since the fractions have denominators of 2, 4, 5, 10, and 20, the student could have recognized that a common denominator for all the fractions could be 20. The student then could have written each fraction in its equivalent form based on the common denominator of 20:</p> $\frac{17}{20} \frac{1}{1}, \frac{17}{20} \frac{1}{2}, \frac{10}{20} \frac{9}{10}, \frac{2}{20} \frac{9}{10}, \frac{2}{20} \frac{9}{10}, \frac{18}{20} \frac{4}{5}, \frac{4}{20} \frac{4}{5}, \frac{16}{20}, \text{ and } \frac{3}{4} \frac{5}{5}, \frac{15}{20}$ <p>The student then could have compared the numerators (top numbers) of the two fractions. Since 17 is less than 18, <math>\frac{17}{20} &lt; \frac{18}{20}</math>, which is equivalent to <math>\frac{17}{20} &lt; \frac{9}{10}</math>. This is an efficient way to solve the problem; however, other methods could be used to solve the problem correctly.</p>
	Option F is incorrect	<p>The student likely considered the fraction with the larger fractional pieces (of equivalent wholes) to be the greater fraction. The student needs to focus on understanding how to compare fractions with different numerators and denominators.</p>
	Option H is incorrect	<p>The student likely considered the fraction with the larger fractional pieces (of equivalent wholes) to be the greater fraction. The student needs to focus on understanding how to compare fractions with different numerators and denominators.</p>
	Option J is incorrect	<p>The student likely considered the fraction with the larger fractional pieces (of equivalent wholes) to be the greater fraction. The student needs to focus on understanding how to compare fractions with different numerators and denominators.</p>





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24	Option F is correct	To determine the equation that shows the fraction of bushes that are lilac bushes, the student should have counted the total number of squares and used that number as the denominator (bottom number of a fraction). The student then should have counted the n

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27	Option B is correct	To determine the measure of angle $TUV$ (the amount of turn between two lines around their common point) to the nearest degree, the student could have found the two measures on the same scale (the measurement values shown on the protractor) through which the two rays ( , part of a line with only one endpoint) of the angle pass. The student then could have subtracted the smaller measure from the larger measure. On the inside scale, $UV$ passes through $70^\circ$ and $UT$ passes through $10^\circ$ , so the measure of angle $TUV$ is $60^\circ$ ( $70^\circ - 10^\circ$ ). Alternatively, on the outside scale, $UV$ passes through 11





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30	Option F is correct	To determine the greatest number of cakes the baker can make, the student could have determined the total number of eggs available by multiplying the number of cartons by the number of eggs in each carton ( $8 \times 12 = 96$ eggs). The student then could have divided the total number of eggs available by the number of eggs used in each cake ( $96 \div 9 = 10$ cakes, with 6 eggs remaining). This 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 performed the correct calculations but rounded the number of cakes to 11 to account for the 6 remaining eggs. The student needs to focus on attending to the details of the question being asked in a two-step problem.
	Option H is incorrect	The student likely multiplied the number of eggs used in each cake by the number of egg cartons ( $9 \times 8 = 72$ ) and divided by the number of eggs in each carton ( $72 \div 12 = 6$ ). The student needs to focus on attending to the details of the question being asked in a two-step problem.
	Option J is incorrect	The student likely multiplied the number of eggs used in each cake by the number of eggs in each carton ( $9 \times 12 = 108$ ) and divided by the number of cartons ( $108 \div 8 = 13$ cakes, with 4 eggs remaining). The student needs to focus on attending to the details of the question being asked in a two-step problem. The student used $i =$

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31	Option C is correct	To determine the figure that has at least one acute angle (angle that is less than $90^\circ$ ), right angle (angle that is equal to $90^\circ$ ), and obtuse angle (angle that is greater than $90^\circ$ and less than $180^\circ$ ), the student could have examined each figure. Figure X has one acute angle (in the lower right corner), two right angles (in the lower left corner and upper left corner), and one obtuse angle (in the upper right corner).
	Option A is incorrect	The student likely identified that the trapezoid contains at least one obtuse angle (angle that is greater than $90^\circ$ and less than $180^\circ$ ) and at least one acute angle (angle that is less than $90^\circ$ ) but misidentified one of the angles as a right angle (angle that is equal to $90^\circ$ ). The student needs to focus on recognizing the difference between acute, obtuse, and right angles in polygons.
	Option B is incorrect	The student likely identified the heptagon (a figure with seven sides) as having at least one obtuse angle (angle that is greater than $90^\circ$ and less than $180^\circ$ ) but misidentified one angle as an acute angle (angle that is less than $90^\circ$ ), and one angle as a right angle (angle that is equal to $90^\circ$ ). The student needs to focus on recognizing the difference between acute, obtuse, and right angles in polygons.
	Option D is incorrect	The student likely identified the triangle as having one right angle (angle that is equal to $90^\circ$ ) and one acute angle (angle that is less than $90^\circ$ ) but misidentified one of the acute angles as an obtuse angle (angle that is greater than $90^\circ$ and less than $180^\circ$ ). The student needs to focus on recognizing the difference between acute, obtuse, and right angles in polygons.



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33	Option A is correct	To determine the area of (amount of space covered by) the place mat in square inches, the student could have referred to the Area section of the STAAR Grade 4 Mathematics Reference Materials page within the test booklet to find the formula for the area of a rectangle ( $A = l \times w$ , where $A$ =

