

DRAFT

Grade 7 Mathematics Item Specifications



The draft Florida Standards Assessment (FSA) *Test Item Specifications (Specifications)* are based upon the Florida Standards and the Florida Course Descriptions as provided in [CPALMs](#). The *Specifications* are a resource that defines the content and format of the test and test items for item writers and reviewers. Each grade-level and course *Specifications* document indicates the alignment of items with the Florida Standards. It also serves to provide all stakeholders with information about the scope and function of the FSA.

Item Specifications Definitions

Also assesses refers to standard(s) closely related to the primary standard statement.

Clarification statements explain what students are expected to do when responding to the question.

Assessment limits define the range of content knowledge and degree of difficulty that should be assessed in the assessment items for the standard.

Acceptable response mechanisms describe the characteristics from which a student must answer a question.

Context defines types of stimulus materials that can be used in the assessment items.

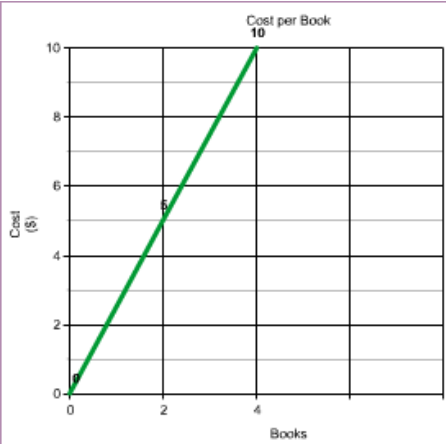
Content Standard	<p>MAFS.7.RP Ratios and Proportional Relationships.</p> <p>MAFS.7.RP.1 Analyze proportional relationships and use them to solve real-world and mathematical problems.</p> <p>MAFS.7.RP.1.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. <i>For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $\frac{\frac{1}{2}}{\frac{1}{4}}$ miles per hour, equivalently 2 miles per hour.</i></p>	
Assessment Limits	<p>Rational numbers — some items may include one rational number and one whole number (other than 1), but the bulk of items from this standard should involve ratios expressed as fractions.</p> <p>Ratios can be expressed as fractions, with “:” or with words.</p> <p>Units can be the same or different across the two quantities.</p>	
Calculator	Yes	
Acceptable Response Mechanisms	<p>Equation Response</p> <p>Graphic Response — Drag and Drop, Drawing, Hot Spot</p> <p>Multiple Choice Response</p> <p>Multi-Select Response</p> <p>Table Response</p>	
Context	Allowable	
Example		
Context	<p>Calculate a unit rate involving a ratio between rational numbers within a situational context or a mathematical problem.</p> <ul style="list-style-type: none"> Calculated or identified unit rates can be ordered differently in description and question/student instruction (e.g., ratio presented as cups per teaspoon, but question can ask for teaspoons per cup). 	
Context easier	<p>Identify a unit rate involving a ratio between a rational number and whole number (except 1) within a situational context or a mathematical problem.</p> <ul style="list-style-type: none"> Identified unit rates follow the same order in description and question (e.g., ratio presented as cups for every teaspoon, then the question asks for cups per teaspoon). 	
Context more difficult	<p>Create a model or complete/use information from a table to determine or represent a unit rate involving a ratio between rational numbers within a situational context or a mathematical problem.</p> <ul style="list-style-type: none"> Could ask students to find all unit rates involved. 	
Sample Item Stem	Response Mechanism	Notes, Comments
A recipe calls for $\frac{2}{3}$ cup of sugar for every 2 teaspoons of vanilla. How much sugar should be used for every 1 teaspoon of vanilla?	Multiple Choice Response	

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A recipe calls for $\frac{2}{3}$ cup of sugar for every 4 teaspoons of vanilla. How much vanilla should be used for every 1 cup of sugar?	Multiple Choice Response	
A recipe calls for $\frac{2}{3}$ cup of sugar for every 2 teaspoons of vanilla. What is the unit rate in cups per teaspoon?	Equation Response	
A recipe calls for $\frac{2}{3}$ cup of sugar for every 4 teaspoons of vanilla. What is the unit rate in teaspoons per cup?	Equation Response	
A recipe calls for $\frac{2}{3}$ cup of sugar for every $\frac{1}{2}$ teaspoons of vanilla. Create a tape diagram to model the unit rate of cups per teaspoon.	Graphic Response	

Content Standard	<p>MAFS.7.RP <i>Ratio and Proportional Relationships</i></p> <p>MAFS.7.RP.1 <i>Analyze proportional relationships and use them to solve real-world and mathematical problems.</i></p> <p>MAFS.7.RP.1.2 Recognize and represent proportional relationships between quantities.</p> <p>MAFS.7.RP.1.2a 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.</p> <p>MAFS.7.RP.1.2b Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.</p> <p>MAFS7.RP.1.2c Represent proportional relationships by equations. <i>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 $t = pn$.</i></p> <p>MAFS.7.RP.1.2d 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.</p>
Assessment Limits	<p>Rational numbers.</p> <p>Ratios can be expressed as fractions, with “:” or with words.</p> <p>Units can be the same or different across the two quantities.</p>
Acceptable Response Mechanisms	<p>Equation Response</p> <p>Graphic Response — Drag and Drop, Drawing, Hot Spot</p> <p>Simulation Response</p> <p>Multiple Choice Response</p> <p>Natural Language Response</p> <p>Table Response</p>
Calculator	Yes
Context	Allowable
Example	
Context	<p>Numbers and situations that have a proportional relationship.</p> <p>Use numbers that result in a unit rate that is not a whole number.</p> <p>Use variables to represent proportional relationships.</p>
Context easier	<p>Numbers and situation that have a proportional relationship.</p> <p>Use only whole numbers and when calculating a unit rate result in an answer as a whole number.</p>
Context more difficult	<p>Problems involve more than one proportional relationship. Numbers used are other than whole numbers.</p>

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Sample Item Stem	Response Mechanism	Notes, Comments
Ethan ran 11 miles in 2 hours. What is the unit rate of miles to hour?	Multiple Choice Response	
Kara is mixing paint. All of the different blue, red, and yellow amounts in each batch are shown in the table. Which batch(s) will have the same shade as the first batch in the table?	Table Response	
Kara is mixing paint. Each batch has twice as much blue paint as yellow paint. Plot points to represent the amount of blue and yellow paint in three different-sized batches.	Graphic Response	
The points on the coordinate plane show the amount of blue and yellow paint in each batch. Write an equation to represent the relationship between blue paint, b , and yellow paint, y , in each batch.	Equation Response	
<p>The graph below represents the unit rate for the cost of b, books.</p>  <p>Write an equation to represent the cost.</p>	Equation Response	

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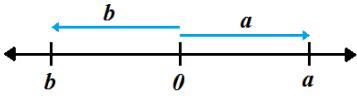
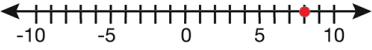
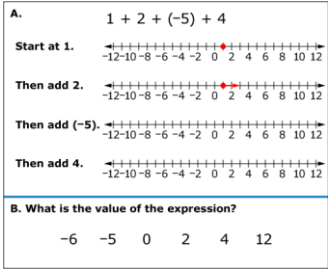
<p>Kara is mixing paint. All of the different blue, red, and yellow amounts in each batch are shown in the table. Graph the points and label the axes to represent the amount of the two colors that are in a proportional relationship in each batch.</p>	<p>Graphic Response — Drawing</p>	
<p>The cost of granola varies directly with its weight. Granola costs \$0.80 for 8 ounces.</p> <p>Write an equation to find how much any weight of granola would cost.</p> <p>How much does 26 ounces of granola cost?</p>	<p>Equation Response</p>	
<p>The ordered pair (1, 5) indicates the unit rate of books to cost. What does the point represent?</p> <p>[Include a graph with a line through the given point to show multiple proportions for the situation.]</p>	<p>Graphic Response — Drawing</p>	

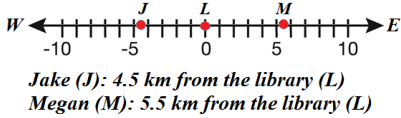
Content Standard	MAFS.7.RP <i>Ratio and Proportional Relationships</i>	
	MAFS.7.RP.1 <i>Analyze proportional relationships and use them to solve real-world and mathematical problems.</i>	
	MAFS.7.RP.1.3 <i>Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</i>	
Assessment Limits	Limit to rational numbers. Units can be the same or different across the two quantities.	
Acceptable Response Mechanisms	Equation Response Multiple Choice Response Graphic Response — Drag and Drop, Drawing, Hot Spot Table Response Matching Item Response	
Calculator	Yes	
Context	Allowable	
Example		
Context	Calculate the tip and sales tax on a restaurant bill. Use percentages that are not a multiple of 5 or 10.	
Context easier	Use percentages for increase/decrease that are a multiple of 5 or 10 (e.g., 10%, 15%, 20%). Limit decrease problems to familiar numbers (students will readily reason that 25% decrease in x is equal to $0.75x$, reducing the work to a simpler problem). Represent problems with equations instead of solving percent problems.	
Context more difficult	Work backwards from a given total and the percent of increase/decrease to find the original amount.	
Sample Item Stem	Response Mechanism	Notes, Comments
Nicole bought a meal in a town that has no sales tax. She tips 20%. Select all meals Nicole could buy for less than \$15 total.	Table response	
Nicole buys a meal in a town with a 9% sales tax. She tips 19% on the bill before adding the sales tax. She pays a total of \$23.35. What should be the original cost of her meal?	Equation Response	

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<p>James buys golf clubs at a 20% off sale, for \$120.00. After buying the clubs, he sees an advertisement for the same clubs at another store for \$8.00 less. At that store they are on sale for 13% off.</p> <p>What is the original cost of the clubs at the second store?</p>	Equation Response	
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Content Standard	<p>MAFS.7.NS <i>The Number System</i></p> <p>MAFS.7.NS.1 <i>Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.</i></p> <p>MAFS.7.NS.1.1 <i>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.</i></p> <p>MAFS.7.NS.1.1a <i>Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.</i></p> <p>MAFS.7.NS.1.1b <i>Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.</i></p> <p>MAFS.7.NS.1.1c <i>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.</i></p> <p>MAFS.7.NS.1.1d <i>Apply properties of operations as strategies to add and subtract rational numbers.</i></p>	
Assessment Limits	<p>Rational numbers: use integers, fractions, and decimals. Limit decimals to those ending in 0.25, 0.5, and 0.75. Limit fractions to halves and fourths.</p>	
Calculator	Neutral	
Acceptable Response Mechanisms	<p>Equation Response Graphic Response – Graphing, Drag and Drop Multiple Choice Response Multi-Select Response</p>	
Context	Allowable	
Example		
Context	<p>Megan and Jake both live on the same street as their library. Jake lives 4.5 km west of the library. Megan lives 5.5 km east of the library. Decimal numbers are used in algorithm/context.</p>	
Context easier	<p>The number line is given for plotting points or calculating distance. Integers are used in algorithm/context.</p>	
Context more difficult	<p>No number line is given; students calculate distance using absolute value. Fractions or mixed numbers are used in algorithm/context.</p>	

Sample Item Stem	Response Mechanism	Notes, Comments
<p>A number line is shown.</p>  <p>Jack knows that $a + b = 0$.</p> <p>Which statement is true?</p>	Multiple Choice Response	
<p>An expression is shown.</p> <p>$2.3 + (-2.3)$</p> <p>What is the value of the expression?</p>	Equation Response	
<p>A number line is shown.</p>  <p>Use the Add Point tool to plot a point that is 14.5 units from 8 on the given number line.</p>	Graphic Response-Drawing	
<p>An expression is shown.</p> <p>$15.5 + (-16.75)$</p> <p>What is the value of the expression?</p>	Equation Response	
<p>An expression is shown.</p> <p>$-5\frac{1}{2} + 7\frac{3}{4}$</p> <p>What is the value of the expression?</p>	Equation Response	
<p>An expression is shown.</p> <p>$1 + 2 + (-5) + 4$</p> <p>Kendrick is using number lines to find the value of the expression. His first two steps are shown.</p> <p>A. Use the Add Arrow tool to show the last two steps.</p> <p>B. Select the value of the expression.</p>	Graphic Response-Hot Spot	<p>Background image:</p> 

<p>Megan and Jake both live on the same street as their library.</p>  <p>Jake (J): 4.5 km from the library (L) Megan (M): 5.5 km from the library (L)</p> <p>How many kilometers (km) apart do Megan and Jake live?</p>	<p>Equation Response</p>	
<p>The sum of a and b is c. The number line shows a and b.</p> <p>[number line with only 0 labeled; a is to the right of 0, b is to the left of zero, with a clearly greater than b]</p> <p>Which statements about c are true?</p> <p>A. $a < c$ B. $a = c$ C. $a > c$ D. $c < 0$ E. $c = 0$ F. $c > 0$</p>	<p>Multi-Select Response</p>	
<p>An expression is shown, where $a < 0$ and $c > 0$.</p> $a + b = c$ <p>Drag the two points to the number line to show possible locations of a and b.</p> <p>[in grid space, number line with only 0 labeled, and c labeled to the right of 0. Two preplaced images, points labeled a and b. The correct answer has b to the right of c, and $b > a$]</p>	<p>Graphic Response — Drag and Drop</p>	

Content Standard	<p>MAFS.7.NS <i>The Number System</i></p> <p>MAFS.7.NS.1 <i>Apply and extend previous understanding of operations with fractions.</i></p> <p>MAFS.7.NS.1.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.</p> <p>MAFS.7.NS.1.2a Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.</p> <p>MAFS.7.NS.1.2b Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.</p> <p>MAFS.7.NS.1.2c Apply properties of operations as strategies to multiply and divide rational numbers.</p> <p>MAFS.7.NS.1.2d Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.</p>
Assessment Limits	<p>Rational numbers.</p> <p>7.NS.2a, 2b, and 2c require the incorporation of a negative value.</p>
Calculator	No
Acceptable Response Mechanisms	<p>Equation Response</p> <p>Graphic Response — Graphing</p> <p>Matching Item Response</p> <p>Multiple Choice Response</p> <p>Multi-Select Response</p>
Context	Allowable
Example	
Context	<p>Springfield has an elevation of -150 feet. Greenville is 3 times as far below sea level as Springfield.</p> <p>Include multiplication or division with one non-integer rational number.</p> <p>Include 1 digit repeating decimals in conversions.</p>
Context easier	<p>Limit values requiring operations to integers.</p> <p>Limit conversions to a terminating decimal.</p>
Context more difficult	<p>Include multiplication or division of 2 or more non-integer rational numbers.</p> <p>Conversions include multi-digit repeating decimals ($\frac{1}{11} = 0.\overline{09}$) and/or decimals where the first digit after the decimal is not the repeating digit ($\frac{1}{6} = 0.1\overline{6}$).</p>

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Sample Item Stem	Response Mechanism	Notes, Comments
What is $\frac{4}{5}$ written as a decimal?	Equation Response	
What is $\frac{2}{3}$ written as a decimal?	Multiple Choice Response	
What is $\frac{6}{11}$ written as a decimal?	Multiple Choice Response	
What is the product of -2 and 5?	Equation Response	
<p>Springfield has an elevation of -150 feet. Greenville is 3 times as far below sea level as Springfield.</p> <p>What is Greenville's elevation in feet?</p>	Equation Response	
<p>An expression is shown.</p> <p>$-5 \div 0.5$</p> <p>What is the value of the expression?</p>	Equation Response	
<p>An expression is shown.</p> <p>$(-1.5)(0.25)(-3)$</p> <p>What is the value of the expression?</p>	Equation Response	

<p>An equation is shown, where $z < 0$.</p> $x \cdot y = z$ <p>A. Assume $x > 0$. Drag the point to the number line to identify a possible location for y.</p> <p>B. Assume $x < 0$. Drag the point to the number line to identify a possible location for y.</p> <p>[grid space is divided horizontally into two sections, each with a number line where only 0 is labeled; preplaced image in each section, a point labeled y - correct answer for A is to the right of 0, for B to the left of 0]</p>	<p>Graphic Response- Drag and Drop</p>	
<p>An equation is shown, where $x > 0$, $z < 0$, and $x > z$.</p> $x \cdot y = z$ <p>Which statements are true?</p> <p>A. $y < 0$ B. $y > 0$ C. $y < 1$ D. $y = 1$ E. $y > 1$</p>	<p>Multi-Select Response</p>	

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Content Standard	MAFS.7.NS <i>The Number System</i>													
	MAFS.7.NS.1 <i>Apply and extend previous understanding of operations with fractions.</i>													
	MAFS.7.NS.1.3 Solve real-world and mathematical problems involving the four operations with rational numbers.													
Assessment Limits	Rational numbers. Complex fractions can be used, but should contain fractions with single-digit numerators and denominators.													
Calculator	No													
Acceptable Response Mechanisms	Equation Response Multi-Select Response Table Response													
Context	Allowable													
Example														
Context	Include one fraction or decimal.													
Context easier	Limit values requiring operations to integers. Limit to one operation. Focus on addition and subtraction.													
Context more difficult	Include all fractions or decimals. Include multiple operations. Focus on multiplication and division.													
Sample Item Stem	Response Mechanism	Notes, Comments												
At 8:00, the temperature was 6°C. Three hours later, the temperature was -13°C. By how many degrees Celsius did the temperature change?	Multi-Select Response													
The change in the price of a certain brand of cereal each year for five years is shown. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Year</th> <th>Change in Dollars</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+0.20</td> </tr> <tr> <td>2</td> <td>+0.30</td> </tr> <tr> <td>3</td> <td>+0.20</td> </tr> <tr> <td>4</td> <td>-0.20</td> </tr> <tr> <td>5</td> <td>-0.70</td> </tr> </tbody> </table> What is the total price change in dollars over the five years?	Year	Change in Dollars	1	+0.20	2	+0.30	3	+0.20	4	-0.20	5	-0.70	Equation Response	
Year	Change in Dollars													
1	+0.20													
2	+0.30													
3	+0.20													
4	-0.20													
5	-0.70													

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<p>The change in the price of a certain brand of cereal from 2010 to 2012 is shown in the table.</p> <table border="1" data-bbox="191 348 532 491"> <thead> <tr> <th>Year</th> <th>Change in Dollars</th> </tr> </thead> <tbody> <tr> <td>2010</td> <td>+0.30</td> </tr> <tr> <td>2011</td> <td>+0.20</td> </tr> <tr> <td>2012</td> <td>-0.20</td> </tr> </tbody> </table> <p>In 2009 the price of cereal was \$3.69.</p> <p>What was the price of the cereal at the end of 2012?</p>	Year	Change in Dollars	2010	+0.30	2011	+0.20	2012	-0.20	<p>Equation Response</p>							
Year	Change in Dollars															
2010	+0.30															
2011	+0.20															
2012	-0.20															
<p>The total amount of change in the price of a certain brand of cereal from 2008 to 2012 was -\$0.20.</p> <p>Complete the table shown to show possible price changes in 2010 and 2012.</p> <table border="1" data-bbox="191 957 532 1230"> <thead> <tr> <th>Year</th> <th>Change in Dollars</th> </tr> </thead> <tbody> <tr> <td>2008</td> <td>+0.20</td> </tr> <tr> <td>2009</td> <td>+0.30</td> </tr> <tr> <td>2010</td> <td></td> </tr> <tr> <td>2011</td> <td>-0.20</td> </tr> <tr> <td>2012</td> <td></td> </tr> <tr> <td>Total</td> <td>-0.20</td> </tr> </tbody> </table>	Year	Change in Dollars	2008	+0.20	2009	+0.30	2010		2011	-0.20	2012		Total	-0.20	<p>Table Response</p>	
Year	Change in Dollars															
2008	+0.20															
2009	+0.30															
2010																
2011	-0.20															
2012																
Total	-0.20															

Content Standard	MAFS.7.EE Expressions and Equations MAFS.7.EE.1 Use properties of operations to generate equivalent expressions. MAFS.7.EE.1.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	
Assessment Limits	Rational numbers and variables. Linear expressions.	
Calculator	Yes	
Acceptable Response Mechanisms	Equation Response Multiple Choice Response Multi-Select Response Natural Language Response	
Context	Allowable	
Example		
Context	Create an expression that is equivalent to $\left(\frac{3}{4}x + 4\right) - \left(\frac{1}{4}x + 2\right)$. Distributing one factor, then collect like terms; fractions have common denominators (or no distribution of factors but the fractions do not have a common denominator).	
Context easier	Create an expression that is equivalent to $\left(\frac{3}{4}x + 4\right) - \left(\frac{1}{4}x + 2\right)$. Combine like terms, no distribution of factors, fractions have common denominators.	
Context more difficult	Create an expression that is equivalent to $\left(\frac{3}{4}x + 4\right) - \left(\frac{1}{4}x + 2\right)$. Distributing more than one factor, then combine like terms; fractions do not have a common denominator.	
Sample Item Stem	Response Mechanism	Notes, Comments
What is the sum of the two expressions? $\left(\frac{2}{5}x + 3\right) + \left(\frac{1}{5}x - 1\right)$	Equation Response	
Write an equivalent expression by combining like terms. $\left(\frac{2}{5}x + 5\right) - \left(\frac{1}{5}x - 3\right)$	Equation Response	

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<p>Write an equivalent expression by combining like terms.</p> $2\left(\frac{3}{5}x + 3\right) - \left(\frac{2}{3}x - 1\right)$	<p>Equation Response</p>	
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Content Standard	MAFS.7.EE Expressions & Equations	
	MAFS.7.EE.1 Use properties of operations to generate equivalent expressions.	
	MAFS.7.EE.1.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, $a + 0.05a = 1.05a$ means that “increase by 5%” is the same as “multiply by 1.05.”	
Assessment Limits	Rational numbers. Linear expressions.	
Calculator	No	
Acceptable Response Mechanisms	Equation Response Multiple Choice Response Multi-Select Response Natural Language Response	
Context	Allowable	
Example		
Context	Expression that represents when x is doubled and then decreased by 25%. Expression involves two operations.	
Context easier	Expression that represents when x is decreased by 25%. Expression involves only one operation.	
Context more difficult	Expression represents when x is increased by 30% and then halved. The expression involves the distributive property.	
Sample Item Stem	Response Mechanism	Notes, Comments
Which statements are true about the expression $b + 0.17b = 1.17b$? [Options could include: “1.17b is 17% more than b” “b is increased by 17%”]	Multi-Select Response	
Which expression represents that x was doubled and then decreased by 25%?	Multiple Choice Response	
An expression is shown. $7.25 (x + 1.5 \cdot 10)$ Enter an equivalent expression.	Equation Response	

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<p>Maggie is buying a jacket. The expression shown represents the sales tax on the jacket price, j.</p> <p>$0.08j$</p> <p>Write an expression in terms of j to represent the total amount that Maggie spends on the jacket, including tax.</p>	<p>Equation Response</p>	
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Content Standard	<p>MAFS.7.EE Expressions and Equations</p> <p>MAFS.7.EE.2 Solve real-life and mathematical problems using numerical and algebraic expressions and equations.</p> <p>MAFS.7.EE.2.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. <i>For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.</i></p>		
Assessment Limits	<p>Rational numbers. No variables. Items should require more than two operations to solve.</p>		
Calculator	Yes		
Acceptable Response Mechanisms	<p>Equation Response Multiple Choice Response</p>		
Context	Required		
Example			
Context	<p>Use three-step problems. Use more than one rational, negative, or percent number.</p> <ul style="list-style-type: none"> A silverware set contains 60 pieces. Each set contains spoons, forks, and knives. Of the total amount, 40% are knives, and there are an equal number of forks and spoons. What fraction of the total silverware are spoons? 		
Context easier	<p>Use two-step problems. Use one rational, negative, or percent number.</p> <ul style="list-style-type: none"> A silverware set contains 60 pieces. Each set contains spoons, forks, and knives. There are an equal number of forks and spoons. Of the total amount, 40% are knives. How many spoons are there? 		
Context more difficult	<p>Use more than three steps. Use more than one rational, negative, or percent number.</p> <ul style="list-style-type: none"> A silverware set contains 60 pieces. Each set contains spoons, forks, and knives. Of the total amount, 40% are spoons. There are half as many knives as forks. How many knives are there? 		
Sample Item Stem	Response Mechanism	Notes, Comments	
Rolando is 13. In five years, his age will be $\frac{3}{2}$ the age of his sister Marisa. How old will Marisa be in three years?	Equation Response		
The dimensions of a rectangular pool are 24.5 feet by 13 feet by 4 feet. Each cubic foot contains 7.48 gallons of water. How many gallons of water are needed to fill the pool completely?	Equation Response		

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<p>A set of pencils sells for \$1.75 and costs \$0.40 to make. Twenty percent of the profit (the different between the purchase price and the amount it costs to make) from each set of pencils goes to a school. If 500 sets are sold, what is the amount of money that will go to the school?</p>	<p>Equation Response</p>	
<p>A bucket holds 243.5 oz of water. The bucket loses 0.3 oz of water per second.</p> <p>In how many seconds will the bucket be 40% full?</p>	<p>Equation Response</p>	
<p>A plane is flying at 31,348 feet. It needs to rise to 36,000 feet in two stages.</p> <p>In stage 1, it rises 5% of its initial altitude of 31,348 feet.</p> <p>In stage 2, it rises at a rate of 140.3 feet per minute.</p> <p>How much time did it take for the plane to rise during stage 2, in minutes?</p>	<p>Equation Response</p>	

Content Standard	<p>MAFS.7.EE Expressions and Equations</p> <p>MAFS.7.EE.2 Solve real-life and mathematical problems using numerical and algebraic expressions and equations.</p> <p>MAFS.7.EE.2.4 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.</p> <p>MAFS.7.EE.2.4a Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. <i>For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?</i></p> <p>MAFS.7.EE.2.4b 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. <i>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.</i></p>
Assessment Limits	Rational numbers. Inequalities must be in context.
Calculator	Yes
Acceptable Response Mechanisms	Equation Response Graphic Response Multiple Choice Response Multi-Select Response Natural Language Response
Context	Allowable
Example	
Context	Use at most one non-whole number. The perimeter of a rectangular garden is 37.5 ft. The length of the garden is 15 ft. What is the width of the garden?
Context easier	Use only positive integers for values. The perimeter of a rectangular garden is 40 ft. The width is x , and the length is 15 ft. What is the value of x ?
Context more difficult	Primarily use rational numbers and negative integers. The perimeter of a rectangular garden is 37.5 ft. The width is x , and the length is $\frac{27}{4}$ ft. What is the width of the garden?

Sample Item Stem	Response Mechanism	Notes, Comments
<p>The perimeter of a rectangular garden is 37.5 ft. The width is x, and the length is 15 ft.</p> <p>What is the width, in feet, of the garden?</p>	Equation Response	
<p>A community is planning to build a rectangular garden. The dimensions of the garden are n ft and $\frac{27}{4}$ ft. The community can use a maximum of 37.5 ft of trim to use as a border for the garden.</p> <p>What are all of the possible lengths, in feet, of the garden?</p>	Equation Response	
<p>A community is planning to build a rectangular garden. The width of the garden is $\frac{27}{4}$ ft, and the perimeter of the garden is 37.5 ft. The community planners want to spread mulch on the garden after the flowers are planted.</p> <p>How many square feet of mulch will be needed?</p>	Equation Response	

Content Standard	<p>MAFS.7.G Geometry</p> <p>MAFS7.G.1 Draw, construct, and describe geometrical figures and describe the relationships between them.</p> <p>MAFS.7.G.1.1 Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.</p>	
Assessment Limits	<p>Two-dimensional polygons.</p> <p>Keep any conversions within one system (e.g., inches to feet is okay but inches to meters is not okay).</p>	
Calculator	Yes	
Acceptable Response Mechanisms	<p>Equation Response</p> <p>Graphic Response — Drawing and Hot Spot</p>	
Context	Allowable	
Example		
Context	<p>Lisa creates a scale picture of the garden area she would like the landscaper to build. The garden she wants built will measure 8 feet by 6 feet. Her scale drawing is $\frac{1}{4}$ the actual size of the garden.</p> <ul style="list-style-type: none"> Use a non-integer length or scale factor. 	
Context easier	Use only whole numbers for the lengths and the scale factor.	
Context more difficult	Use non-integer numbers for the lengths and the scale factor.	
Sample Item Stem	Response Mechanism	Notes, Comments
<p>Lisa drew a picture of a boat. She used the scale shown.</p> <p>1 inch : 6 feet</p> <p>Her picture is 7 inches long.</p> <p>What is the length, in feet, of the actual boat?</p>	Equation Response	

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<p>Lisa drew a picture of a boat. She used the scale shown.</p> <p>1 inch : 8 feet</p> <p>Her picture is 7.25 inches long.</p> <p>What is the length, in feet, of the actual boat?</p>	<p>Equation Response</p>	
<p>Lisa drew a picture of a boat. She used the scale shown.</p> <p>1 inch : 6.5 feet</p> <p>Her picture is 7.25 inches long.</p> <p>What is the length, in feet, of the actual boat?</p>	<p>Equation Response</p>	
<p>A rectangle is shown.</p> <p>[rectangle with side lengths of 48 and 18 inches]</p> <p>Use the Connect Line tool to create a scale drawing of the rectangle.</p> <p>[grid length is labeled as “6 inches” in the background, denoting the scale]</p>	<p>Graphic Response — Drawing</p>	
<p>The dimensions of a house are shown.</p> <p>[Graphic of a house with whole number dimensions in feet or yards]</p> <p>Eric wants to create a scale drawing of the house. The scale drawing needs to fit on a paper that is at most 6 inches wide. In order to be seen, the house must be at least 3 inches wide.</p> <p>A. Select an appropriate scale for the drawing.</p> <p>B. Use the Connect Line tool to create the scale drawing, based on the scale you chose.</p>	<p>Graphic Response — Hot Spot and Drawing</p>	

<p>The dimensions of a house are shown.</p> <p>[Graphic of a house with whole number dimensions in feet or yards]</p> <p>Eric wants to create a scale drawing of the house. The scale drawing needs to fit on a rectangular paper that one of its dimensions is 7.5 inches.</p> <p>A. Select an appropriate scale for the drawing.</p> <p>B. Use the Connect Line tool to create the scale drawing, based on the scale you chose.</p>	<p>Graphic Response — Hot Spot and Drawing</p>	
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Content Standard	<p>MAFS.7.G Geometry</p> <p>MAFS.7.G.1 Draw, construct, and describe geometrical figures and describe the relationships between them.</p> <p>MAFS.7.G.1.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. 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.</p>		
Assessment Limits	<p>Include questions about the sum of two side lengths of a triangle being greater than the third side length.</p> <p>Given conditions should not focus on similarity or congruence or that the sum of angles in a triangle is 180 degrees.</p> <p>Be aware of the scoring capabilities for the Graphic Response tool when designing these items.</p> <p>To distinguish from previous grades, conditions should include factors outside of parallel/perpendicular lines and angle measure, such as symmetry and side length.</p>		
Calculator	Neutral		
Acceptable Response Mechanisms	<p>Equation Response</p> <p>Graphic Response — Drawing</p> <p>Multiple Choice Response</p> <p>Multi-Select Response</p>		
Context	Allowable		
Example			
Context	<p>Draw a quadrilateral with exactly one pair of parallel sides and two lines of symmetry.</p> <ul style="list-style-type: none"> • Give two parameters. • Triangle side lengths have at most 1 non-integer measure. 		
Context easier	<p>Give only one parameter.</p> <p>Triangle side lengths are all integers.</p>		
Context more difficult	<p>Give more than two parameters.</p> <p>Triangle side lengths have all non-integer measures.</p>		
Sample Item Stem	Response Mechanism	Notes, Comments	
Use the Connect Line tool to draw a quadrilateral that has two lines of symmetry.	Graphic Response		

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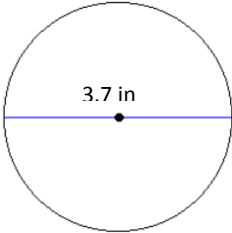
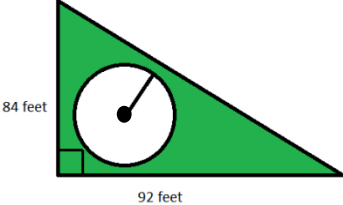
<p>Use the Connect Line tool to draw a figure that has at least one pair of parallel sides and two side lengths of 5 units and 7 units.</p> <p>[grid length should be labeled "1 unit" in background]</p>	Graphic Response	
<p>Nathan wants to draw a shape with the following conditions.</p> <ul style="list-style-type: none">• Four sides• At least one pair of parallel sides• Symmetric about the y-axis <p>Use the Connect Line tool to draw a figure that satisfies these conditions.</p> <p>[coordinate grid is given]</p>	Graphic Response — Drawing	

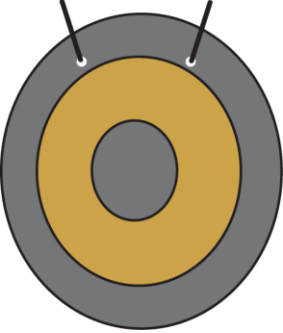
Content Standard	MAFS.7.G Geometry	
	MAFS.7.G.1 Draw, construct, and describe geometrical figures and describe the relationships between them.	
	MAFS.7.G.1.3 Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.	
Assessment Limits	Spheres, cones, and cylinders are allowed.	
Calculator	Neutral	
Acceptable Response Mechanisms	Graphic Response — Drawing Matching Item Response Multiple Choice Response Multi-Select Response Natural Language Response	
Context	Allowable	
Example		
Context	A hexagonal prism is cut by a vertical plane. <ul style="list-style-type: none"> • Include prisms with base with number of sides greater than 4 and cylinders. • Use traditional orientation of a figure 	
Context easier	Use cross-sections that are parallel to the base. Use rectangular prisms.	
Context more difficult	Use nontraditional orientations of rectangular prisms. Include pyramids, cones, and spheres.	
Sample Item Stem	Response Mechanism	Notes, Comments
A prism is sliced horizontally as shown. [rectangular prism in standard orientation] Use the Connect Line Tool to draw a shape that represents the cross-section of the prism.	Graphic Response-Drawing	
A prism is sliced vertically as shown. [pentagonal prism on its base] Use the Connect Line Tool to draw a shape that represents the cross-section of the prism.	Graphic Response-Drawing	

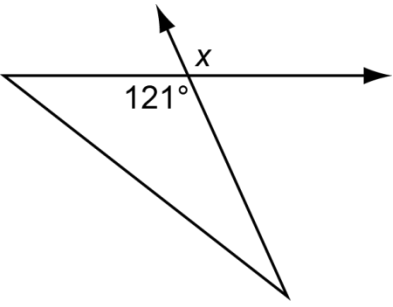
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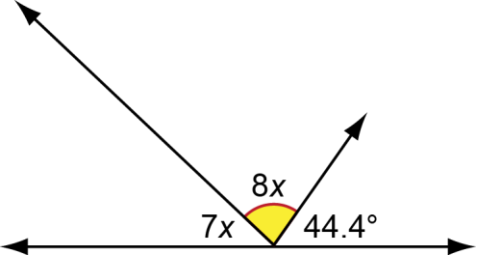
<p>A pyramid is sliced horizontally as shown.</p> <p>[pentagonal pyramid]</p> <p>Use the Connect Line Tool to draw a shape that represents the two dimensional cross-section of the pyramid.</p>	<p>Graphic Response-Drawing</p>	
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Content Standard	<p>MAFS.7.G Geometry</p> <p>MAFS.7.G.2 Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.</p> <p>MAFS.7.G.2.4 Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.</p>	
Assessment Limits	Circles are limited to whole circles and semicircles.	
Calculator	Yes	
Acceptable Response Mechanisms	Equation Response	
Context	Allowable	
Example		
Context	<p>A circle is shown.</p> <ul style="list-style-type: none"> • Use whole numbers for the diameter with a non-integer radius length. • When finding the area, give the diameter of the circle as an odd number. 	
Context easier	<p>Use whole circles only.</p> <p>Use whole numbers for both the radius and diameter.</p> <p>When finding the area, give the radius of the circle.</p>	
Context more difficult	<p>Include semicircles.</p> <p>Use non-integer radius and diameter lengths.</p> <p>Use variables for the radius and/or diameter length.</p> <p>When finding the area, give the diameter of the circle as a fraction.</p>	
Sample Item Stem	Response Mechanism	Notes, Comments
<p>A circle is shown.</p> <p>[circle with radius of 4 cm]</p> <p>What is the area of the circle in square centimeters?</p>	Equation Response	
<p>A circle is shown.</p> <p>[circle with diameter of 15 inches]</p> <p>What is the area of the circle in square inches?</p>	Equation Response	

<p>A circle is shown.</p>  <p>3.7 in</p> <p>What is the area of half of the circle in square inches?</p>	<p>Equation Response</p>	
<p>Mark placed a pool in his backyard enclosed by a triangular fence.</p>  <p>84 feet</p> <p>92 feet</p> <p>The radius of the pool is 20.5 feet. How much of the backyard area is not covered by the pool?</p>	<p>Equation Response</p>	
<p>The circumference of a circle is 37.68 cm. What is the area of the circle? (use $\pi = 3.14$)</p>	<p>Equation Response</p>	
<p>The circumference of a circle is 53.38 cm. What is the area in square centimeters? (use $\pi = 3.14$)</p>	<p>Equation Response</p>	

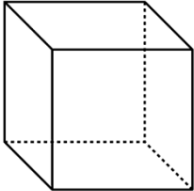
<p>A picture of a gong is shown.</p>  <p>It is composed of 3 different-sized circles.</p> <ul style="list-style-type: none">• The circumference of the smallest circle is 15.7 inches.• The diameter of the whole gong is 21 inches. <p>What is the area of the middle circle? (use $\pi = 3.14$)</p>	<p>Equation Response</p>	
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Content Standard	<p>MAFS.7.G Geometry</p> <p>MAFS.7.G.2 Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.</p> <p>MAFS.7.G.2.5 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.</p>		
Assessment Limits	<p>Angle measurements are shown only in degrees and should not be greater than 180.</p> <p>The following words should not be used in any item: supplementary, complementary, vertical, and adjacent.</p> <p>Graphics appear in every item.</p>		
Calculator	Yes		
Acceptable Response Mechanisms	Equation Response		
Context	Allowable		
Example			
Context	<p>A figure is shown.</p> <p>Use non-integer angle measurements for adjacent angles.</p> <p>Use terms with only one variable for angle measurements.</p>		
Context easier	<p>Use whole numbers for angle measurements.</p> <p>Use only supplementary, complementary, or vertical angles.</p>		
Context more difficult	<p>Use expressions and equations with only one variable for angle measurements.</p>		
Sample Item Stem	Response Mechanism	Notes, Comments	
<p>A figure is shown.</p>  <p>What is the measure, in degrees, of angle x?</p>	Equation Response		

<p>A figure is shown.</p>  <p>What is the measure, in degrees, of the highlighted (middle) angle?</p>	<p>Equation Response</p>	
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Content Standard	<p>MAFS.7.G Geometry</p> <p>MAFS.7.G.2 Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.</p> <p>MAFS.7.G.2.6 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.</p>	
Assessment Limits	3D shapes include right prisms, triangular prisms, and pyramids. If the base of the figure has more than four sides, then the area of the base should be given.	
Calculator	Yes	
Acceptable Response Mechanisms	Equation Response Graphic Response — Drawing	
Context	Allowable	
Example		
Context	A figure is shown. Use prisms that do not have rectangular bases and cylinders. Use 2 cubes.	
Context easier	Use rectangular prisms. Use only 1 cube.	
Context more difficult	Use pyramids. Use more than 2 cubes.	
Sample Item Stem	Response Mechanism	Notes, Comments
The surface area of a cube is 6 square centimeters. What is its volume, in cubic centimeters?	Equation Response	
The surface area of a cube is 216 square centimeters. The surface area is decreased by 75%. By how much did the volume, in cubic centimeters, decrease?	Equation Response	

<p>A cube with a surface area of 96 square centimeters is shown.</p>  <p>Four similar cubes are combined to create a larger cube. What is the volume, in cubic centimeters, of the new cube?</p>	<p>Equation Response</p>	
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Content Standard	<p>MAFS.7.SP Statistics and Probability</p> <p>MAFS.7.SP.1 Use random sampling to draw inferences about a population.</p> <p>MAFS.7.SP.1.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.</p>
Assessment Limits	Grade appropriate context.
Calculator	Neutral
Acceptable Response Mechanisms	Multiple Choice Response Multi-Select Response Natural Language Response
Context	Required
Example	
Context	<p>A school librarian wants to know which books are the most popular among the students in her school. Since she cannot ask all the students, she will survey a group of them.</p> <ul style="list-style-type: none"> the subpopulations are of equal size
Context easier	No subpopulations are mentioned.
Context more difficult	Base subpopulations on two categories. Subpopulations of unequal size.

Sample Item Stem	Response Mechanism	Notes, Comments
<p>Grades 6, 7, and 8 at a middle school each have 220 students. The librarian wants to know which books are the most popular among the students in her school. Since she cannot ask all the students, she will survey a group of them. Which sample can best help her to draw conclusions about the preferences of all the students in the school?</p> <p>A. 3 students from each grade B. 20 students from each grade C. 3 students from each class D. 20 students from each class</p>	<p>Multiple Choice Response</p>	
<p>A middle school has</p> <ul style="list-style-type: none"> • 220 students in grade 6; • 170 students in grade 7; and • 100 students in grade 8. <p>The librarian wants to know which books are the most popular among the students in her school. Since she cannot ask all the students, she will survey a group of them. Which sample can best help her to draw conclusions about the preferences of all the students in the school?</p> <p>A. 45 sixth graders, 35 seventh graders, 20 eighth graders B. 20 sixth graders, 35 seventh graders, 45 eighth graders C. 45 sixth graders, 45 seventh graders, 45 eighth graders D. 20 sixth graders, 20 seventh</p>	<p>Multiple Choice Response</p>	

graders, 20 eighth graders		
<p>A middle school has 220 students in each grade 6, 7, and 8. The librarian wants to know which books are the most popular among the students in her school. Since she can't ask all the students, she will survey a group of them.</p> <p>Which sample can best help her to draw conclusions about the preferences of all the students in the school?</p> <ul style="list-style-type: none"> A. 3 students from each grade B. 20 students from each grade C. 3 students from each class D. 20 students from each class <p>Why is this sample the most appropriate method?</p> <ul style="list-style-type: none"> a. This sample is the most random. b. This sample requires the least amount of people. c. This sample is the easiest. d. This sample represents the whole population. e. This sample is proportional to the whole population. 	<p>Multiple Choice Response</p> <p>Multi-Select Response</p>	

<p>A middle school has</p> <ul style="list-style-type: none">• 220 students in grade 6;• 170 students in grade 7; and• 100 students in grade 8. <p>The librarian wants to know which books are the most popular among the students in her school. Since she cannot ask all the students, she will survey a group of them.</p> <p>Which sample can best help her to draw conclusions about the preferences of all the students in the school?</p> <ul style="list-style-type: none">A. 45 sixth graders, 35 seventh graders, 20 eighth gradersB. 20 sixth graders, 35 seventh graders, 45 eighth gradersC. 45 sixth graders, 45 seventh graders, 45 eighth gradersD. 20 sixth graders, 20 seventh graders, 20 eighth graders <p>Why is this sample the most appropriate method?</p> <ul style="list-style-type: none">a. This sample is the most random.b. This sample requires the least amount of people.c. This sample is the easiest.d. This sample represents the whole population.e. This sample is proportional to the whole population.	<p>Multiple Choice Response</p> <p>Multi-Select Response</p>	
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Content Standard	<p>MAFS.7.SP Statistics and Probability</p> <p>MAFS.7.SP.1 Use random sampling to draw inferences about a population.</p> <p>MAFS.7.SP.1.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. <i>For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.</i></p>	
Assessment Limits	Rational numbers	
Calculator	Yes	
Acceptable Response Mechanisms	Equation Response Multiple Choice Response Multi-Select Response	
Context	Required	
Example		
Context	A company samples 50 products out of a production run of 2,000 to check their weight. Two subgroups.	
Context easier	No subgroups are mentioned.	
Context more difficult	More than one characteristic.	
Sample Item Stem	Response Mechanism	Notes, Comments
A chocolate company selects 50 random packages to check their weight. They find that 2 packages have an incorrect weight. How many packages out of 2,000 should the company predict have incorrect weights?	Equation Response	

<p>A chocolate company produces 2 types of chocolate: type A and type B. The company selects 25 random packages of each type to check their weight and finds that one package of type A has an incorrect weight and 3 packages of type B have incorrect weights.</p> <p>How many packages should the company predict have incorrect weights when it checks 2,000 of each type?</p>	Equation Response	
<p>A chocolate company selects 100 random packages to check their weight and packaging. The company finds that 5 packages have incorrect weights and 10 different packages have incorrect packaging.</p> <p>How many packages out of 2,000 should the company predict have only incorrect weights?</p> <p>How many packages out of 2,000 should the company predict have only incorrect packaging?</p>	Equation Response	

Content Standard	<p>MAFS.7.SP Statistics and Probability</p> <p>MAFS.7.SP.2 Draw informal comparative inferences about two populations.</p> <p>MAFS.7.SP.2.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variability, measuring the difference between the centers by expressing it as a multiple of a measure of variability. <i>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, the separation between the two distributions of heights is noticeable.</i></p> <p>MAFS.7.SP.2.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. <i>For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.</i></p>
Assessment Limits	Rational numbers. Two data sets are required.
Calculator	Neutral
Acceptable Response Mechanisms	Equation Response Graphic Response — Drag and Drop, Hot Spot Multiple Choice Response Multi-Select Response
Context	Required
Example	
Context	Two classes in a school conduct a fundraiser and record the number of sales each day for 2 weeks. Show results in a box plot. Focus on mean (measure of center). Focus on median (measure of center) with an odd number of data points.
Context easier	Fewer than about 10 data points. Only dot plots used. Focus on range (measure of variation).
Context more difficult	More than about 20 data points Focus on mean absolute deviation (measure of variation). Focus on median (measure of center) with an even number of data points. Focus on interquartile range (measure of variation).

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Sample Item Stem	Response Mechanism	Notes, Comments
<p>Dot plots for the sales of the two classes are shown.</p> <p>[range is same in both plots]</p> <p>Which measure do both classes have in common?</p> <p>A. mean B. median C. interquartile range D. range</p>	<p>Multiple Choice Response</p>	
<p>Box plots for the sales of the two classes are shown.</p> <p>[median is same in both plots; both plots have an odd number of points]</p> <p>What do both classes have in common?</p> <p>A. mean B. median C. interquartile range D. range</p>	<p>Multiple Choice Response</p>	
<p>Box plots for the sales of the two classes are shown.</p> <p>[box plots with same median, range, and mean, but different IQR]</p> <p>What feature is different in both sets of data?</p> <p>A. interquartile range B. mean C. median D. range</p>	<p>Multiple Choice Response</p>	
<p>Dot plots for the sales of the two classes are shown.</p> <p>What is the difference in ranges between the two sets of data?</p>	<p>Equation Response</p>	

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Box plots for the sales of the two classes are shown. What is the difference in the mean between the two sets of data?	Equation Response	
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Content Standard	<p>MAFS.7.SP Statistics & Probability</p> <p>MAFS.7.SP.C Investigate chance processes and develop, use, and evaluate probability models.</p> <p>MAFS.7.SP.C.5 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.</p>	
Assessment Limits	Rational numbers	
Calculator	Neutral	
Acceptable Response Mechanisms	Equation Response Matching Item Response Multiple Choice Response Multi-Select Response	
Context	Required	
Example		
Context	Chance of rain with a given probability in two forms (forms could be decimal, percent, and /or ratio – fractions can have common denominators).	
Context easier	All probability given in the same form and consist of benchmark values (e.g., $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 0.25, 0.50, 0.75).	
Context more difficult	Probability given in ratio decimal and percent. (Fractions with uncommon denominators).	
Sample Item Stem	Response Mechanism	Notes, Comments
<p>The local weather report stated there was a $\frac{2}{3}$ chance of rain for Friday.</p> <p>How likely is it to rain?</p> <p>A. certain B. likely C. unlikely D. impossible</p>	Multiple Choice Response	

<p>The weather report stated there was a $\frac{2}{3}$ chance of rain on Friday, but it was more likely to rain on Saturday than Friday.</p> <p>What is a possible probability of rain on Saturday as a percentage?</p>	<p>Equation Response</p>	
<p>The local weather report stated there is more than a $\frac{2}{3}$ chance of rain for Saturday.</p> <p>How likely is that it will rain on Saturday?</p> <p>A. It is certain to rain on Saturday. B. It is likely to rain on Saturday. C. It is neither likely nor unlikely to rain on Saturday. D. It is impossible that it will rain on Saturday.</p> <p>Select all probabilistic situations for this scenario.</p> <p>a. There is a 0.1875 chance of rain. b. There is a 87.5% chance of rain. c. There is a $\frac{3}{5}$ chance of rain. d. There is a 63% chance of rain. e. There is a 0.7 chance of rain.</p>	<p>Multiple Choice Response</p> <p>Multi-Select Response</p>	

Content Standard		MAFS.7.SP Statistics & Probability	
		MAFS.7.SP.3 Investigate chance processes and develop, use, and evaluate probability models.	
		MAFS.7.SP.3.6 Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. <i>For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.</i>	
Assessment Limits		Rational numbers. Long-run frequency should be greater than or equal to 300.	
Calculator		Neutral	
Acceptable Response Mechanisms		Equation Response Multi-Select Response Table Response	
Context		Required	
Example			
Context	A spinner with 5-8 possible outcomes.		
Context easier	A spinner with 2-4 possible outcomes. Find the probability of a single outcome.		
Context more difficult	Two different outcomes, such as a spinner and a number cube.		
Sample Item Stem		Response Mechanism	Notes, Comments
A table of outcomes is shown. A spinner is divided into blue, green, and red parts. George spun the spinner 300 times. Based on the table, what is an estimated probability of the spinner landing on red?		Equation Response	
A table of outcomes is shown. A spinner is divided into equal parts 1-5. George spun the spinner 300 times. Based on the table, what is an estimated probability of the spinner landing on an even number?		Equation Response	

Content Standard	<p>MAFS.7.SP Statistics and Probability</p> <p>MAFS.7.SP.3 Investigate chance processes and develop, use, and evaluate probability models.</p> <p>MAFS.7.SP.3.7 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.</p> <p>MAFS.7.SP.3.7a Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. <i>For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.</i></p> <p>MAFS.7.SP.3.7b Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. <i>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?</i></p>
Assessment Limits	Rational numbers. Natural language.
Calculator	Yes
Acceptable Response Mechanisms	Equation Response Multiple Choice Response Multi-Select Response Table Response
Context	Required
	Example
Context	A bag is filled with a total of 16 blue, red, yellow, and green marbles with uniform probability. Between 10 and 20 marbles. Between 3 and 4 possible outcomes (colors).
Context easier	Fewer than around 10 marbles total. Only 2 different colors of marbles.
Context more difficult	More than around 20 marbles total. A model with non-uniform probability. 5 or more colors of marbles.

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Sample Item Stem	Response Mechanism	Notes, Comments												
<p>A bag contains 3 red marbles and 6 blue marbles.</p> <p>What is the probability of randomly selecting a red marble out of the bag?</p>	Equation Response													
<p>A bag contains 4 blue, 4 yellow, 4 red, and 4 green marbles. A marble was randomly pulled from the bag and replaced 5 times. The table shows the outcome of the experiment.</p> <table border="1" data-bbox="191 701 557 926"> <thead> <tr> <th>Trial</th> <th>Outcome</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Yellow</td> </tr> <tr> <td>2</td> <td>Blue</td> </tr> <tr> <td>3</td> <td>Yellow</td> </tr> <tr> <td>4</td> <td>Red</td> </tr> <tr> <td>5</td> <td>Blue</td> </tr> </tbody> </table> <p>Which statement correctly compares the observed frequencies to the expected probability of each event?</p>	Trial	Outcome	1	Yellow	2	Blue	3	Yellow	4	Red	5	Blue	Multi-Select Response	
Trial	Outcome													
1	Yellow													
2	Blue													
3	Yellow													
4	Red													
5	Blue													
<p>Which situation describes a probability of $\frac{1}{6}$ of drawing a red marble out of the bag?</p> <p>[options with 5 different colored marbles]</p>	Multi-Select Response													

Content Standard	<p>MAFS.7.SP Statistics and Probability</p> <p>MAFS.7.SP.3 Investigate chance processes and develop, use, and evaluate probability models.</p> <p>MAFS.7.SP.3.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.</p> <p>MAFS.7.SP.3.8a 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.</p> <p>MAFS.7.SP.3.8b 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.</p> <p>MAFS.7.SP.3.8c Design and use a simulation to generate frequencies for compound events. <i>For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?</i></p>	
Assessment Limits	Rational numbers.	
Calculator	Neutral	
Acceptable Response Mechanisms	Equation Response Graphic Response — Hot Spot Multiple Choice Response Multi-Select Response Natural Language Response	
Context	Required	
Example		
Context	A bucket is filled with 6 green tennis balls, 7 blue tennis balls, and 3 red tennis balls. Find the probability of 3 events. Present all probabilities with common denominators.	
Context easier	Two different colors of tennis balls. Find the probability of two events.	
Context more difficult	More than 3 colors of tennis balls. Find the probability of more than three events. Present probabilities in reduced form with different denominators.	

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Sample Item Stem	Response Mechanism	Notes, Comments
<p>A tree diagram is shown.</p> <p>[represent two red and/or green tennis balls being removed from a bucket in the grid space]</p> <p>Select the outcome(s) that represent a compound event.</p>	<p>Graphic Response – Hot Spot</p>	
<p>Tony has a bucket filled with green, blue, and red tennis balls. He removes three tennis balls from the bucket, with replacement.</p> <p>Which of the following sample spaces represents all of the possible outcomes?</p>	<p>Multi-Select Response</p>	
<p>Tony has a bucket filled with 10 green, 3 blue, 1 red, and 7 yellow tennis balls. He removes four tennis balls from the bucket, without replacement.</p> <p>Which of the following outcomes could represent this selection?</p>	<p>Multi-Select Response</p>	
<p>Tony removes 2 tennis balls, with replacement, from the bucket shown.</p> <p>[bucket with 5 green and 2 yellow tennis balls]</p> <p>What is the probability that Tony will choose a yellow tennis ball and then a green tennis ball?</p>	<p>Equation Response</p>	
<p>Tony removes 3 tennis balls, with replacement, from the bucket shown.</p> <p>[bucket with 6 red, 5 green and 2 yellow tennis balls]</p> <p>What is the probability that the first tennis ball is yellow, the second tennis ball is green, and the third tennis ball is red?</p>	<p>Equation Response</p>	

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<p>Tony removes 3 tennis balls, without replacement, from the bucket shown.</p> <p>[bucket with 6 red, 5 green, 8 blue, and 2 yellow tennis balls]</p> <p>What is the probability that Tony removes one yellow, one green, and two blue tennis balls?</p>	<p>Equation Response</p>	
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