DRAFT

Grade 7 Mathematics Item Specifications

Florida Standards Assessments

The draft Florida Standards Assessments (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.

Item types describe the characteristics of the question.

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

- **Context - Allowable** refers to items that may but are not required to have context.
- **Context - No context** refers to items that should not have context.
- **Context - Required** refers to items that must have context.

Technology-Enhanced Item Descriptions:

The Florida Standards Assessments (FSA) are composed of test items that include traditional multiple-choice items, items that require the student to type or write a response, and technology-enhanced items (TEI). Technology-enhanced items are computer-delivered items that require the student to interact with test content to select, construct, and/or support their answers.

Currently, there are nine types of TEIs that may appear on computer-based assessments for FSA Mathematics. For students with an IEP or 504 plan that specifies a paper-based accommodation, TEIs will be modified or replaced with test items that can be scanned and scored electronically.

Any of the item types may be combined into a single item with multiple parts called a multi-interaction item. The student will interact with different item types within a single item. Each part could be a different item type. For paper-based assessments, the following selectable-response item types may be combined into a single item: multiple choice, multi-select, editing task choice, selectable hot text, and matching.

For samples of each of the item types described below, see the FSA Practice Tests.

Technology-Enhanced Item Types – Mathematics

1. **Editing Task Choice –** The student clicks a highlighted word, phrase, or blank, which reveals a drop-down menu containing options for correcting an error as well as the highlighted word or phrase as it is shown in the sentence to indicate that no correction is needed. The student then selects the correct word or phrase from the drop-down menu. For paper-based assessments, the item is modified so that it can be scanned and scored electronically. The student fills in a bubble to indicate the correct word or phrase.
2. **Editing Task –** The student clicks on a highlighted word or phrase that may be incorrect, which reveals a text box. The directions in the text box direct the student to replace the highlighted word or phrase with the correct word or phrase. For paper-based assessments, this item type may be replaced with another item type that assesses the same standard and can be scanned and scored electronically.
3. **Hot Text –**
    a. **Selectable Hot Text –** Excerpted sentences from the text are presented in this item type. When the student hovers over certain words, phrases, or sentences, the options highlight. This indicates that the text is selectable ("hot"). The student can then click on an option to select it. For paper-based assessments, a "selectable" hot text item is

modified so that it can be scanned and scored electronically. In this version, the student fills in a bubble to indicate a selection.

b. **Drag-and-Drop Hot Text –** Certain numbers, words, phrases, or sentences may be designated "draggable" in this item type. When the student hovers over these areas, the text highlights. The student can then click on the option, hold down the mouse button, and drag it to a graphic or other format. For paper-based assessments, drag-and-drop hot text items will be replaced with another item type that assesses the same standard and can be scanned and scored electronically.

4. **Open Response –** The student uses the keyboard to enter a response into a text field. These items can usually be answered in a sentence or two. For paper-based assessments, this item type may be replaced with another item type that assesses the same standard and can be scanned and scored electronically.
5. **Multiselect –** The student is directed to select all of the correct answers from among a number of options. These items are different from Multiple Choice items, which allow the student to select only one correct answer. These items appear in the online and paper-based assessments.
6. **Graphic Response Item Display (GRID) –** The student selects numbers, words, phrases, or images and uses the drag-and-drop feature to place them into a graphic. This item type may also require the student to use the point, line, or arrow tools to create a response on a graph. For paper-based assessments, this item type may be replaced with another item type that assesses the same standard and can be scanned and scored electronically.
7. **Equation Editor** – The student is presented with a toolbar that includes a variety of mathematical symbols that can be used to create a response. Responses may be in the form of a number, variable, expression, or equation, as appropriate to the test item. For paper-based assessments, this item type may be replaced with a modified version of the item that can be scanned and scored electronically or replaced with another item type that assesses the same standard and can be scanned and scored electronically.
8. **Matching Item –** The student checks a box to indicate if information from a column header matches information from a row. For paper-based assessments, this item type may be replaced with another item type that assesses the same standard and can be scanned and scored electronically.
9. **Table Item –** The student types numeric values into a given table. The student may complete the entire table or portions of the table depending on what is being asked. For paper-based assessments, this item type may be replaced with another item type that assesses the same standard and can be scanned and scored electronically.

Mathematical Practices:

The Mathematical Practices are a part of each course description for Grades 3–8, Algebra 1, and Geometry. These practices are an important part of the curriculum. The Mathematical Practices will be assessed throughout.

MAFS.K12.MP.1.1:	**Make sense of problems and persevere in solving them.** Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.
MAFS.K12.MP.2.1:	**Reason abstractly and quantitatively**. Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

MAFS.K12.MP.3.1:	**Construct viable arguments and critique the reasoning of others.** Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.
MAFS.K12.MP.4.1:	**Model with mathematics.** Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

MAFS.K12.MP.5.1:	**Use appropriate tools strategically.** Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.
MAFS.K12.MP.6.1:	**Attend to precision.** Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

MAFS.K12.MP.7.1:	**Look for and make use of structure.** Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7 × 8 equals the well remembered 7 × 5 + 7 × 3, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2 × 7 and the 9 as 2 + 7. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 – 3(x – y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.
MAFS.K12.MP.8.1:	**Look for and express regularity in repeated reasoning.** Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y – 2)/(x – 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x – 1)(x + 1)$, $(x – 1)(x^2 + x + 1)$, and $(x – 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Reference Sheets:

- Reference sheets will be available as online references (in a pop-up window). A paper version will be available for paper-based tests.
- Reference sheets with conversions will be provided for FSA Mathematics assessments in Grades 4–8 and EOC Mathematics assessments.
- There is no reference sheet for Grade 3.
- For Grades 4, 6, 7, and Geometry, some formulas will be provided on the reference sheet.
- For Grade 5 and Algebra 1, some formulas may be included with the test item if needed to meet the intent of the standard being assessed.
- For Grade 8, no formulas will be provided; however, conversions will be available on a reference sheet.

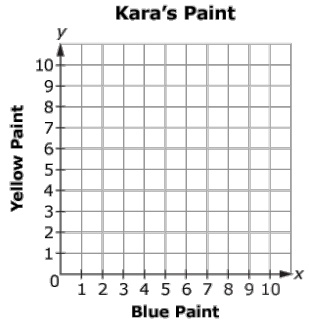
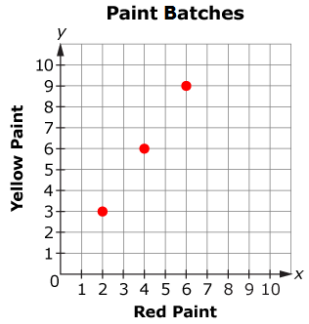
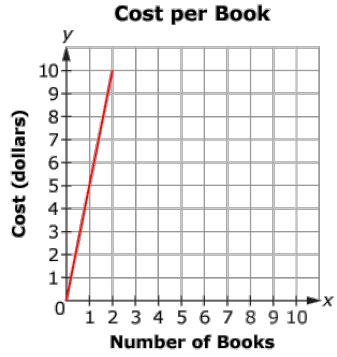
Grade	Conversions	Some Formulas
3	No	No
4	On Reference Sheet	On Reference Sheet
5	On Reference Sheet	With Item
6	On Reference Sheet	On Reference Sheet
7	On Reference Sheet	On Reference Sheet
8	On Reference Sheet	No
Algebra 1	On Reference Sheet	With Item
Geometry	On Reference Sheet	On Reference Sheet

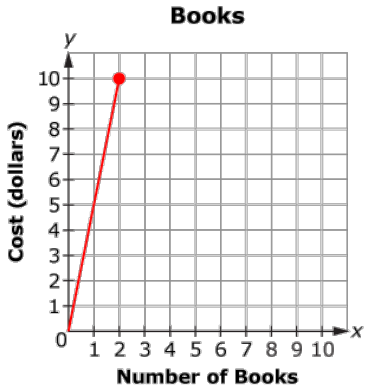
Content Standard	***MAFS.7.RP*** *Ratios & Proportional Relationships* ***MAFS.7.RP.1*** *Analyze proportional relationships and use them to solve real-world and mathematical problems.* ***MAFS.7.RP.1.1*** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *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*.
Assessment Limits	The item stem must include at least one fraction. Ratios may be expressed as fractions, with ":" or with words. Units may be the same or different across the two quantities.
Calculator	Yes
Context	Allowable

Sample Item	Item Type
A recipe used $\frac{2}{3}$ cup of sugar for every 2 teaspoons of vanilla. How much sugar was used per teaspoon of vanilla? A. $\frac{1}{3}$ B. $1\frac{1}{3}$ C. $2\frac{2}{3}$ D. 3	Multiple Choice
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? A. $\frac{1}{6}$ B. $2\frac{2}{3}$ C. $4\frac{2}{3}$ D. 6	Multiple Choice
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 Editor
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 Editor
See Appendix A for the Practice Test item aligned to this standard.	

Content Standard	***MAFS.7.RP*** *Ratios & Proportional Relationships* ***MAFS.7.RP.1*** *Analyze proportional relationships and use them to solve real-world and mathematical problems*. ***MAFS.7.RP.1.2*** Recognize and represent proportional relationships between quantities. ***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. ***MAFS.7.RP.1.2b*** Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. ***MAFS.7.RP.1.2c*** 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 $t = pn$.* ***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.
Assessment Limits	Ratios should be expressed as fractions, with ":" or with words. Units may be the same or different across the two quantities.
Calculator	Neutral
Context	Allowable

Sample Item	Item Type
Ethan ran 11 miles in 2 hours. What is the constant of proportionality of miles to hour? A. 5.5 miles per hour B. $0.\overline{18}$ miles per hour C. 5.5 hours per mile D. $0.\overline{18}$ hours per mile	Multiple Choice

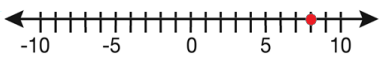
Sample Item	Item Type
Kara is mixing paint. Each batch has twice as much blue paint as yellow paint. Plot points to represent the amount of blue and yellow paint used in three different-sized batches.  	GRID
The points on the coordinate plane show the amount of red and yellow paint in each batch.  Write an equation to represent the relationship between red paint, r, and yellow paint, y, in each batch.	Equation Editor
The graph below represents the rate for the cost of b books.  Write an equation to represent the cost, c.	Equation Editor

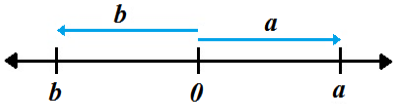
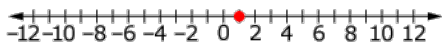
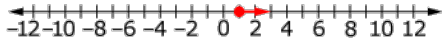
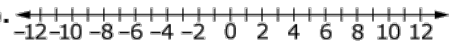
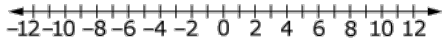
Sample Item	Item Type
The ordered pair $(1, 5)$ indicates the unit rate of books to cost on the graph shown.  What does the point on the graph represent?	Open Response
See Appendix A for the Practice Test item aligned to this standard.	

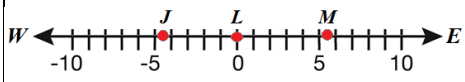
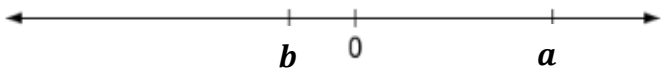
Content Standard	***MAFS.7.RP*** *Ratios & Proportional Relationships* ***MAFS.7.RP.1*** *Analyze proportional relationships and use them to solve real-world and mathematical problems.* ***MAFS.7.RP.1.3*** Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*
Assessment Limits	Units may be the same or different across the two quantities.
Calculator	Yes
Context	Allowable

Sample Item	Item Type
Nicole has $\$25$ to spend on dinner for herself. Tax on her meal is 5.5%, and she wants to tip 20% on the amount of her meal only. Select all the amounts Nicole could spend on her meal. ☐ $\$13.00$ ☐ $\$14.79$ ☐ $\$15.85$ ☐ $\$18.60$ ☐ $\$20.25$ ☐ $\$21.50$	Multiselect
James pays $\$120.00$ for golf clubs that are on sale for 20% off at Golf Pros. At Nine Iron, the same clubs cost $\$8.00$ less than they cost at Golf Pros. They are on sale for 13% off. What is the original cost of the clubs at Nine Iron?	Equation Editor
See Appendix A for the Practice Test item aligned to this standard.	

Content Standard	***MAFS.7.NS*** *The Number System* ***MAFS.7.NS.1*** *Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.* ***MAFS.7.NS.1.1*** 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. ***MAFS.7.NS.1.1a*** 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.* ***MAFS.7.NS.1.1b*** 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. ***MAFS.7.NS.1.1c*** 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. ***MAFS.7.NS.1.1d*** Apply properties of operations as strategies to add and subtract rational numbers.
Assessment Limit	N/A
Calculator	Neutral
Context	Allowable

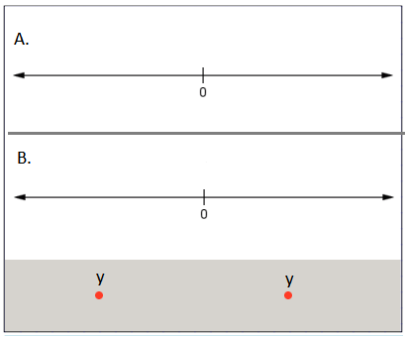
Sample Item	Item Type
A number line is shown.  Use the Add Point tool to plot a point that is 14.5 units from 8 on the given number line.	GRID
An expression is shown. $-5\frac{1}{2} + 7\frac{3}{4}$ What is the value of the expression?	Equation Editor

Sample Item	Item Type
A number line is shown.  Jack knows that $a + b = 0$. Which statement is true? A. $a = b$ B. $-b = a$ C. $a - b = 0$ D. $b - a = 0$	Multiple Choice
An expression is shown. $1 + 2 + (-5) + 4$ Kendrick is using number lines to find the value of the expression. His first two steps are shown. A. Use the Add Arrow tool to show the last two steps. B. Select the value of the expression. **A.** $1 + 2 + (-5) + 4$ **Start at 1.**  **Then add 2.**  **Then add (−5).**  **Then add 4.**  **B. What is the value of the expression?** −6 −5 0 2 4 12	GRID
An expression is shown. $15.5 + (-16.75)$ What is the value of the expression?	Equation Editor

Sample Item	Item Type
Megan and Jake both live on the same street that the library is on.  ***Jake (J): 4.5 km from the library (L)*** ***Megan (M): 5.5 km from the library (L)*** How many kilometers (km) apart do Megan and Jake live?	Equation Editor
The sum of a and b is c. The number line shows a and b.  Which statements about c are true? ☐ $\lvert a\rvert < \lvert c\rvert$ ☐ $\lvert a\rvert = \lvert c\rvert$ ☐ $\lvert a\rvert > \lvert c\rvert$ ☐ $c < 0$ ☐ $c = 0$ ☐ $c > 0$	Multiselect
See Appendix A for the Practice Test item aligned to this standard.	

Content Standard	***MAFS.7.NS*** *The Number System* ***MAFS.7.NS.1*** *Apply and extend previous understanding of operations with fractions.* ***MAFS.7.NS.1.2*** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. ***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. ***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 $-\frac{p}{q} = \frac{p}{-q}$. Interpret quotients of rational numbers by describing real-world contexts. ***MAFS.7.NS.1.2c*** Apply properties of operations as strategies to multiply and divide rational numbers. ***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.
Assessment Limits	*7.NS.1.2a*, *2b*, and *2c* require the incorporation of a negative value.
Calculator	No
Context	Allowable

Sample Item	Item Type
Springfield has an elevation of -150 feet. Greenville is 3 times as far below sea level as Springfield. What is Greenville's elevation, in feet?	Equation Editor
An equation is shown, where $x > 0,\ z < 0$, and $\lvert x\rvert > \lvert z\rvert$. $x \cdot y = z$ Which statements are true? □ $y < 0$ □ $y > 0$ □ $\lvert y\rvert < 1$ □ $\lvert y\rvert = 1$ □ $\lvert y\rvert > 1$	Multiselect

Sample Item	Item Type
An equation is shown, where $z < 0$. $x \cdot y = z$ A. Assume $x > 0$. Drag the point to the number line to identify a possible location for y. B. Assume $x < 0$. Drag the point to the number line to identify a possible location for y. 	GRID
See Appendix A for the Practice Test item aligned to this standard.	

<table>
<tr><td>Content Standard</td><td colspan="2">MAFS.7.NS The Number System

MAFS.7.NS.1 Apply and extend previous understanding of operations with fractions.

MAFS.7.NS.1.3 Solve real-world and mathematical problems involving the four operations with rational numbers.</td></tr>
<tr><td>Assessment Limits</td><td colspan="2">Complex fractions may be used, but should contain fractions with single-digit numerators and denominators.</td></tr>
<tr><td>Calculator</td><td colspan="2">Neutral</td></tr>
<tr><td>Context</td><td colspan="2">Allowable</td></tr>
<tr><td colspan="2">Sample Item</td><td>Item Type</td></tr>
<tr><td colspan="2">At 8:00, the temperature was 6 degrees Celsius (°C). Three hours later, the temperature was -13° C.

By how many degrees Celsius did the temperature change?</td><td>Equation Editor</td></tr>
<tr><td colspan="2">The change in the price of a certain brand of cereal from 2010 to 2012 is shown in the table.

<table><tr><th>Year</th><th>Price Change (in dollars)</th></tr><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></table>
In 2009 the price of cereal was $\$3.69$.

What was the price of the cereal at the end of 2012?</td><td>Equation Editor</td></tr>
<tr><td colspan="3">See Appendix A for the Practice Test item aligned to this standard.</td></tr>
</table>

Content Standard	***MAFS.7.EE*** *Expressions & 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	Expressions must be linear and contain a variable.
Calculator	Neutral
Context	Allowable

Sample Item	Item Type
What is the sum of the two expressions? $\left(\frac{2}{5}x+3\right)+\left(\frac{1}{5}x-1\right)$	Equation Editor
Find the difference of the two expressions. $\left(\frac{2}{5}x+5\right)-\left(\frac{1}{5}x-3\right)$	Equation Editor
See Appendix A for the Practice Test item aligned to this standard.	

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	Expressions must be linear.	
Calculator	Neutral	
Context	Allowable	
Sample Item		Item Type
Maggie is buying a jacket. The expression shown represents the sales tax on the jacket price, j. $0.08j$ Write an expression in terms of j to represent the total amount that Maggie spends on the jacket, including tax.		Equation Editor
The expression shown represents the total amount that Jen spent on buying two of the same sweaters during a sale. $1.75x$ Which equivalent expression reveals the discount Jen received on one for buying two? A. $2x - 0.25x$ B. $0.25x - 2x$ C. $2(x - 0.25x)$ D. $2x - (2x - 0.25x)$		Multiple Choice
See Appendix A for the Practice Test item aligned to this standard.		

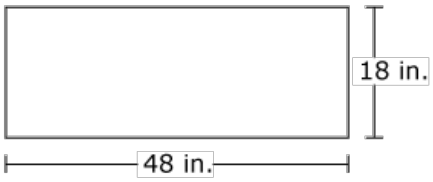
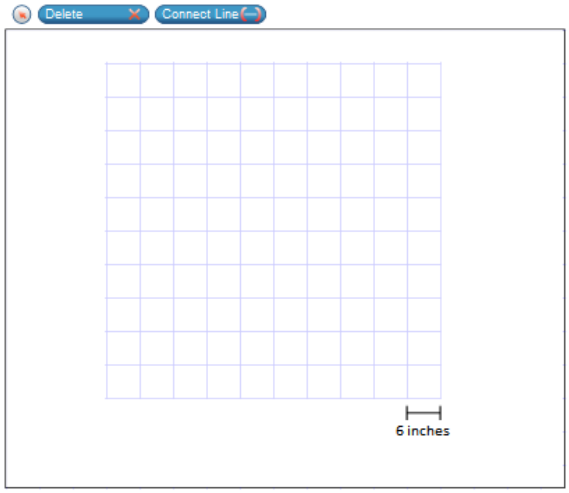
Content Standard	***MAFS.7.EE*** *Expressions & Equations* ***MAFS.7.EE.2*** *Solve real-life and mathematical problems using numerical and algebraic expressions and equations.* ***MAFS.7.EE.2.3*** Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers 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. *For example: If a woman making* $\$25$ *an hour gets a* 10% *raise, she will make an additional* $\frac{1}{10}$ *of her salary an hour, or* $\$2.50$*, for a new salary of* $\$27.50$*. If you want to place a towel bar* $9\frac{3}{4}$ *inches long in the center of a door that is* $27\frac{1}{2}$ *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.*
Assessment Limits	Items should not use variables. Items should require two or more steps.
Calculator	Yes
Context	Required

Sample Item	Item Type
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 Editor
A set of pencils sells for $\$1.75$ and costs $\$0.40$ to make. Twenty percent of the profit (the difference 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?	Equation Editor
A bucket holds 243.5 ounces (oz) of water when full. The bucket loses 0.3 oz of water per second. In how many seconds will the bucket be 40% full?	Equation Editor
A plane is flying at $31{,}348$ feet. It needs to rise to $36{,}000$ feet in two stages. In stage 1, it rises 5% of its initial altitude of $31{,}348$ feet. In stage 2, it rises at a rate of 140.3 feet per minute. How many minutes does it take for the plane to rise during stage 2?	Equation Editor
See Appendix A for the Practice Test item aligned to this standard.	

Content Standard	***MAFS.7.EE*** *Expressions & Equations* ***MAFS.7.EE.2*** *Solve real-life and mathematical problems using numerical and algebraic expressions and equations.* ***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. ***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. *For example, the perimeter of a rectangle is* 54 *cm. Its length is* 6 *cm. What is its width?* ***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. *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.*
Assessment Limits	Inequalities must have context. Inequalities may use ≤ or ≥. Inequalities may not be compound inequalities.
Calculator	Yes
Context	Allowable

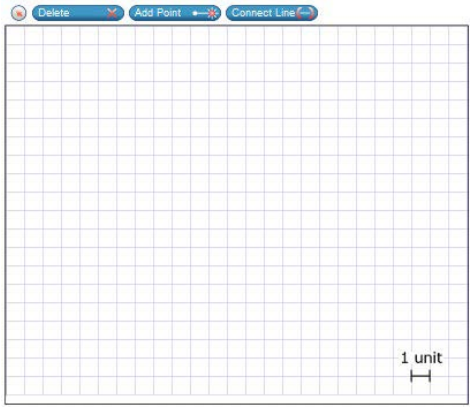
Sample Item	Item Type
The perimeter of a rectangular garden is 37.5 feet (ft). The width is x, and the length is 15 ft. What is the width, in feet, of the garden?	Equation Editor
A community is planning to build a rectangular garden. The width of the garden is $\frac{27}{4}$ feet (ft), and the perimeter of the garden is 37.5 ft. The community planners want to spread mulch on the entire garden. How many square feet of mulch will be needed?	Equation Editor
See Appendix A for the Practice Test item aligned to this standard.	

Content Standard	***MAFS.7.G*** *Geometry* ***MAFS7.G.1*** *Draw, construct, and describe geometrical figures and describe the relationships between them.* ***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.
Assessment Limit	Geometric figures must be two-dimensional polygons.
Calculator	Yes
Context	Allowable

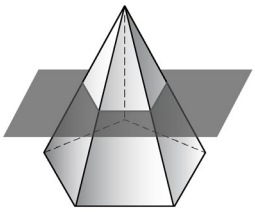
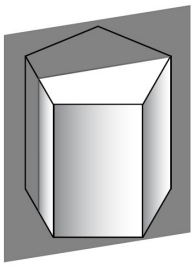
Sample Item	Item Type
A rectangle with its dimensions, in inches (in.), is shown.  Use the Connect Line tool to create a scale drawing of the rectangle.  	GRID

Sample Item	Item Type
Lisa drew a picture of a boat. She used the scale shown. 1 inch : 6 feet The boat in her picture is 7 inches long. What is the length, in feet, of the actual boat?	Equation Editor
Lisa drew a picture of a boat. She used the scale shown. 1 inch : 6.5 feet The boat in her picture is 7.25 inches long. What is the length, in feet, of the actual boat?	Equation Editor
See Appendix A for the Practice Test item aligned to this standard.	

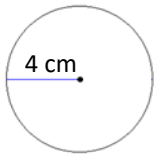
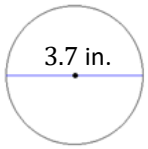
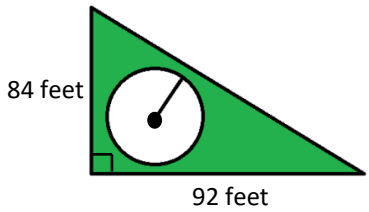
Content Standard	***MAFS.7.G*** *Geometry* ***MAFS.7.G.1*** *Draw, construct, and describe geometrical figures and describe the relationships between them.* ***MAFS.7.G.1.2*** Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
Assessment Limits	Given conditions should not focus on similarity or congruence or that the sum of angles in a triangle is 180 degrees. Be aware of the scoring capabilities for the GRID tool when designing these items. To distinguish from other grades, conditions should include factors other than parallel/perpendicular lines and angle measure, such as symmetry and side length.
Calculator	Neutral
Context	Allowable

Sample Item	Item Type
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. 	GRID
Nathan wants to draw a triangle. He knows that two of the side lengths are 5 inches and 7 inches. What is a possible length for the third side?	Equation Editor
See Appendix A for the Practice Test item aligned to this standard.	

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. Slicing is limited to horizontal or vertical slices. Bases of prisms and pyramids can be a triangle (any type); a square; a rectangle; or a regular pentagon or hexagon. Items should not use composite figures.
Calculator	Neutral
Context	Allowable

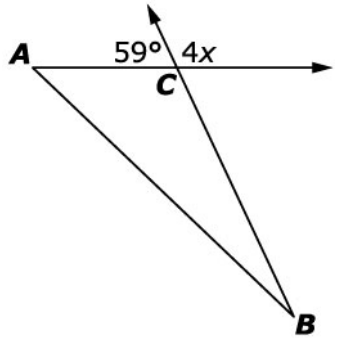
Sample Item	Item Type
A pyramid is sliced horizontally as shown.  Use the Connect Line tool to draw a shape that represents the two-dimensional cross section of the pyramid.	GRID
A prism is sliced vertically as shown.  Use the Connect Line tool to draw a shape that represents the cross section of the prism.	GRID
See Appendix A for the Practice Test item aligned to this standard.	

Content Standard	***MAFS.7.G*** *Geometry* ***MAFS.7.G.2*** *Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.* ***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.
Assessment Limit	Circles are limited to whole circles and semicircles.
Calculator	Yes
Context	Allowable

Sample Item	Item Type
A circle with its dimensions, in centimeters (cm), is shown.  What is the area, in square centimeters, of the circle?	Equation Editor
A circle with its dimensions, in inches (in.), is shown.  What is the area, in square inches, of half the circle?	Equation Editor
Mark placed a pool in his backyard, which is enclosed by a triangular fence.  The radius of the pool is 20.5 feet. How much of the backyard area is not covered by the pool?	Equation Editor
See Appendix A for the Practice Test item aligned to this standard.	

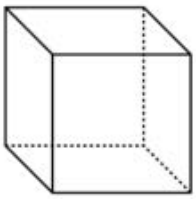
<table>
<tr><td>Content Standard</td><td colspan="2">MAFS.7.G Geometry

MAFS.7.G.2 Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

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.</td></tr>
<tr><td>Assessment Limits</td><td colspan="2">Items should use angles measured in degrees only.</td></tr>
<tr><td>Calculator</td><td colspan="2">Yes</td></tr>
<tr><td>Context</td><td colspan="2">Allowable</td></tr>
<tr><td colspan="2">Sample Item</td><td>Item Type</td></tr>
<tr><td colspan="2">A figure is shown.
 

What is the measure, in degrees, of $\angle ACB$?</td><td>Equation Editor</td></tr>
<tr><td colspan="3">See Appendix A for the Practice Test item aligned to this standard.</td></tr>
</table>

Content Standard	***MAFS.7.G*** *Geometry* ***MAFS.7.G.2*** *Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.* ***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.
Assessment Limits	Three-dimensional shapes may include right prisms and right pyramids. When the base of a figure has more than four sides, the area of the base must be given.
Calculator	Yes
Context	Allowable

Sample Item	Item Type
The surface area of a cube is 6 square centimeters. What is its volume, in cubic centimeters?	Equation Editor
A cube with a surface area of 96 square centimeters is shown.  Eight cubes like the one shown are combined to create a larger cube. What is the volume, in cubic centimeters, of the new cube?	Equation Editor

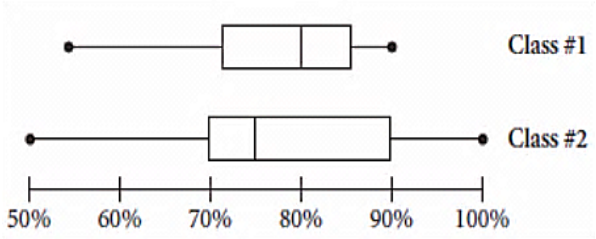
See Appendix A for the Practice Test item aligned to this standard.

Content Standard	***MAFS.7.SP*** *Statistics & Probability* ***MAFS.7.SP.1*** *Use random sampling to draw inferences about a population*. ***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. *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*. Also Assesses: ***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.
Assessment Limits	Context must be grade appropriate.
Calculator	Neutral
Context	Required

Sample Item	Item Type
A chocolate company selects 50 random packages and checks their weight. It finds that 2 packages have an incorrect weight. How many packages out of 2000 should the company predict have an incorrect weight?	Equation Editor
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 an incorrect weight. How many packages should the company predict have an incorrect weight when it checks 2000 of each type?	Equation Editor

Sample Item	Item Type
A middle school has • 220 students in grade 6; • 170 students in grade 7; and • 100 students in grade 8. The media specialist 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 the media specialist draw conclusions about the preferences of all the students in the school? 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 graders, 20 eighth graders	Multiple Choice
See Appendix A for the Practice Test items aligned to a standard in this grouping.	

Content Standard	***MAFS.7.SP*** *Statistics & Probability* ***MAFS.7.SP.2*** *Draw informal comparative inferences about two populations.* ***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. *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.* Also Assesses: ***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. *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.*
Assessment Limit	N/A
Calculator	Neutral
Context	Required

Sample Item	Item Type
Box plots for chapter 6 test scores of two classes are shown.  The difference in the medians between Class #1 and Class #2 is approximately how many IQRs?	Equation Editor

See Appendix A for the Practice Test items aligned to a standard in this grouping.

Content Standard	***MAFS.7.SP*** *Statistics & Probability* ***MAFS.7.SP.3*** *Investigate chance processes and develop, use, and evaluate probability models.* ***MAFS.7.SP.3.5*** 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.
Assessment Limit	N/A
Calculator	Neutral
Context	Required

Sample Item	Item Type
The local weather report stated there is a $\frac{2}{3}$ chance of rain on Friday. How likely is it to rain? A. certain B. likely C. unlikely D. impossible	Multiple Choice
The weather report stated there is a $\frac{2}{3}$ chance of rain on Friday, but it is more likely to rain on Saturday than on Friday. What is a possible probability of rain on Saturday?	Equation Editor

See Appendix A for the Practice Test item aligned to this standard.

<table>
<tr><td>Content Standard</td><td colspan="2">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. 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.</td></tr>
<tr><td>Assessment Limits</td><td colspan="2">Long-run frequency should be greater than or equal to 300.</td></tr>
<tr><td>Calculator</td><td colspan="2">Neutral</td></tr>
<tr><td>Context</td><td colspan="2">Required</td></tr>
<tr><td colspan="2">Sample Item</td><td>Item Type</td></tr>
<tr><td colspan="2">A spinner is divided into equal parts $1 – 5$. George spun the spinner 300 times. A table of outcomes is shown.

<table><tr><th>Spinner Part</th><th>Times Spun</th></tr><tr><td>1</td><td>42</td></tr><tr><td>2</td><td>66</td></tr><tr><td>3</td><td>63</td></tr><tr><td>4</td><td>72</td></tr><tr><td>5</td><td>57</td></tr></table>
Based on the table, what is an estimated probability of the spinner landing on an even number?</td><td>Equation Editor</td></tr>
<tr><td colspan="3">See Appendix A for the Practice Test item aligned to this standard.</td></tr>
</table>

Content Standard	***MAFS.7.SP*** *Statistics & Probability* ***MAFS.7.SP.3*** *Investigate chance processes and develop, use, and evaluate probability models.* ***MAFS.7.SP.3.7*** 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. ***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. *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.* ***MAFS.7.SP.3.7b*** 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?* Also Assesses: ***MAFS.7.SP.3.8*** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. ***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. ***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. ***MAFS.7.SP.3.8c*** Design and use a simulation to generate frequencies for compound events. *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?*
Assessment Limit	N/A
Calculator	Neutral
Context	Required

Sample Item	Item Type
A bag contains 3 red marbles and 6 blue marbles. What is the probability of randomly selecting a red marble from the bag?	Equation Editor

Sample Item	Item Type
Tony has a bucket filled with 10 green, 3 blue, 1 red, and 7 yellow tennis balls. He removes 4 tennis balls from the bucket, without replacement. Which of the following outcomes could represent this selection? ☐ All of the tennis balls are blue. ☐ There is 1 tennis ball of each color. ☐ There are exactly 3 green tennis balls. ☐ There are more red tennis balls removed than other colors. ☐ The number of red tennis balls is the same as the number of blue tennis balls.	Multiselect
Select all situations that describe a probability of $\frac{1}{6}$ of drawing a red marble out of the bag. ☐ 1 red, 6 yellow, 6 green, 6 blue, 6 white ☐ 3 red, 4 yellow, 4 green, 4 blue, 3 white ☐ 4 red, 5 yellow, 5 green, 4 blue, 6 white ☐ 6 red, 6 yellow, 6 green, 6 blue, 6 white ☐ 6 red, 4 yellow, 8 green, 6 blue, 12 white	Multiselect
A bucket contains 5 green tennis balls and 2 yellow tennis balls. Tony removes 2 tennis balls, with replacement, from the bucket shown.  What is the probability that Tony will choose a yellow tennis ball and then a green tennis ball?	Equation Editor
A bucket contains 5 green tennis balls, 2 yellow tennis balls, and 6 red tennis balls. Tony removes 3 tennis balls, with replacement, from the bucket shown.  What is the probability that the first tennis ball is yellow, the second tennis ball is green, and the third tennis ball is red?	Equation Editor

Sample Item	Item Type
A bucket contains 5 green tennis balls, 2 yellow tennis balls, 6 red tennis balls, and 8 blue tennis balls. Tony removes 4 tennis balls, without replacement, from the bucket shown.  What is the probability that Tony removes 1 yellow, 1 green, and 2 blue tennis balls?	Equation Editor
See Appendix A for the Practice Test items aligned to these standards.	

Appendix A

The chart below contains information about the standard alignment for the items in the Grade 7 Mathematics FSA Computer-Based Practice Test at http://fsassessments.org/students-and-families/practice-tests/

Content Standard	Item Type	Computer-Based Practice Test Item Number
MAFS.7.RP.1.1	Equation Editor	17
MAFS.7.RP.1.2a	Editing Task Choice	15
MAFS.7.RP.1.2a	Multiselect	19
MAFS.7.RP.1.3	Equation Editor	12
MAFS.7.NS.1.1	GRID	9
MAFS.7.NS.1.2d	Multiple Choice	6
MAFS.7.NS.1.3	Table Item	5
MAFS.7.EE.1.1	Equation Editor	20
MAFS.7.EE.1.2	Matching Item	2
MAFS.7.EE.2.3	Equation Editor	13
MAFS.7.EE.2.4	Equation Editor	23
MAFS.7.EE.2.4b	Equation Editor, GRID, and Multiselect	26
MAFS.7.G.1.1	GRID	24
MAFS.7.G.1.2	GRID	4
MAFS.7.G.1.3	Open Response	14
MAFS.7.G.2.4	Equation Editor	16
MAFS.7.G.2.5	Equation Editor	22
MAFS.7.G.2.5	Equation Editor	27
MAFS.7.G.2.6	GRID	18
MAFS.7.SP.1.1	Multiple Choice	11
MAFS.7.SP.1.2	Equation Editor	25
MAFS.7.SP.2.3	GRID	7
MAFS.7.SP.2.4	Selectable Hot Text	10
MAFS.7.SP.3.5	Multiple Choice	1
MAFS.7.SP.3.6	Equation Editor	3
MAFS.7.SP.3.7	Multiple Choice	21
MAFS.7.SP.3.8	Multiselect	8

Appendix B: Revisions

Page(s)	Revision	Date
3	Description of multi-interaction items for paper-based assessments revised.	January 2020
11	Sample item revised.	January 2020
14	Sample items deleted.	January 2020
18	Sample item revised.	January 2020
22	Sample item revised.	January 2020
30	Sample item revised.	January 2020
34	Sample item revised.	January 2020

Grade 7 FSA Mathematics Reference Sheet

Customary Conversions

1 foot = 12 inches
1 yard = 3 feet
1 mile = 5,280 feet
1 mile = 1,760 yards

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts

1 pound = 16 ounces
1 ton = 2,000 pounds

Metric Conversions

1 meter = 100 centimeters
1 meter = 1000 millimeters
1 kilometer = 1000 meters

1 liter = 1000 milliliters

1 gram = 1000 milligrams
1 kilogram = 1000 grams

Time Conversions

1 minute = 60 seconds
1 hour = 60 minutes
1 day = 24 hours
1 year = 365 days
1 year = 52 weeks

Formulas

$A = bh$

$A = lw$

$A = \frac{1}{2}bh$

$A = \frac{1}{2}h(b_1 + b_2)$

$V = Bh$

$V = \frac{1}{3}Bh$

$SA = Ph + 2B$

$SA = \frac{1}{2}P\ell + B$