Ohio Department of Education

Ohio's State Tests

PRACTICE TEST ANSWER KEY & SCORING GUIDELINES

> GRADE 7 MATHEMATICS

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Question No.	ltem Type	Content Cluster	Content Standard	Answer Key	Points
1	Multiple Choice	Summarize and describe distributions representing one population and draw informal comparative inferences about two populations.	Describe and analyze distributions. b. Informally assess the degree of visual overlap of two numerical data distributions with roughly equal variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot (line plot), the separation between the two distributions of heights is noticeable. (7.SP.3b)	D	1 point
2	Equation Item	Draw, construct, and describe geometrical figures and describe the relationships between them.	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. <i>a</i> . Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. (7.G.2a)		1 point

Question No.	ltem Type	Content Cluster	Content Standard	Answer Key	Points
3	Graphic Response	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. (7.NS.1c)		1 point
4	Equation Item	Analyze proportional relationships and use them to solve real- world and mathematical problems.	Recognize and represent proportional relationships between quantities. c. Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn. (7.RP.2c)		1 point

Question No.	ltem Type	Content Cluster	Content Standard	Answer Key	Points
5	Multiple Choice	Investigate chance processes and develop, use, and evaluate probability models.	Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies? (7.SP.7b)	С	1 point
6	Matching Item	Draw, construct, and describe geometrical figures and describe the relationships between them.	Describe the two-dimensional figures that result from slicing three- dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. (7.G.3)		1 point
7	Equation Item	Analyze proportional relationships and use them to solve real- world and mathematical problems.	Recognize and represent proportional relationships between quantities. b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. (7.RP.2b)		1 point

Question No.	ltem Type	Content Cluster	Content Standard	Answer Key	Points
8	Table Item	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	Solve real-world and mathematical problems involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions. (7.NS.3)		1 point
9	Equation Item	Use properties of operations to generate equivalent expressions.	In a problem context, understand that rewriting an expression in an equivalent form can reveal and explain properties of the quantities represented by the expression and can reveal how those quantities are related. For example, a discount of 15% (represented by p - 0.15p) is equivalent to (1 - 0.15)p, which is equivalent to 0.85p or finding 85% of the original price. (7.EE.2)		1 point
10	Multiple Choice	Analyze proportional relationships and use them to solve real- world and mathematical problems.	Recognize and represent proportional relationships between quantities. <i>d</i> . Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and (1, r) where <i>r</i> is the unit rate. (7.RP.2d)	В	1 point

Question No.	ltem Type	Content Content Cluster Standard		Answer Key	Points
11	Equation Item	Investigate chance processes and develop, use, and evaluate probability models.	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. (7.SP.5)		1 point
12	Multiple Choice	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. c. Apply properties of operations as strategies to multiply and divide rational numbers. (7.NS.2c)	A	1 point
13	Equation Item	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	Solve real-world and mathematical problems involving area, volume and surface area of two- and three- dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (7.G.6)		1 point
14	Multi- Select Item	Analyze proportional relationships and use them to solve real- world and mathematical problems.	Recognize and represent proportional relationships between quantities. <i>a.</i> Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. (7.RP.2a)	A, B, E	1 point

Question No.	ltem Type	Content Cluster	Content Standard	Answer Key	Points
15	Equation Item	Broaden understanding of statistical problem solving.	Broaden statistical reasoning using the GAISE model. <i>a.</i> Formulate Questions: Recognize and formulate a statistical question as one that anticipates variability and can be answered with quantitative data. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because of the variability in students' ages. (GAISE Model, step 1) b. Collect Data: Design and use a plan to collect appropriate data to answer a statistical question. (GAISE Model, step 2) c. Analyze Data: Select appropriate graphical methods and numerical measures to analyze data by displaying variability within a group, comparing individual to individual, and comparing individual to group. (GAISE Model, step 3) <i>d.</i> Interpret Results: Draw logical conclusions from the data based on the original question. (GAISE Model, step 4) (7.SP.2)		1 point
16	Graphic Response	Draw, construct, and describe geometrical figures and describe the relationships between them.	Solve problems involving similar figures with right triangles, other triangles, and special quadrilaterals. <i>a</i> . Compute actual lengths and areas from a scale drawing and reproduce a scale drawing at a different scale. (7.G.1a)		1 point

Question No.	ltem Type	Content Cluster	Content Standard	Answer Key	Points
17	Equation Item	Analyze proportional relationships and use them to solve real- world and mathematical problems.	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $\frac{1}{2}/\frac{1}{4}$ miles per hour, equivalently 2 miles per hour. (7.RP.1)		1 point
18	Multi- Select Item	Use properties of operations to generate equivalent expressions.	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. (7.EE.1)	B, C, E	1 point
19	Equation Item	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	Work with circles b. Know and use the formulas for the area and circumference of a circle and use them to solve real- world and mathematical problems. (7.G.4b)		1 point
20	Multiple Choice	Investigate chance processes and develop, use, and evaluate probability models.	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulations. <i>a.</i> Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. (7.SP.8a)	С	1 point

Question No.	ltem Type	Content Cluster	Content Standard	Answer Key	Points
21	Equation Item	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. b. Solve word problems leading to inequalities of the form $px + q > r$ or px + q < r, where p , q , and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions. (7.EE.4b)		2 points
22	Equation Item	Analyze proportional relationships and use them to solve real- world and mathematical problems.	Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error. (7.RP.3)		1 point
23	Multiple Choice	Investigate chance processes and develop, use, and evaluate probability models.	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulations. b. Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams. For an event described in everyday language, e.g., "rolling double sixes," identify the outcomes in the sample space which compose the event. (7.SP.8b)	D	1 point

Question No.	ltem Type	Content Cluster	Content Standard	Answer Key	Points
24	Equation Item	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. (7.G.5)		1 point
25	Gap Match Item	Analyze proportional relationships and use them to solve real- world and mathematical problems.	Recognize and represent proportional relationships between quantities. b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. (7.RP.2b)		1 point
26	Inline Choice Item	Investigate chance processes and develop, use, and evaluate probability models.	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event; a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely; and a probability near 1 indicates a likely event. (7.SP.5)		1 point

Grade 7 Math Practice Test

Question 1

Question and Scoring Guidelines

Question 1



Points Possible: 1

Content Cluster: Summarize and describe distributions representing one population and draw informal comparative inferences about two populations.

Content Standard: Describe and analyze distributions. b. Informally assess the degree of visual overlap of two numerical data distributions with roughly equal variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot (line plot), the separation between the two distributions of heights is noticeable. (7.SP.3b)

Scoring Guidelines

<u>Rationale for Option A:</u> This is incorrect. The student may have ignored that half of the first data set is not included in the overlap.

<u>Rationale for Option B:</u> This is incorrect. The student may have selected the set that has half of the dots overlapping but did not see that there was another plot with more overlapping dots.

<u>Rationale for Option C:</u> This is incorrect. The student may have thought that this set had the most overlap because six of the points in the two sets overlap but missed that there is another plot with more overlapping dots.

<u>Rationale for Option D:</u> **Key** – The student selected the pair of dot plots where almost all of the data from both sets are included in the overlap of the sets.



Sample Response: 1 point

Grade 7 Math Practice Test

Question 2

Question and Scoring Guidelines

Question 2

A triangle has a side length of $\frac{3}{4}$ inch and a side length of 3 inches.

What could be the length, in inches, of the third side of the triangle?

			inches			
$\bullet \bullet \bullet \bullet \bullet$						
1	2	3				
4	5	6				
7	8	9				
	0					
·	-	<u>-</u>				

Points Possible: 1

Content Cluster: Draw, construct, and describe geometrical figures and describe the relationships between them.

Content Standard: Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. *a.* Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. (7.G.2a)

Scoring Guidelines

Exemplar Response

• 3 inches

Other Correct Responses

• Any value greater than 2.25 and less than 3.75

For this item, a full-credit response includes:

• A correct length (1 point).

Grade 7 Math Practice Test

Question 2

Sample Responses

Sample Response: 1 point



Notes on Scoring

This response earns full credit (1 point) because the student correctly chose a length greater than 2.25 and less than 3.75. In this case, the student created an isosceles triangle.

Sample Response: 1 point



Notes on Scoring

This response earns full credit (1 point) because the student correctly chose a length greater than 2.25 and less than 3.75. In this case, the student created an obtuse triangle.

Sample Response: 0 points



Notes on Scoring

This response earns no credit (0 points) because the student did not correctly choose a length greater than 2.25 and less than 3.75. A third leg of 2 inches would not allow for the three sides to connect to create a closed shape, and therefore would not create a triangle. Sample Response: 0 points



Notes on Scoring

This response earns no credit (0 points) because the student did not correctly choose a length greater than 2.25 and less than 3.75. A third leg of 4 inches would not allow for the three sides to create a closed shape, and therefore would not create a triangle. Connecting the 3 inch leg with the $\frac{3}{4}$ inch leg gives a length of 3.75 inches with no angle, and the 4 inch leg would reach longer than the two other legs together.

Grade 7 Math Practice Test

Question 3

Question and Scoring Guidelines

Question 3

An equation is shown, where b < 0 and c < 0. a - b = cPlace the two points on the number line to show possible locations of a and c. b c c cc

Points Possible: 1

Content Cluster: Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Content Standard: Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

c. Understand subtraction of rational numbers as adding the additive inverse, p - q = p + (-q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. (7.NS.1c)

Scoring Guidelines

Exemplar Response



Other Correct Responses

• Any response where *a* < *b*, *c* < 0, and the distance from *a* to *b* is the same as the distance from *c* to 0

For this item, a full-credit response includes:

• Two correct placements (1 point).

Grade 7 Math Practice Test

Question 3

Sample Responses

Sample Response: 1 point



Notes on Scoring

This response earns full credit (1 point) because the student correctly placed two points on the number line that could represent the situation. The points could have the following values: a = -5, b = -4, and c = -1, so that (-5) - (-4) = (-1).

Sample Response: 1 point



Notes on Scoring

This response earns full credit (1 point) because the student correctly placed two points on the number line that could represent the situation. The points could have the following values: a = -9, b = -4, and c = -5, so that (-9) - (-4) = (-5).

Sample Response: 0 points



Notes on Scoring

This response earns no credit (0 points) because the student did not correctly place two points on the number line to represent the situation. The points the student chose could have the following values: a = 2, b = -4, and c = -2, but $2 - (-4) \neq (-2)$. Instead, 2 - (-4) = 6.

Sample Response: 0 points



Notes on Scoring

This response earns no credit (0 points) because the student did not correctly place two points on the number line to represent the situation. The points the student chose could have the following values: a = 0, b = -4, and c = 4. Note that 0 - (-4) = 4, which is correct. However, the information given specifies that the values of b and c are both less than 0, which is not the case in this response.
Question 4

Question and Scoring Guidelines

Question 4

Two quant	Two quantities, a and b, have a proportional relationship, where a is -4 when b is -3 .						
Create an	equation t	o represer	nt this relati	ionship.			
	• •						
1	2	3	a	b			
4	5	6	+	-	•	÷	
7	8	9	<		=		>
	0						
<u> </u>							

Points Possible: 1

Content Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

Content Standard: Recognize and represent proportional relationships between quantities.

c. Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn. (7.RP.2c)

Scoring Guidelines

Exemplar Response

•
$$b = \frac{3}{4}a$$

Other Correct Responses

• Any equivalent equation

For this item, a full-credit response includes:

• A correct equation (1 point).

Question 4

Sample Responses

Two quant	Two quantities, a and b, have a proportional relationship, where a is -4 when b is -3 .						
Create an	Create an equation to represent this relationship.						
$a=\frac{4}{3}b$	$a=\frac{4}{3}b$						
	$\bullet \bullet \bullet \bullet \bullet \bullet$						
1	2	3	a	b			
4	5	6	+	-	•	÷	
7	8	9	<	<u>≤</u>	=	2	>
	0			0		π	
· - =							

Notes on Scoring

This response earns full credit (1 point) because the student correctly created an equation that represents the given relationship. This can be shown by substituting the value a = -4 into the equation and solving to find that b = -3 as shown.

$$-4 = \left(\frac{4}{3}\right)b$$
$$-4 \cdot \left(\frac{3}{4}\right) = b$$
$$\left(-\frac{12}{4}\right) = b$$
$$-3 = b$$



Notes on Scoring

This response earns full credit (1 point) because the student correctly created an equation that represents the given relationship. This can be shown by substituting the value a = -4 into the equation and solving to find that b = -3 as shown.

$$\begin{pmatrix} \frac{-4}{-4} \end{pmatrix} = \begin{pmatrix} \frac{b}{-3} \end{pmatrix}$$
$$1 = \begin{pmatrix} \frac{b}{-3} \end{pmatrix}$$
$$1 \cdot (-3) = b$$
$$-3 = b$$



Notes on Scoring

This response earns no credit (0 points) because the student did not create a correct equation that represents the given relationship. Substituting the value a = -4 into the equation and showing that *b* is not equal to *b* shows that this equation does not represent this relationship as shown. The student's equation represents the opposite relationship, i.e., "... where *a* is -3 when *b* is -4."

$$-4 = \left(\frac{3}{4}\right)b$$
$$-4 \cdot \left(\frac{4}{3}\right) = b$$
$$\left(-\frac{16}{3}\right) = b$$
$$\left(-\frac{16}{3}\right) \neq -3$$



Notes on Scoring

This response earns no credit (0 points) because the student did not create a correct equation that represents the given relationship. The student's equation represents the relationship where a is -4 when b is positive 3, instead of b is negative 3, as is given.

Question 5

Question and Scoring Guidelines

Question 5

Mr. Larkin grouped the students in his class into 4 groups of equal size, labeled Red, Blue, Green, and Yellow. Each day, Mr. Larkin selects one group at random to read aloud during class. The groups selected each day for 8 days are shown.

Day	Selected Group	
1	Green Group	
2	Blue Group	
3	Green Group	
4	Blue Group	
5	Red Group	
6	Blue Group	
7	Blue Group	
8	Blue Group	

Which group's observed frequency of being selected is closest to its expected frequency?

- Red Group
- Blue Group
- © Green Group
- Yellow Group

Points Possible: 1

Content Cluster: Investigate chance processes and develop, use, and evaluate probability models.

Content Standard: Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.

b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies? (7.SP.7b)

Scoring Guidelines

<u>Rationale for Option A:</u> This is incorrect. The student may have thought that the expected frequency was $\frac{1}{8}$ because there are 8 days, and then chose the group whose frequency was closest to that.

<u>Rationale for Option B:</u> This is incorrect. The student may have thought that the question was asking for the group that was chosen the most frequently.

<u>Rationale for Option C:</u> **Key** – The student correctly determined the group whose observed frequency is closest to its expected frequency: $\frac{2}{8} = \frac{1}{4}$

<u>Rationale for Option D:</u> This is incorrect. The student may have thought that the expected frequency for a group should be 0.

Sample Response: 1 point

Mr. Larkin grouped the students in his class into 4 groups of equal size, labeled Red, Blue, Green, and Yellow. Each day, Mr. Larkin selects one group at random to read aloud during class. The groups selected each day for 8 days are shown.

Day	Selected Group	
1	Green Group	
2	Blue Group	
3	Green Group	
4	Blue Group	
5	Red Group	
6	Blue Group	
7	Blue Group	
8	Blue Group	

Which group's observed frequency of being selected is closest to its expected frequency?

A Red Group

Blue Group

Green Group

Yellow Group

Question 6

Question and Scoring Guidelines

Question 6

A three-dimensional figure is shown.



Select all of the shapes of the cross sections that could result from slicing the figure as described in the table.

	Square	Triangle	Trapezoid
Parallel to the base			
Perpendicular to the base through the apex			
Perpendicular to the base, not through the apex			

Points Possible: 1

Content Cluster: Draw, construct, and describe geometrical figures and describe the relationships between them.

Content Standard: Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. (7.G.3)

Scoring Guidelines

For this item, a full-credit response includes:

- "Square" selected for a slice "Parallel to the base"; AND
- "Triangle" selected for a slice "Perpendicular to the base through the apex";

AND

• Both "Triangle" and "Trapezoid" selected for a slice "Perpendicular to the base, not through the apex" (1 point).

Sample Response: 1 point



Notes on Scoring

This response receives full credit (1 point) because all four selections are correct. In order to receive credit for this item, all four selections must be correct.

When slicing the figure "perpendicular to the base, not through the apex", the cut can be made through opposite sides, creating a trapezoid, or the slice can be made through adjacent sides, creating a triangle.

Question 7

Question and Scoring Guidelines

Question 7

The relationship between the number of cups of water, w, and the number of cups of lemon juice, j, used in a recipe is described by the equation shown.

j = 2*w*

How many cups of water are needed for each cup of lemon juice?

		cup(s)	
$\bullet \bullet \bullet \bullet$			
1	2	3	
4	5	6	
7	8	9	
	0		
	-		

Points Possible: 1

Content Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

Content Standard: Recognize and represent proportional relationships between quantities. b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. (7.RP.2b)

Scoring Guidelines

Exemplar Response

• 0.5 cup

Other Correct Responses

• Any equivalent value

For this item, a full-credit response includes:

• The correct value (1 point).

Question 7

Sample Responses

The relationship between the number of cups of water, w, and the number of cups of lemon juice, j, used in a recipe is described by the equation shown.

j = 2*w*

How many cups of water are needed for each cup of lemon juice?

$\frac{1}{2}$	cup(s)		
$\bullet \bullet \bullet \bullet$			
1	2	3	
4	5	6	
7	8	9	
	0		
	-		

Notes on Scoring

This response earns full credit (1 point) because the student correctly identified the constant of proportionality and determined that two times "however many cups of water" gives the number of cups of lemon juice. Therefore, for each cup of lemon juice, $\frac{1}{2}$ cup of water is needed.

The relationship between the number of cups of water, w, and the number of cups of lemon juice, j, used in a recipe is described by the equation shown.

j = 2*w*

How many cups of water are needed for each cup of lemon juice?

.5	cup(s)			
$\bullet \bullet \bullet \bullet \bullet \bullet$				
1	2	3		
4	5	6		
7	8	9		
	0			
	-			

Notes on Scoring

This response earns full credit (1 point) because the student correctly identified the constant of proportionality and determined that two times "however many cups of water" gives the number of cups of lemon juice. Therefore, for each cup of lemon juice, 0.5 cup of water is needed.

The relationship between the number of cups of water, w, and the number of cups of lemon juice, j, used in a recipe is described by the equation shown.

j = 2*w*

How many cups of water are needed for each cup of lemon juice?



Notes on Scoring

This response earns no credit (0 points) because the student did not correctly identify the constant of proportionality to determine the number of cups of water that is needed.

The student may have thought that 2*w* means that there needs to be 2 cups of water for each cup of lemon juice.

The relationship between the number of cups of water, w, and the number of cups of lemon juice, j, used in a recipe is described by the equation shown.

j = 2*w*

How many cups of water are needed for each cup of lemon juice?



Notes on Scoring

This response earns no credit (0 points) because the student did not correctly identify the constant of proportionality to determine the number of cups of water that are needed.

The student may have thought that the coefficient, 1, in front of *j* is how many cups of water are needed.

Question 8

Question and Scoring Guidelines

Question 8

The total change in the daily high temperature from Monday to Saturday in one week in Columbus was $-15^{\circ}F$.

Complete the table to show possible temperature changes for Tuesday and Thursday.

Day	Change in Daily High Temperature (°F)
Monday	+7
Tuesday	
Wednesday	-12
Thursday	
Friday	+2
Saturday	+]
Total	-15

Points Possible: 1

Content Cluster: Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Content Standard: Solve real-world and mathematical problems involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions. (7.NS.3)

Scoring Guidelines

Exemplar Response

Day	Change in Daily High Temperature (° <i>F</i>)
Monday	+ 7
Tuesday	-3
Wednesday	- 12
Thursday	-10
Friday	+ 2
Saturday	+ 1
Total	-15

Other Correct Responses

• Any two values whose sum is -13

For this item, a full-credit response includes:

• One pair of correct values (1 point).

Question 8

Sample Responses

The total change in the daily high temperature from Monday to Saturday in one week in	Day	Change in Daily High Temperature (°F)
Columbus was -15°F.	Monday	+7
Complete the table to show	Tuesday	0
possible temperature changes for Tuesday and Thursday.	Wednesday	-12
uesuay and mursuay.	Thursday	-13
	Friday	+2
	Saturday	+1
	Total	-15

Notes on Scoring

This response earns full credit (1 point) because the student correctly completed the table with two possible temperatures that add up to -13 to make a sum of -15.

The total change in the daily high temperature from Monday to Saturday in one week in	Day	Change in Daily High Temperature (°F)
Columbus was -15°F.	Monday	+7
Complete the table to show	Tuesday	-7
possible temperature changes for Tuesday and Thursday.	Wednesday	-12
	Thursday	-6
	Friday	+2
	Saturday	+1
	Total	-15

Notes on Scoring

This response earns full credit (1 point) because the student correctly completed the table with two possible temperatures that add up to -13 to make a sum of -15.

The total change in the daily high temperature from Monday to Saturday in one week in Columbus was –15° <i>F</i> .	Day	Change in Daily High Temperature (°F)
	Monday	+7
Complete the table to show possible temperature changes for Tuesday and Thursday.	Tuesday	-13
	Wednesday	-12
	Thursday	15
	Friday	+2
	Saturday	+1
	Total	-15

Notes on Scoring

This response earns no credit (0 points) because the student did not correctly complete the table with two possible temperatures that add up to -13 to make a sum of -15. The student may have mistakenly added the given total (-15) as a change in daily high temperature.
Sample Response: 0 points

The total change in the daily high temperature from Monday	Day	Change in Daily High Temperature (°F)
Columbus was -15°F.	Monday	+7
Complete the table to show	Tuesday	-8
possible temperature changes for Tuesday and Thursday.	Wednesday	-12
,,	Thursday	-7
	Friday	+2
	Saturday	+1
	Total	-15

Notes on Scoring

This response earns no credit (0 points) because the student did not correctly complete the table with two possible temperatures that add up to -13 to make a sum of -15. The student may have mistakenly completed the table with two temperatures that add up to -15 and not thought about the total sum.

Question 9

Question and Scoring Guidelines

Question 9

A square is shown.



The perimeter of the square can be represented by the expression 16x + 24. Willa wants to write an equivalent expression for the perimeter that shows the side length of the square.

Create an equivalent expression that Willa could write.

$\bullet \bullet \bullet$							
1	2	3	x				
4	5	6	+	-	•	÷	
7	8	9	<	≤	=	2	>
	0			()		π	
	-	<u><u></u></u>					

Points Possible: 1

Content Cluster: Use properties of operations to generate equivalent expressions.

Content Standard: In a problem context, understand that rewriting an expression in an equivalent form can reveal and explain properties of the quantities represented by the expression and can reveal how those quantities are related. For example, a discount of 15% (represented by p - 0.15p) is equivalent to (1 - 0.15)p, which is equivalent to 0.85p or finding 85% of the original price. (7.EE.2)

Scoring Guidelines

Exemplar Response

• 4(4x + 6)

Other Correct Responses

• Any equivalent expression that includes 4x + 6, for example, 4x + 6 + 4x + 6 + 4x + 6 + 4x + 6

For this item, a full-credit response includes:

• A correct expression (1 point).

Question 9

Sample Responses

Sample Response: 1 point

A square is shown.

4(4x+6)							
$\bullet \bullet \bullet$							
1	2	3	x				
4	5	6	+	-	•	÷	
7	8	9	<	≤	=	2	>
	0			()		π	
	-						

Notes on Scoring

This response earns full credit (1 point) because the student correctly created an equivalent expression that shows that each of the four side lengths is $(4x + 6) \log x$.

Sample Response: 1 point

A square is shown. The perimeter of the square can be represented by the expression 16x + 24. Willa wants to write an equivalent expression for the perimeter that shows the side length of the square. Create an equivalent expression that Willa could write. (4x+6)-4← → ♠ ⊘ 🛛 3 1 2 х 4 5 6 + -• ÷ 7 8 9 < \leq = ≥ > 0 ()П π -_

Notes on Scoring

This response earns full credit (1 point) because the student correctly created an equivalent expression that shows that each of the four side lengths is $(4x + 6) \log x$.

Sample Response: 0 points

A square is shown. The perimeter of the square can be represented by the expression 16x + 24. Willa wants to write an equivalent expression for the perimeter that shows the side length of the square. Create an equivalent expression that Willa could write. 4(x+8)← → ♠ ሎ 🔇 3 1 2 x 4 5 6 + • ÷ _ 7 8 9 < \leq = ≥ > 0 П 0 π 믐 _

Notes on Scoring

This response earns no credit (0 points) because the student did not correctly create an equivalent expression that shows that each of the four side lengths is (4x + 6) long. The student may have subtracted 16 from 24 to get (x + 8) and then multiplied by four to "show" the four sides.

Sample Response: 0 points

A square is shown. The perimeter of the square can be represented by the expression 16x + 24. Willa wants to write an equivalent expression for the perimeter that shows the side length of the square. Create an equivalent expression that Willa could write. 2(8x+12)← → ♠ ሎ 🔇 2 3 1 x 4 5 6 + • ÷ _ 7 8 9 < \leq = \geq > 0 () Ш π 믐

Notes on Scoring

This response earns no credit (0 points) because the student did not create an equivalent expression that shows the length of each of the four sides. The student may have noticed that both numbers in the parentheses were even and therefore correctly factored out a 2. However, this factoring does not show the length of each of the four sides. The student should have factored out a 4 to show that the length of each side is (4x + 6).

Question 10

Question and Scoring Guidelines

Question 10



Points Possible: 1

Content Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

Content Standard: Recognize and represent proportional relationships between quantities.

d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where *r* is the unit rate. (7.*RP*.2*d*)

Scoring Guidelines

<u>Rationale for Option A:</u> This is incorrect. The student may have confused the axes.

<u>Rationale for Option B:</u> **Key** – The student correctly interpreted the point on the graph.

<u>Rationale for Option C:</u> This is incorrect. The student may have assumed 60 to represent the speed of the car.

<u>Rationale for Option D:</u> This is incorrect. The student may have confused the axes.

Sample Response: 1 point



Question 11

Question and Scoring Guidelines

Question 11

A box contains red markers, blue markers, and green markers. There are more blue markers than red markers. The probability of randomly selecting a blue marker from the box is $\frac{1}{5}$.

What is a possible probability that a randomly selected marker from the box is red?

$\bullet \bullet \bullet \bullet$		
1	2	3
4	5	6
7	8	9
	0	
	-	<u>-</u>

Points Possible: 1

Content Cluster: Investigate chance processes and develop, use, and evaluate probability models.

Content Standard: Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. (7.SP.5)

Scoring Guidelines

Exemplar Response

 $\bullet \quad \frac{1}{10}$

Other Correct Responses

• Any value between 0 and $\frac{1}{5}$, exclusive

For this item, a full-credit response includes:

• A correct probability (1 point).

Question 11

Sample Responses

Sample Response: 1 point

A box contains red markers, blue markers, and green markers. There are more blue markers than red markers. The probability of randomly selecting a blue marker from the box is $\frac{1}{5}$.

What is a possible probability that a randomly selected marker from the box is red?



Notes on Scoring

This response earns full credit (1 point) because the student correctly responded with a probability less than $\frac{1}{5}$ (the probability of selecting a blue marker) and greater than 0 (the probability of selecting a red marker if there were no red markers in the box), since there were fewer red markers than blue markers. A probability of $\frac{1}{5}$ is equivalent to a probability of 0.20, and a probability of $\frac{1}{10}$ is equivalent to a probability of 0.10.

Sample Response: 1 point

A box contains red markers, blue markers, and green markers. There are more blue markers than red markers. The probability of randomly selecting a blue marker from the box is $\frac{1}{5}$.

What is a possible probability that a randomly selected marker from the box is red?



Notes on Scoring

This response earns full credit (1 point) because the student correctly responded with a probability less than $\frac{1}{5}$ (the probability of selecting a blue marker) and greater than 0 (the probability of selecting a red marker if there were no red markers in the box), since there were fewer red markers than blue markers. A probability of $\frac{1}{5}$ is equivalent to a probability of 0.20, and a probability of $\frac{3}{20}$ is equivalent to a probability of 0.15.

Sample Response: 0 points

A box contains red markers, blue markers, and green markers. There are more blue markers than red markers. The probability of randomly selecting a blue marker from the box is $\frac{1}{r}$.

What is a possible probability that a randomly selected marker from the box is red?

-0.5			
$\bullet \bullet \bullet$			
1	2	3	
4	5	6	
7	8	9	
	0		
	-		

Notes on Scoring

This response earns no credit (0 points) because the student did not correctly respond with a probability less than $\frac{1}{5}$ (the

probability of selecting a blue marker) and greater than 0 (the probability of selecting a red marker if there were no red markers in the box), since there were fewer red markers than blue markers. The student may not recognize that the probability of a chance event is a number between 0 and 1. Therefore, -0.5 would not describe a probability.

Sample Response: 0 points

A box contains red markers, blue markers, and green markers. There are more blue markers than red markers. The probability of randomly selecting a blue marker from the box is $\frac{1}{5}$.

What is a possible probability that a randomly selected marker from the box is red?

	•	
1	2	3
4	5	6
7	8	9
	0	
	-	<u> </u>

Notes on Scoring

This response earns no credit (0 points) because the student did not correctly respond with a probability less than $\frac{1}{5}$ (the probability of selecting a blue marker) and greater than 0 (the probability of selecting a red marker if there were no red markers in the box), since there were fewer red markers than blue markers. A probability of 0 means that there were no red markers in the box, which is in conflict with the given situation.

Question 12

Question and Scoring Guidelines

Question 12

An inequality is given, where r is a positive rational number.



Points Possible: 1

Content Cluster: Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Content Standard: Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

c. Apply properties of operations as strategies to multiply and divide rational numbers. (7.NS.2c)

Scoring Guidelines

<u>Rationale for Option A:</u> **Key** – The student correctly identified that since r > 0, the value of q must be less than 0 to make the inequality true.

<u>Rationale for Option B:</u> This is incorrect. The student may have confused r for q and correctly identified an inequality that is true for r.

<u>Rationale for Option C:</u> This is incorrect. The student may have thought that the inequality was $r \cdot q/r < -r$, in which case, q/r < -1, and q < -r.

<u>Rationale for Option D:</u> This is incorrect. The student may have incorrectly subtracted *r* from both sides.

Sample Response: 1 point



Question 13

Question and Scoring Guidelines

Question 13



Points Possible: 1

Content Cluster: Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Content Standard: Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (7.G.6)

Scoring Guidelines

Exemplar Response

• 264 cubic inches

Other Correct Responses

• Any equivalent value

For this item, a full-credit response includes:

• A correct volume (1 point).

Question 13

Sample Responses

Sample Response: 1 point



Notes on Scoring

This response earns full credit (1 point) because the student correctly calculated the volume of the triangular prism: $0.5(6 \cdot 8) \cdot 11 = 264$.


Notes on Scoring

This response earns full credit (1 point) because the student correctly calculated the volume of the triangular prism: $0.5(6 \cdot 8) \cdot 11 = 264.0$.



Notes on Scoring

This response earns no credit (0 points) because the student did not correctly calculate the volume of the triangular prism. The student may have multiplied the three given numbers to get 528.

 $8 \cdot 11 \cdot 6 = 528$



Notes on Scoring

This response earns no credit (0 points) because the student did not correctly calculate the volume of the triangular prism. The student may have incorrectly thought that all three rectangular sides of the shape are 8 by 11 and then calculated the surface area instead of the volume.

 $8 \cdot 11 \cdot 3 = 264$ $0.5(6 \cdot 8) \cdot 2 = 48$ 264 + 48 = 312

Question 14

Question and Scoring Guidelines

Question 14

Abdul has an original recipe for a fruit drink with apple, orange, and pineapple juice. He makes new fruit drinks by mixing different quantities of the three juices. The table shows the amount of each juice in the recipe and in each drink.

Drink	Cups of Apple Juice	Cups of Orange Juice	Cups of Pineapple Juice
Original Recipe	$1\frac{1}{4}$	$1\frac{3}{4}$	$\frac{1}{2}$
1	$1\frac{2}{3}$	$2\frac{1}{3}$	2 3
2	$2\frac{1}{2}$	$3\frac{1}{2}$	1
3	5	7	1
4	$1\frac{1}{3}$	$2\frac{3}{4}$	$\frac{1}{3}$
5	$1\frac{7}{8}$	2 ⁵ / ₈	<u>6</u> 8

Select all the drinks that have the same proportion of juices as Abdul's original recipe.

- Drink 1
- Drink 2
- Drink 3
- Drink 4
- Drink 5

Points Possible: 1

Content Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

Content Standard: Recognize and represent proportional relationships between quantities.

a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. (7.RP.2a)

Scoring Guidelines

<u>Rationale for First Option:</u> **Key** – The student correctly identified a drink that has the same proportion of juices as the recipe.

<u>Rationale for Second Option:</u> **Key** – The student correctly identified a drink that has the same proportion of juices as the recipe.

<u>Rationale for Third Option:</u> This is incorrect. The student may have thought that since there are 5 fourths of apple juice and 7 fourths of orange juice in the original recipe that these drinks have the same proportion of juices. However, there are 2 fourths of pineapple juice in the original recipe and not 1 fourth.

<u>Rationale for Fourth Option:</u> This is incorrect. The student may have looked at the fractional parts and thought that these looked similar to the original recipe, and therefore the drink must have the same proportion of juices.

<u>Rationale for Fifth Option:</u> **Key** – The student correctly identified a drink that has the same proportion of juices as the recipe.

Abdul has an original recipe for a fruit drink with apple, orange, and pineapple juice. He makes new fruit drinks by mixing different quantities of the three juices. The table shows the amount of each juice in the recipe and in each drink.

Drink	Cups of Apple Juice	Cups of Orange Juice	Cups of Pineapple Juice
Original Recipe	$1\frac{1}{4}$	$1\frac{3}{4}$	$\frac{1}{2}$
1	$1\frac{2}{3}$	$2\frac{1}{3}$	2 3
2	$2\frac{1}{2}$	$3\frac{1}{2}$	1
3	5	7	1
4	$1\frac{1}{3}$	$2\frac{3}{4}$	1 3
5	1 7 8	2 ⁵ / ₈	<u>6</u> 8

Select all the drinks that have the same proportion of juices as Abdul's original recipe.

- Drink 1
- Drink 2
- Drink 3
- Drink 4
- Drink 5

Question 15

Question and Scoring Guidelines

Question 15

A pizza shop wants to determine how often it delivers to three different areas of a city. The table shows the areas from a random sample of 80 deliveries.

Area of City	Number of Deliveries
Northern	14
Central	44
Southern	22

Based on these data, if the driver makes 200 deliveries, how many deliveries will be to the southern area of the city?

$\bullet \bullet \bullet \bullet$		
1	2	3
4	5	6
7	8	9
	0	
	-	=

Points Possible: 1

Content Cluster: Broaden understanding of statistical problem solving.

Content Standard: Broaden statistical reasoning using the GAISE model. *a.* Formulate Questions: Recognize and formulate a statistical question as one that anticipates variability and can be answered with quantitative data. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because of the variability in students' ages. (GAISE Model, step 1) b. Collect Data: Design and use a plan to collect appropriate data to answer a statistical question. (GAISE Model, step 2) c. Analyze Data: Select appropriate graphical methods and numerical measures to analyze data by displaying variability within a group, comparing individual to individual, and comparing individual to group. (GAISE Model, step 3) d. Interpret Results: Draw logical conclusions from the data based on the original question. (GAISE Model, step 4) (7.SP.2)

Scoring Guidelines

Exemplar Response

• 55

Other Correct Responses

• Any equivalent value

For this item, a full-credit response includes:

• The correct value (1 point).

Question 15

Sample Responses

A pizza shop wants to determine how often it delivers to three different areas of a city. The table shows the areas from a random sample of 80 deliveries.

Area of City	Number of Deliveries
Northern	14
Central	44
Southern	22

Based on these data, if the driver makes 200 deliveries, how many deliveries will be to the southern area of the city?

55		
$\bullet \bullet \bullet$		
1	2	3
4	5	6
7	8	9
	0	
	-	-

Notes on Scoring

This response earns full credit (1 point) because the student correctly predicted the number of deliveries to the southern area of the city.

 $\frac{22}{80} = 0.275$ (the probability of deliveries to the southern area from the data)

 $0.275 \cdot 200 = 55$ (the expected number of deliveries to the southern area, out of 200 deliveries total, given the data)

A pizza shop wants to determine how often it delivers to three different areas of a city. The table shows the areas from a random sample of 80 deliveries.

Area of City	Number of Deliveries
Northern	14
Central	44
Southern	22

Based on these data, if the driver makes 200 deliveries, how many deliveries will be to the southern area of the city?

55.0		
$\bullet \bullet \bullet \bullet$		
1	2	3
4	5	6
7	8	9
	0	
	-	<u><u></u></u>

Notes on Scoring

This response earns full credit (1 point) because the student correctly predicted the number of deliveries to the southern area of the city.

 $\frac{22}{80} = 0.275$ (the probability of deliveries to the southern area from the data)

 $0.275 \cdot 200 = 55.0$ (the expected number of deliveries to the southern area, out of 200 deliveries total, given the data)

A pizza shop wants to determine how often it delivers to three different areas of a city. The table shows the areas from a random sample of 80 deliveries.

Area of City	Number of Deliveries
Northern	14
Central	44
Southern	22

Based on these data, if the driver makes 200 deliveries, how many deliveries will be to the southern area of the city?

110		
1	2	3
4	5	6
7	8	9
	0	
	-	<u><u></u></u>

Notes on Scoring

This response earns no credit (0 points) because the student did not correctly predict the number of deliveries to the southern area of the city.

 $\frac{22}{80} = 0.275$ (the probability of deliveries to the southern area from the data)

 $0.275 \cdot 200 = 55$ (the expected number of deliveries to the southern area, out of 200 deliveries total, given the data)

The student may then have multiplied by 2 (because of the number 200) to get 110 as a response.

A pizza shop wants to determine how often it delivers to three different areas of a city. The table shows the areas from a random sample of 80 deliveries.

Area of City	Number of Deliveries
Northern	14
Central	44
Southern	22

Based on these data, if the driver makes 200 deliveries, how many deliveries will be to the southern area of the city?

67		
$\bullet \bullet \bullet \bullet$		
1	2	3
4	5	6
7	8	9
	0	
	-	-

Notes on Scoring

This response earns no credit (0 points) because the student did not correctly predict the number of deliveries to the southern area of the city.

The student may have divided the 200 deliveries equally by 3 areas. The result would be 66.666..., which the student rounded to 67 deliveries.

Question 16

Question and Scoring Guidelines

Question 16



Points Possible: 1

Content Cluster: Draw, construct, and describe geometrical figures and describe the relationships between them.

Content Standard: Solve problems involving similar figures with right triangles, other triangles, and special quadrilaterals. *a.* Compute actual lengths and areas from a scale drawing and reproduce a scale drawing at a different scale. (7.G.1a)

Scoring Guidelines

Exemplar Response



Other Correct Responses



- In Part A, the scale may be 1 inch : 4 feet or 1 inch : 3 feet.
- In Part B, any rectangle with the proper dimensions given the scale in Part A.

For this item, a full-credit response includes:

- An appropriate scale, and
- A correct rectangle for the chosen scale (1 point).

Question 16

Sample Responses



Notes on Scoring

This response earns full credit (1 point) because the student has chosen an appropriate scale (1 inch : 3 feet) and produced a correct scale drawing (8 inches by 6 inches).



Notes on Scoring

This response earns full credit (1 point) because the student has chosen an appropriate scale (1 inch : 4 feet) and produced a correct scale drawing (4.5 inches by 6 inches).



Notes on Scoring

This response earns no credit (0 points) because even though the student has chosen an appropriate scale (1 inch : 3 feet), the scale drawing is not correct (3 inches by 4 inches). Using this scale drawing, the room would be 9 feet by 12 feet. The student may have used a scale drawing where one boxwidth equals 1 inch instead of the given two box-widths equal 1 inch.



Notes on Scoring

This response earns no credit (0 points) because even though the student has chosen a scale that would allow the room to be drawn on the paper (1 inch : 6 feet), Madeline wanted her scale drawing to be "at least 4 inches wide and long". This drawing is 4 inches wide, but only 3 inches long.



Notes on Scoring

This response earns no credit (0 points) because the student chose a scale (1 inch : 2 feet) that does not allow the room to be drawn on the 8.5 inches by 7 inches paper. Using this scale, the drawing would be 12 inches by 9 inches.

Question 17

Question and Scoring Guidelines

Question 17

A snail moves $\frac{1}{50}$ of a mile in $\frac{5}{6}$ of an hour.			
If the snail continues at this pace, how far, in miles, does it move in one hour?			
mile(s)			
$\bullet \bullet \bullet \bullet \bullet$			
1	2	3	
4	5	6	
7	8	9	
	0		
	-	<u><u></u></u>	

Points Possible: 1

Content Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

Content Standard: Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction

 $\frac{1}{2}/\frac{1}{4}$ miles per hour, equivalently 2 miles per hour. (7.RP.1)

Scoring Guidelines

Exemplar Response

• $\frac{3}{125}$ mile

Other Correct Responses

• Any equivalent value

For this item, a full-credit response includes:

• The correct value (1 point).

Question 17

Sample Responses



Notes on Scoring

This response earns full credit (1 point) because the student correctly calculated the distance the snail would move in one hour.

The student may have divided $\frac{1}{50}$ by 5 to get how far the snail moved in $\frac{1}{6}$ of an hour. This would result in $\frac{1}{250}$ mile. The student may have then multiplied by 6 to calculate how far the snail moved in $\frac{6}{6}$ hour and got $\frac{6}{250}$ mile.



Notes on Scoring

This response earns full credit (1 point) because the student correctly calculated the distance the snail would move in one hour.

The student may have converted $\frac{1}{50}$ to the decimal 0.02 and then divided 0.02 by 5 to get how far the snail moved in $\frac{1}{6}$ of an hour. This would result in 0.004 miles. The student may have then multiplied by 6 to calculate how far the snail moved in $\frac{6}{6}$ hour and got 0.024 mile.



Notes on Scoring

This response earns no credit (0 points) because the student did not correctly calculate the distance the snail would move in one hour.

The student may have multiplied $\frac{1}{50}$ by $\frac{5}{6}$ to get $\frac{5}{300}$, and then divided both the numerator and denominator by 5 to get the equivalent fraction $\frac{1}{60}$.
Sample Response: 0 points



Notes on Scoring

This response earns no credit (0 points) because the student did not correctly calculate the distance the snail would move in one hour.

The student may have divided $\frac{1}{50}$ by 5 to get how far the snail moved in $\frac{1}{6}$ of an hour. This would result in $\frac{1}{250}$ mile. The student may then have forgotten to multiply by 6 to calculate how far the snail moved in $\frac{6}{6}$ hour.

Question 18

Question and Scoring Guidelines

Question 18

Select the three expressions that are equivalent to -2(4-3x) + (5x-2).



Points Possible: 1

Content Strand: Use properties of operations to generate equivalent expressions.

Content Standard: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. (7.EE.1)

Scoring Guidelines

<u>Rationale for First Option:</u> This is incorrect. The student may not have distributed the -2 to the -3.

<u>Rationale for Second Option:</u> **Key** – The student correctly identifies that 11x - 10 represents the given expression with all like terms combined.

<u>Rationale for Third Option</u>: **Key** – The student correctly identifies that -8 + 11x - 2 represents the expression after distributing and combining the *x*-terms.

<u>Rationale for Fourth Option</u>: This is incorrect. The student may have incorrectly distributed or incorrectly added the x-terms to get -11x.

<u>Rationale for Fifth Option:</u> **Key** – The student correctly identifies the expression that represents distributing the –2 to the first two terms and leaving the rest of the expression the same.

<u>Rationale for Sixth Option</u>: This is incorrect. The student may not have distributed the -2 to the -3.

Sample Response: 1 point



Question 19

Question and Scoring Guidelines

Question 19

A circle has a diameter of 7.2 inches. What is the circumference of the circle, rounded to the nearest tenth of an inch? inches 3 1 2 4 5 6 7 8 9 0 믐 _

Points Possible: 1

Content Cluster: Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Content Standard: Work with circles

b. Know and use the formulas for the area and circumference of a circle and use them to solve real-world and mathematical problems. (7.G.4b)

Scoring Guidelines

Exemplar Response

• 22.6 inches

Other Correct Responses

• Any value from 22.6 to 22.63, inclusive

For this item, a full-credit response includes:

• A correct circumference (1 point).

Question 19

Sample Responses

Sample Response: 1 point

A circle has a diameter of 7.2 inches.

What is the circumference of the circle, rounded to the nearest tenth of an inch?

22.6		ir	ches			
$\bullet \bullet \bullet$						
1	2	3				
4	5	6				
7	8	9				
	0					
-	_					

Notes on Scoring

This response earns full credit (1 point) because the student correctly calculated the circumference of the circle and rounded to the nearest tenth.

$$2 \cdot \pi \cdot \left(\frac{7.2}{2}\right) \approx 22.619 \approx 22.6$$

Sample Response: 1 point



Notes on Scoring

This response earns full credit (1 point) because the student correctly calculated the circumference of the circle.

Because standards at grade 6 and above assess content other than rounding, a range of values will be accepted as correct. Answers that are more precise than the rounding instructions will be accepted. Answers that are truncated can be less precise than the rounding instructions and therefore may fall outside the range of acceptable values.

Sample Response: 0 points



Notes on Scoring

This response earns no credit (0 points) because the student did not correctly calculate the circumference of the circle.

Because standards at grade 6 and above assess content other than rounding, a range of values will be accepted as correct. Answers that are more precise than the rounding instructions will be accepted. Answers that are truncated can be less precise than the rounding instructions and therefore may fall outside the range of acceptable values.

$$2 \cdot \pi \cdot 3.6 = 22.619 \dots$$

 $2 \cdot 3.14 \cdot 3.6 = 22.608 \dots$

 $2 \cdot \left(\frac{22}{7}\right) \cdot 3.6 = 22.628 \dots$

None of these calculations would round to 22.7 when rounded to the nearest tenth of an inch.

Sample Response: 0 points



Notes on Scoring

This response earns no credit (0 points) because the student did not correctly calculate the circumference of the circle.

The student may have calculated the area of the circle instead of the circumference.

 $3.14 \cdot \left(\frac{7.2}{2}\right)^2 = 40.6944$ $40.6944 \approx 40.7$, correctly rounded to the nearest tenth.

Question 20

Question and Scoring Guidelines

Question 20

A fair coin is flipped 3 times.

What is the probability that the coin lands heads up once and lands tails up twice if order does not matter?

(a) $\frac{1}{8}$ (b) $\frac{1}{4}$ (c) $\frac{3}{8}$ (c) $\frac{5}{8}$

Points Possible: 1

Content Cluster: Investigate chance processes and develop, use, and evaluate probability models.

Content Standard: Find probabilities of compound events using organized lists, tables, tree diagrams, and simulations. *a.* Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. (7.SP.8a)

Scoring Guidelines

<u>Rationale for Option A:</u> This is incorrect. The student may have considered just one way that a coin can land 1 H and 2 T, such as H, T, T, forgetting about the two other ways this can happen (T, H, T and T, T, H).

<u>Rationale for Option B:</u> This is incorrect. The student may have considered just two ways that a coin can land 1 H and 2 T (e.g., H, T, T and T, H, T), forgetting about the third way this can happen (T, T, H).

<u>Rationale for Option C:</u> **Key** – The student correctly determined the number of combinations out of the 8 possible combinations that could contain exactly 1 H and 2 T (H, T, T, and T, H, T, and T, T, H).

<u>Rationale for Option D:</u> This is incorrect. The student may have found the probability that the coin-flips do not contain exactly 1 H and 2 T instead of the probability that the coin-flips are 1 H and 2 T.

Sample Response: 1 point

A fair coin is flipped 3 times. What is the probability that the coin lands heads up once and lands tails up twice if order does not matter? (A) $\frac{1}{8}$ (B) $\frac{1}{4}$ (B) $\frac{3}{8}$ (D) $\frac{5}{8}$

Question 21

Question and Scoring Guidelines

Question 21

Each student in Ms. Clark's class is decorating a shirt for a school program.

There are 25 students in the class. Ms. Clark already has 3 shirts. She will buy shirts in packages of 6 shirts. She cannot buy part of a package.

- A. Create an inequality using only the given numbers to represent this situation, where *p* represents the number of packages of shirts.
- $^{\mathsf{B.}}$ What is the minimum number of whole packages of shirts that Ms. Clark needs to buy?

<i>A</i> .							
<i>B</i> .							
$\bullet \bullet \bullet$							
1	2	3	p				
4	5	6	+	-	•	÷	
7	8	9	<	<u>≤</u>	=	2	>
	0			()		π	
· .	-	<u><u></u></u>					

Points Possible: 2

Content Cluster: Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Content Standard: Use variables to represent quantities in a real- world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

b. Solve word problems leading to inequalities of the form px + q > ror px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions. (7.EE.4b)

Scoring Guidelines

Exemplar Response

• A. 6p + 3 ≥ 25 B. 4

Other Correct Responses

• Any equivalent inequality that uses the numbers 6, 3, and 25

For this item, a full-credit response includes:

- A correct inequality (1 point); AND
- A correct number of packages (1 point).

Question 21

Sample Responses

Sample Response: 2 points

Each student in Ms. Clark's class is decorating a shirt for a school program. There are 25 students in the class. Ms. Clark already has 3 shirts. She will buy shirts in packages of 6 shirts. She cannot buy part of a package. A. Create an inequality using only the given numbers to represent this situation, where p represents the number of packages of shirts. ^{B.} What is the minimum number of whole packages of shirts that Ms. Clark needs to buy? A. $25 \le 3 + 6p$ *B*. 4 3 1 2 р 5 4 6 + • ÷ -7 8 9 < \leq = \geq > 0 П ()π 믐 _

Notes on Scoring

This response earns full credit (2 points) because the student created a correct inequality to represent this situation and solved the inequality correctly, rounding up to 4 whole packages.

Sample Response: 2 points

Each student in Ms. Clark's class is decorating a shirt for a school program. There are 25 students in the class. Ms. Clark already has 3 shirts. She will buy shirts in packages of 6 shirts. She cannot buy part of a package. A. Create an inequality using only the given numbers to represent this situation, where p represents the number of packages of shirts. ^{B.} What is the minimum number of whole packages of shirts that Ms. Clark needs to buy? 6p > 25 - 3А. *B*. 4 $(\bullet, \bullet) (\bullet) (\blacksquare)$ 3 1 2 р 4 5 6 + _ • ÷ 7 8 9 < ≤ ≥ > = 0 ()Ш π 믐

Notes on Scoring

This response earns full credit (2 points) because the student created a correct inequality to represent this situation and solved the inequality correctly, rounding up to 4 whole packages.

Sample Response: 1 point

Each student in Ms. Clark's class is decorating a shirt for a school program.

There are 25 students in the class. Ms. Clark already has 3 shirts. She will buy shirts in packages of 6 shirts. She cannot buy part of a package.

A. Create an inequality using only the given numbers to represent this situation, where *p* represents the number of packages of shirts.

^{B.} What is the minimum number of whole packages of shirts that Ms. Clark needs to buy?

A. $6p \ge 3$	22						
<i>B</i> . 4							
$\bullet \bullet \bullet$							
1	2	3	p				
4	5	6	+	-	•	÷	
7	8	9	<	≤	=	2	>
	0			()		π	
	-						

Notes on Scoring

This response earns partial credit (1 point) because the student did not create an inequality to represent this situation using only the numbers given in the directions, but still arrived at a correct number of 4 whole packages.

Sample Response: 1 point

Each student in Ms. Clark's class is decorating a shirt for a school program.

There are 25 students in the class. Ms. Clark already has 3 shirts. She will buy shirts in packages of 6 shirts. She cannot buy part of a package.

A. Create an inequality using only the given numbers to represent this situation, where *p* represents the number of packages of shirts.

^{B.} What is the minimum number of whole packages of shirts that Ms. Clark needs to buy?

A. $25 \leq$	3 +6 p						
$B. \boxed{\frac{11}{3}}$							
$\bullet \bullet \bullet$							
1	2	3	p				
4	5	6	+	-	•	÷	
7	8	9	<	≤	=	2	>
	0			()		π	
	-	<u>-</u>					

Notes on Scoring

This response earns partial credit (1 point) because the student correctly created an inequality to represent this situation; the student solved the inequality correctly, but did not round up to 4 whole packages.

Sample Response: 0 points

Each student in Ms. Clark's class is decorating a shirt for a school program.

There are 25 students in the class. Ms. Clark already has 3 shirts. She will buy shirts in packages of 6 shirts. She cannot buy part of a package.

A. Create an inequality using only the given numbers to represent this situation, where *p* represents the number of packages of shirts.

^{B.} What is the minimum number of whole packages of shirts that Ms. Clark needs to buy?

<i>A</i> .	$22 \leq$	6 <i>p</i>						
В.	$\frac{11}{3}$							
	•							
	1	2	3	p				
	4	5	6	+	-	•	÷	
	7	8	9	<	≤	=	2	>
		0			()		π	
		-	<u>-</u>					

Notes on Scoring

This response earns no credit (0 points) because the student did not create an inequality to represent this situation using only the numbers given in the directions, and even though the student solved the inequality correctly, the student did not round up to 4 whole packages.

Sample Response: 0 points

Each student in Ms. Clark's class is decorating a shirt for a school program. There are 25 students in the class. Ms. Clark already has 3 shirts. She will buy shirts in packages of 6 shirts. She cannot buy part of a package. A. Create an inequality using only the given numbers to represent this situation, where p represents the number of packages of shirts. ^{B.} What is the minimum number of whole packages of shirts that Ms. Clark needs to buy? $25 \ge 6p + 3$ A. *B*. 3 $\bullet \bullet \bullet \bullet \blacksquare$ 2 3 1 р 4 5 6 + _ • ÷ 7 8 9 < \leq = ≥ > 0 ()П π 믐

Notes on Scoring

This response earns no credit (0 points) because the student did not create a correct inequality to represent this situation. The inequality sign is turned the wrong way. The student also incorrectly rounded the answer down to 3 whole packages. Since the number of shirts needs to be more than the number of students, the answer to the inequality needs to be rounded up to make sure that there are enough shirts.

Question 22

Question and Scoring Guidelines

Question 22

Ben has a coupon for an additional 15% off the sale price of any item in a store. He uses his coupon to buy a shirt whose sale price is already 20% off the original price. He pays \$14.96, and there is no sales tax.

What is the original price of the shirt?

\$						
$\bullet \bullet \bullet \bullet$	•					
1	2	3				
4	5	6				
7	8	9				
	0					
	-					

Points Possible: 1

Content Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

Content Standard: Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error. (7.RP.3)*

Scoring Guidelines

Exemplar Response

• \$22

Other Correct Responses

• Any equivalent value

For this item, a full-credit response includes:

• The correct value (1 point).

Question 22

Sample Responses

Sample Response: 1 point

Ben has a coupon for an additional 15% off the sale price of any item in a store. He uses his coupon to buy a shirt whose sale price is already 20% off the original price. He pays \$14.96, and there is no sales tax.



Notes on Scoring

This response earns full credit (1 point) because the student correctly solved the multistep percent problem. $14.96 = 0.85 \cdot \text{sale price}$ 17.60 = sale price

 $17.60 = 0.80 \cdot \text{original price}$

22 = original price
Ben has a coupon for an additional 15% off the sale price of any item in a store. He uses his coupon to buy a shirt whose sale price is already 20% off the original price. He pays \$14.96, and there is no sales tax.



Notes on Scoring

This response earns full credit (1 point) because the student correctly solved the multistep percent problem.

 $14.96 = 0.85 \cdot \text{sale price}$

17.60 = sale price

 $17.60 = 0.80 \cdot \text{original price}$

22.00 = original price

Ben has a coupon for an additional 15% off the sale price of any item in a store. He uses his coupon to buy a shirt whose sale price is already 20% off the original price. He pays \$14.96, and there is no sales tax.



Notes on Scoring

This response earns no credit (0 points) because the student did not correctly solve the multistep percent problem.

The student may have added the two percentages in the problem, 15% + 20%, to get 35%, then calculated using 65% to get an original price of $\frac{14.96}{0.65} = 23.02$.

Ben has a coupon for an additional 15% off the sale price of any item in a store. He uses his coupon to buy a shirt whose sale price is already 20% off the original price. He pays \$14.96, and there is no sales tax.



Notes on Scoring

This response earns no credit (0 points) because the student did not correctly solve the multistep percent problem. The student may have calculated 35% of \$14.96 ($0.35 \cdot 14.96 = 5.236$) and added this to the \$14.96 (14.96 + 5.236) to get 20.196, then rounded to the nearest hundredth to get \$20.20.

Question 23

Question and Scoring Guidelines

Question 23

Arianne drives by a stop light near her home once every morning. The stop light has red, yellow, and green lights. She wants to know the probability of the light being red on two mornings.

Which list represents the sample space for two mornings at the stop light?

- (A) red, yellow, green
- (B) red/red, yellow/yellow, green/green
- © red/yellow, red/green, yellow/green, yellow/red, green/yellow, green/red
- red/red, red/yellow, red/green, yellow/red, yellow/yellow, yellow/green, green/red, green/yellow, green/green

Points Possible: 1

Content Strand: Investigate chance processes and develop, use, and evaluate probability models.

Content Standard: Find probabilities of compound events using organized lists, tables, tree diagrams, and simulations. *b*. Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams. For an event described in everyday language, e.g., "rolling double sixes," identify the outcomes in the sample space which compose the event. (7.SP.8b)

Scoring Guidelines

<u>Rationale for Option A:</u> This is incorrect. The student may choose the sample space that represents each possibility for the light once.

<u>Rationale for Option B:</u> This is incorrect. The student may think that only repeated lights are possible.

<u>Rationale for Option C:</u> This is incorrect. The student may think that no repeated lights are possible.

<u>Rationale for Option D:</u> **Key** – The student correctly chooses the correct sample space.

Arianne drives by a stop light near her home once every morning. The stop light has red, yellow, and green lights. She wants to know the probability of the light being red on two mornings.

Which list represents the sample space for two mornings at the stop light?

- A red, yellow, green
- (B) red/red, yellow/yellow, green/green
- © red/yellow, red/green, yellow/green, yellow/red, green/yellow, green/red
- red/red, red/yellow, red/green, yellow/red, yellow/yellow, yellow/green, green/red, green/yellow, green/green

Question 24

Question and Scoring Guidelines

Question 24



Points Possible: 1

Content Cluster: Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Content Standard: Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. (7.G.5)

Scoring Guidelines

Exemplar Response

• 70 degrees

Other Correct Responses

• Any equivalent value

For this item, a full-credit response includes:

• A correct angle measure (1 point).

Question 24

Sample Responses



Notes on Scoring

This response earns full credit (1 point) because the student correctly used facts about complementary and vertical angles to find the measure of angle EBF.

Angle DBC is 70 degrees because it is complementary to angle ABC. Angle EBF is 70 degrees because it is vertical to angle DBC.



Notes on Scoring

This response earns full credit (1 point) because the student correctly used facts about complementary and vertical angles to find the measure of angle EBF.

Angle DBC is 70.0 degrees because it is complementary to angle ABC. Angle EBF is 70.0 degrees because it is vertical to angle DBC.



Notes on Scoring

This response earns no credit (0 points) because the student did not correctly use facts about complementary and vertical angles to find the measure of angle EBF. The student may have thought that angle EBF is vertical to angle ABC.



Notes on Scoring

This response earns no credit (0 points) because the student did not correctly use facts about complementary and vertical angles to find the measure of angle EBF. The student may have thought that angle EBF is vertical to angle ABD.

Question 25

Question and Scoring Guidelines

Question 25



Points Possible: 1

Content Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

Content Standard: Recognize and represent proportional relationships between quantities.

b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. (7.RP.2b)

Scoring Guidelines

Exemplar Response



Other Correct Responses

• N/A

For this item, a full-credit response includes:

• A correct number line (1 point).

Question 25

Sample Responses



Notes on Scoring

This response earns full credit (1 point) because the student correctly orders the relationships from smallest to largest constant of proportionality.

100 feet every 30 minutes is a constant speed of $3\frac{1}{3}$ feet per minute.

The graph shows a constant speed of 3.75 feet per minute.

The equation shows a constant speed of 4 feet per minute.

The table shows a constant speed of $4\frac{1}{3}$ feet per minute.



Notes on Scoring

This response earns no credit (0 points) because the student does not correctly order the relationships from smallest to largest constant of proportionality. The student orders the relationships on the number line from largest to smallest constant of proportionality instead of from smallest to largest.



Notes on Scoring

This response earns no credit (0 points) because the student does not correctly order the relationships from smallest to largest constant of proportionality. The student may incorrectly calculate the constant of proportionality for the table by dividing 60 by 260 to get about 0.23 feet per minute, and then identifies this as the smallest constant of proportionality.



Notes on Scoring

This response earns no credit (0 points) because the student does not correctly order the relationships from smallest to largest constant of proportionality. The student may incorrectly calculate the constant of proportionality for the table by dividing 60 by 260 to get about 0.23 feet per minute, and then identifies this as the smallest constant of proportionality. Then, the student may incorrectly order them on the number line from largest to smallest.

Question 26

Question and Scoring Guidelines

Question 26

Complete the sentence about the probability of an event.

An event with a probability

indicates that the event is

•

Points Possible: 1

Content Cluster: Investigate chance processes and develop, use, and evaluate probability models.

Content Standard: Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event; a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely; and a probability near 1 indicates a likely event. (7.SP.5)

Scoring Guidelines

Exemplar Response

• A probability **near 0** indicates that the event is **unlikely**.

Other Correct Responses

- A probability **near 1** indicates that the event is **likely**.
- A probability **near 0.5** indicates that the event is **neither unlikely nor likely**.

For this item, a full-credit response includes:

• A correctly completed statement (1 point).

Question 26

Sample Responses

Complete the sentence about the probability of an event.

An event with a probability near 0 🔹 indicates that the event is unlikely.

-

Notes on Scoring

This response earns full credit (1 point) because the student correctly completes the sentence about the probability of an event.

A probability near 0 indicates an unlikely event, a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely and a probability near 1 indicates a likely event.
Sample Response: 1 point

Complete the sentence about the probability of an event.

An event with a probability near 0.5 🔹 indicates that the event is neither unlikely nor likely. 💌

Notes on Scoring

This response earns full credit (1 point) because the student correctly completes the sentence about the probability of an event.

A probability near 0 indicates an unlikely event, a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely and a probability near 1 indicates a likely event.

Sample Response: 1 point

Complete the sentence about the probability of an event.

An event with a probability near 1 🔹 indicates that the event is likely.

Notes on Scoring

This response earns full credit (1 point) because the student correctly completes the sentence about the probability of an event.

•

A probability near 0 indicates an unlikely event, a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely and a probability near 1 indicates a likely event.

Sample Response: 0 points

Complete the sentence about the probability of an event.

An event with a probability near 1 🔽 indicates that the event is unlikely.

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly complete the sentence about the probability of an event. The student may think that a higher number indicates a higher probability. The student may not understand that the probability of a chance event is a number between 0 and 1, with "near 1" indicating a likely event. •

Sample Response: 0 points

Complete the sentence about the probability of an event.

An event with a probability near 0 🔹 indicates that the event is neither unlikely nor likely.

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly complete the sentence about the probability of an event. The student may not understand that the probability of a chance event is a number between 0 and 1, with "near 0" indicating an unlikely event.

Sample Response: 0 points

Complete the sentence about the probability of an event.

An event with a probability near 0.5 - indicates that the event is likely.

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly complete the sentence about the probability of an event. The student may not understand that the probability of a chance event is a number between 0 and 1, with "near 0.5" indicating an event that is neither unlikely nor likely. •

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