DRAFT

Grade 6 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.

Item Descriptions:

The Florida Standards Assessments (FSA) are composed of test items that include traditional multiple-choice items and other item types that may be scanned and scored electronically.

Currently, there are six types of items that may appear on paper-based assessments for FSA Mathematics.

Any of the item types may be combined into a single item with multiple parts called a multi-interaction item. 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.

Paper-Based Item Types – Mathematics

1. **Multiple Choice –** The student is directed to select the one correct response from among four options.
2. **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 prompt the student to select only one correct answer.
3. **Editing Task Choice –** The student fills in a bubble to indicate the correct number, word, or phrase that should replace a blank.
4. **Selectable Hot Text –** Excerpted sentences from the text are presented in this item type. The student fills in bubbles to indicate which sentences are correct.
5. **Equation Editor/Gridded-Response –** The student fills in bubbles indicating numbers and mathematical symbols to create a response. Students respond in response grids in which they write their answer in the boxes at the top of the grid, then fill in the corresponding bubble underneath each box.
6. **Matching Item –** This item type presents options in columns and rows. The student is directed to fill in a bubble that matches a correct option from a column with a correct option from a row. Typically, there is only one correct option per row or column, though the number of correct answers may vary.

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.6.RP*** *Ratios & Proportional Relationships* ***MAFS.6.RP.1*** *Understand ratio concepts and use ratio reasoning to solve problems.* ***MAFS.6.RP.1.1*** Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was* $2:1$*, because for every* 2 *wings there was* 1 *beak." "For every vote candidate A received, candidate C received nearly three votes."*
Assessment Limits	Whole numbers should be used for the quantities. Ratios can be expressed as fractions, with ":" or with words. Items may involve mixed units within each system (e.g. convert hours/min to seconds). Context itself does not determine the order. Limit use of percent to *MAFS.6.RP.1.3c*.
Calculator	No
Context	Allowable

Sample Item	Item Type
Jordan has 3 blue marbles and 8 red marbles. What is the ratio of blue marbles to red marbles? A. $3:3$ B. $3:5$ C. $3:8$ D. $3:11$	Multiple Choice

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

Content Standard	***MAFS.6.RP*** *Ratios & Proportional Relationships* ***MAFS.6.RP.1*** *Understand ratio concepts and use ratio reasoning to solve problems.* ***MAFS.6.RP.1.2*** Understand the concept of a unit rate $\frac{a}{b}$ associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of* 3 *cups of flour to* 4 *cups of sugar, so there is* $\frac{3}{4}$ *cup of flour for each cup of sugar." "We paid* $\$75$ *for* 15 *hamburgers, which is a rate of* $\$5$ *per hamburger."*
Assessment Limits	Items using the comparison of a ratio will use whole numbers. Rates can be expressed as fractions, with ":" or with words. Items may involve mixed units within each system (e.g. convert hours/min to seconds). Context itself does not determine the order. Name the amount of either quantity in terms of the other as long as one of the values is one unit.
Calculator	No
Context	Required

Sample Item	Item Type
Which statement describes a unit rate? A. Sara ate 1 cookie. B. Sara is driving 16 miles. C. Sara is driving 30 miles per 1 hour. D. Sara ate 3 crackers and 1 apple.	Multiple Choice

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

Content Standard	***MAFS.6.RP*** *Ratios & Proportional Relationships* ***MAFS.6.RP.1*** *Understand ratio concepts and use ratio reasoning to solve problems.* ***MAFS.6.RP.1.3*** Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. ***MAFS.6.RP.1.3a*** Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. ***MAFS.6.RP.1.3b*** Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took* 7 *hours to mow* 4 *lawns, then at that rate, how many lawns could be mowed in* 35 *hours? At what rate were lawns being mowed?* ***MAFS.6.RP.1.3c*** Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $\frac{30}{100}$ times the quantity); solve problems involving finding the whole, given a part and the percent. ***MAFS.6.RP.1.3d*** Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. ***MAFS.6.RP.1.3e*** Understand the concept of Pi as the ratio of the circumference of a circle to its diameter.
Assessment Limits	Rates can be expressed as fractions, with ":" or with words. Items may involve mixed units within each system (e.g. convert hours/min to seconds). Percent found as a rate per 100. Quadrant I only for *MAFS.6.RP.1.3a.*
Calculator	No
Context	Allowable

Sample Item	Item Type
Tom knows that in his school 10 out of every 85 students are left-handed. There are 391 students in Tom's school. How many students in Tom's school are left-handed?	Equation Editor
On the first day of shooting a movie, a director uses 30% of a film reel. The strip of film used was 90 meters long. What is the standard length on a film reel?	Equation Editor
See Appendix A for the Practice Test item aligned to this standard.	

Content Standard	***MAFS.6.NS*** *The Number System* ***MAFS.6.NS.1*** *Apply and extend previous understandings of multiplication and division to divide fractions by fractions.* ***MAFS.6.NS.1.1*** Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for* $\frac{2}{3} \div \frac{3}{4}$ *and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that* $\frac{2}{3} \div \frac{3}{4} = \frac{8}{9}$ *because* $\frac{3}{4}$ *of* $\frac{8}{9}$ *is* $\frac{2}{3}$*. (In general,* $\frac{a}{b} \div \frac{c}{d} = \frac{ad}{bc}$*.) How much chocolate will each person get if 3 people share* $\frac{1}{2}$ *lb of chocolate equally? How many* $\frac{3}{4}$*-cup servings are in* $\frac{2}{3}$ *of a cup of yogurt? How wide is a rectangular strip of land with length* $\frac{3}{4}$ *mi. and area* $\frac{1}{2}$ *square mi.?*
Assessment Limits	At least the divisor or dividend needs to be a non-unit fraction. Dividing a unit fraction by a whole number or vice versa (e.g., $\frac{1}{a} \div q$ or $q \div \frac{1}{a}$, where *a* is a whole number) is below grade level.
Calculator	No
Context	Allowable

Sample Item	Item Type
An expression is shown. $\frac{4}{5} \div \frac{8}{7}$ What is the value of the expression?	Equation Editor
An expression is shown. $2\frac{1}{4} \div 1\frac{2}{5}$ What is the value of the expression?	Equation Editor
A rectangular plot of land has an area of $\frac{3}{2}$ square kilometers and a length of $\frac{3}{4}$ kilometer. What is the width of the plot of land?	Equation Editor
See Appendix A for the Practice Test item aligned to this standard.	

Content Standard	***MAFS.6.NS*** *The Number System* ***MAFS.6.NS.2*** *Compute fluently with multi-digit numbers and find common factors and multiples.* ***MAFS.6.NS.2.2*** Fluently divide multi-digit numbers using the standard algorithm.	
Assessment Limits	Items may only have 5-digit dividends divided by 2-digit divisors or 4-digit dividends divided by 2- or 3-digit divisors. Numbers in items are limited to non-decimal rational numbers.	
Calculator	No	
Context	No context	
Sample Item		Item Type
An expression is shown. $2925 \div 15$ What is the value of the expression?		Equation Editor
See Appendix A for the Practice Test item aligned to this standard.		

Content Standard	***MAFS.6.NS*** *The Number System* ***MAFS.6.NS.2*** *Compute fluently with multi-digit numbers and find common factors and multiples.* ***MAFS.6.NS.2.3*** Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	
Assessment Limits	Items may include values to the thousandths place. Items may be set up in standard algorithm form.	
Calculator	No	
Context	Allowable	
Sample Item		Item Type
An expression is shown. $2312.2 + 3.4$ What is the value of the expression?		Equation Editor
See Appendix A for the Practice Test item aligned to this standard.		

Content Standard	***MAFS.6.NS*** *The Number System* ***MAFS.6.NS.2*** *Compute fluently with multi-digit numbers and find common factors and multiples.* ***MAFS.6.NS.2.4*** Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers $1–100$ with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express* $36 + 8$ *as* $4(9 + 2)$.
Assessment Limits	Whole numbers less than or equal to 100. Least common multiple of two whole numbers less than or equal to 12.
Calculator	No
Context	No context

Sample Item	Item Type
What is the greatest common factor of 15 and 20?	Equation Editor
What is the least common multiple of 7 and 12?	Equation Editor
Which expression is equivalent to $8 + 20$? A. $4(4 + 20)$ B. $4(2 + 5)$ C. $2(2 + 10)$ D. $2(6 + 18)$	Multiple Choice
An equation is shown. $30 + 12 = \square\ (5 + 2)$ What factor is missing from the equation?	Equation Editor
See Appendix A for the Practice Test item aligned to this standard.	

Content Standard	***MAFS.6.NS*** *The Number System* ***MAFS.6.NS.3*** *Apply and extend previous understandings of numbers to the system of rational numbers.* ***MAFS.6.NS.3.5*** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
Assessment Limits	Items should not require the student to perform an operation.
Calculator	No
Context	Required

Sample Item	Item Type
Chicago, Illinois has an elevation of 600 feet above sea level. The elevation of Desert Shores, California is -200 feet. Select all the true statements. A. Desert Shores is above sea level. B. Desert Shores is at sea level. C. Desert Shores is below sea level. D. The difference in the elevations is less than 600 feet. E. The difference in the elevations is 600 feet. F. The difference in the elevations is more than 600 feet.	Multiselect
Desert Shores, California is located at an elevation that is below sea level. What is a possible elevation of Desert Shores, California? A. 600 feet B. 500 feet C. -200 feet D. 0 feet	Multiple Choice

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

Content Standard	***MAFS.6.NS*** *The Number System* ***MAFS.6.NS.3*** *Apply and extend previous understandings of numbers to the system of rational numbers.* ***MAFS.6.NS.3.6*** Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. ***MAFS.6.NS.3.6a*** Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$, and that 0 is its own opposite. ***MAFS.6.NS.3.6b*** Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. ***MAFS.6.NS.3.6c*** Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. Also Assesses: ***MAFS.6.NS.3.8*** Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
Assessment Limits	Plotting of points in the coordinate plane should include some negative values (not just first quadrant). Numbers in *MAFS.6.NS.3.8* must be positive or negative rational numbers. Do not use polygons/vertices for *MAFS.6.NS.3.8*. Do not exceed a 10×10 coordinate grid, though scales can vary.
Calculator	No
Context	Allowable

Sample Item	Item Type
What is the opposite of -5?	Equation Editor
What is the value of the x-coordinate that is 9 units to the left of $(5, -8)$?	Equation Editor
See Appendix A for the Practice Test items aligned to these standards.	

<table>
<tr><td>Content Standard</td><td colspan="2">MAFS.6.NS The Number System

MAFS.6.NS.3 Apply and extend previous understandings of numbers to the system of rational numbers.

MAFS.6.NS.3.7 Understand ordering and absolute value of rational numbers.

MAFS.6.NS.3.7a Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret $-3 > -7$ as a statement that -3 is located to the right of -7 on a number line oriented from left to right.

MAFS.6.NS.3.7b Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write $-3\ ^oC > -7\ ^oC$ to express the fact that $-3\ ^oC$ is warmer than $-7\ ^oC$.

MAFS.6.NS.3.7c Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. For example, for an account balance of -30 dollars, write $|-30| = 30$ to describe the size of the debt in dollars.

MAFS.6.NS.3.7d Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.</td></tr>
<tr><td>Assessment Limit</td><td colspan="2">N/A</td></tr>
<tr><td>Calculator</td><td colspan="2">No</td></tr>
<tr><td>Context</td><td colspan="2">Allowable</td></tr>
<tr><td>Sample Item</td><td colspan="2">Item Type</td></tr>
<tr><td>Which value is furthest from 0 on the number line?

A. 20
B. -21
C. $|20.5|$
D. $|-21.5|$</td><td colspan="2">Multiple Choice</td></tr>
<tr><td>The elevations of several cities are shown.

Select which city has the greatest elevation and which city is farthest from sea level.

<table><tr><th></th><th>Highest Elevation</th><th>Farthest from Sea Level</th></tr><tr><td>Chicago, IL 600 feet</td><td>A.</td><td>B.</td></tr><tr><td>Desert Shores, CA -200 feet</td><td>C.</td><td>D.</td></tr><tr><td>Orlando, FL 80 feet</td><td>E.</td><td>F.</td></tr></table></td><td colspan="2">Matching Item</td></tr>
<tr><td colspan="3">See Appendix A for the Practice Test item aligned to this standard.</td></tr>
</table>

Content Standard	***MAFS.6.EE*** *Expressions & Equations* ***MAFS.6.EE.1*** *Apply and extend previous understandings of arithmetic to algebraic expressions.* ***MAFS.6.EE.1.1*** Write and evaluate numerical expressions involving whole-number exponents.	
Assessment Limits	Whole number bases. Whole number exponents.	
Calculator	No	
Context	Allowable	
Sample Item		Item Type
Which value is equivalent to the expression 4^5? A. 9 B. 20 C. 625 D. 1024		Multiple Choice
See Appendix A for the Practice Test item aligned to this standard.		

Content Standard	***MAFS.6.EE*** *Expressions & Equations* ***MAFS.6.EE.1*** *Apply and extend previous understandings of arithmetic to algebraic expressions.* ***MAFS.6.EE.1.2*** Write, read, and evaluate expressions in which letters stand for numbers. ***MAFS.6.EE.1.2a*** Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract* y *from* 5*" as* $5 - y$. ***MAFS.6.EE.1.2b*** Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression* $2(8 + 7)$ *as a product of two factors; view* $(8 + 7)$ *as both a single entity and a sum of two terms.* ***MAFS.6.EE.1.2c*** Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas* $V = s^3$ *and* $A = 6\,s^2$ *to find the volume and surface area of a cube with sides of length* $s = \frac{1}{2}$.
Assessment Limit	N/A
Calculator	No
Context	Allowable

Sample Item	Item Type
Which expression has a coefficient of 2? A. 3 B. $2x^5$ C. $4x^2$ D. $\frac{3x}{2}$	Multiple Choice
What is the surface area, in centimeters, of a cube with a side length, s, of $\frac{1}{3}$ cm?	Equation Editor
See Appendix A for the Practice Test item aligned to this standard.	

Content Standard	***MAFS.6.EE*** *Expressions & Equations* ***MAFS.6.EE.1*** *Apply and extend previous understandings of arithmetic to algebraic expressions.* ***MAFS.6.EE.1.3*** Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression* $3(2 + x)$ *to produce the equivalent expression* $6 + 3x$*; apply the distributive property to the expression* $24x + 18y$ *to produce the equivalent expression* $6(4x + 3y)$; *apply properties of operations to* $y + y + y$ *to produce the equivalent expression* $3y$.
Assessment Limits	Positive rational numbers, values may include exponents. Variables must be included in the expression. For items using distribution, coefficients may be fractions before distribution but must be integer values after simplification. Only positive rational numbers may be distributed.
Calculator	No
Context	Allowable

Sample Item	Item Type
Alyssa attends football games at her school. At each football game, she buys a bottle of water for $\$0.75$ and a candy bar for x dollars. Select all expressions that represent the amount of money, in dollars, Alyssa spends after attending 6 football games. A. $6(0.75)(x)$ B. $6(0.75 + x)$ C. $6(0.75) + 6(x)$ D. $6 + 0.75 + x$ E. $(6 + 0.75)(6 + x)$	Multiselect

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

Content Standard	***MAFS.6.EE*** *Expressions & Equations* ***MAFS.6.EE.1*** *Apply and extend previous understandings of arithmetic to algebraic expressions.* ***MAFS.6.EE.1.4*** Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions* $y + y + y$ *and* $3y$ *are equivalent because they name the same number regardless of which number* y *stands for.*
Assessment Limits	Numbers in items must be nonnegative rational numbers. Variables must be included in the expression.
Calculator	No
Context	No context

Sample Item	Item Type
Which is an equivalent way to express $3y$? A. y^3 B. $3 + y$ C. $y + y + y$ D. $y \cdot y \cdot y$	Multiple Choice

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

Content Standard	***MAFS.6.EE*** *Expressions & Equations* ***MAFS.6.EE.2*** *Reason about and solve one-variable equations and inequalities.* ***MAFS.6.EE.2.5*** Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
Assessment Limits	Numbers in items must be nonnegative rational numbers. One-variable linear equations and inequalities. An equation or inequality should be given if a context is included. Inequalities are restricted to < or >. Lists of numbers should not use set notation.
Calculator	No
Context	Allowable

Sample Item	Item Type
An equation is shown. $x + 5 = 14$ Which of the values can be substituted for x to make the equation true? A. 7 B. 9 C. 14 D. 15	Multiple Choice
An equation is shown. $5x + 3x = 5x + \frac{15}{2}$ What value of $3x$ makes the equation true?	Equation Editor

Sample Item	Item Type
An inequality is shown. $\frac{27}{7}\ n > \frac{4}{3}$ Select all the values of n that make the inequality true. A. $\frac{2}{5}$ B. $\frac{1}{3}$ C. 1 D. $\frac{2}{9}$ E. $\frac{3}{2}$	Multiselect
See Appendix A for the Practice Test item aligned to this standard.	

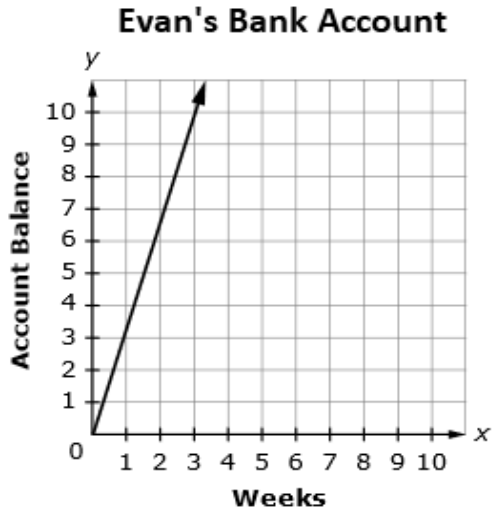
Content Standard	***MAFS.6.EE*** *Expressions & Equations* ***MAFS.6.EE.2*** *Reason about and solve one-variable equations and inequalities.* ***MAFS.6.EE.2.6*** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
Assessment Limits	Numbers in items should not require students to perform operations with negative rational numbers or result in answers with negative rational numbers. Expressions must contain at least one variable.
Calculator	No
Context	Allowable
See Appendix A for the Practice Test item aligned to this standard.	

Content Standard	***MAFS.6.EE*** *Expressions & Equations* ***MAFS.6.EE.2*** *Reason about and solve one-variable equations and inequalities.* ***MAFS.6.EE.2.7*** Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q, and x are all non-negative rational numbers.
Assessment Limits	Numbers in items should not require students to perform operations with negative rational numbers or result in answers with negative rational numbers. Items must be one-step linear equations with one variable.
Calculator	No
Context	Allowable

Sample Item	Item Type
An equation is shown. $8x = 35$ What is the value for x that makes the equation true?	Equation Editor
Suzie buys a salad for \$6.35 on lunch. She bought a salad for \$5.12 and a drink for x dollars. Which equation can be used to solve for the price of the drink? A. $5.12x = 6.35$ B. $\frac{x}{6.35} = 5.12$ C. $x + 5.12 = 6.35$ D. $6.35 + x = 5.12$	Multiple Choice
See Appendix A for the Practice Test item aligned to this standard.	

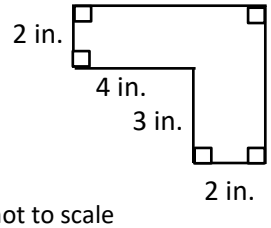
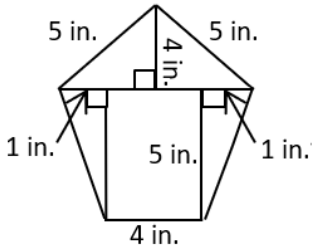
Content Standard	***MAFS.6.EE*** *Expressions & Equations* ***MAFS.6.EE.2*** *Reason about and solve one-variable equations and inequalities.* ***MAFS.6.EE.2.8*** Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
Assessment Limits	Numbers in items should not require students to perform operations with negative rational numbers or result in answers with negative rational numbers. Context in real-world items should be continuous or close to continuous. Inequalities are limited to < or >.
Calculator	No
Context	Allowable
See Appendix A for the Practice Test item aligned to this standard.	

Content Standard	***MAFS.6.EE*** *Expressions & Equations* ***MAFS.6.EE.3*** *Represent and analyze quantitative relationships between dependent and independent variables.* ***MAFS.6.EE.3.9*** Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.*
Assessment Limits	Items must involve relationships and/or equations of the form $y = px$ or $y = x + p$. Numbers in items should not require students to perform operations with negative rational numbers or result in answers with negative rational numbers. Variables need to be defined.
Calculator	No
Context	Required

Sample Item	Item Type
A graph of Evan's bank account is shown.  Fill in the bubbles to select the dependent and independent variables. **Weeks** — Dependent: A. — Independent: B. **Account Balance** — Dependent: C. — Independent: D.	Matching Item

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

Content Standard	***MAFS.6.G*** *Geometry* ***MAFS.6.G.1*** *Solve real-world and mathematical problems involving area, surface area, and volume.* ***MAFS.6.G.1.1*** Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
Assessment Limits	Numbers in items must be nonnegative rational numbers. Limit shapes to those that can be decomposed or composed into rectangles and/or right triangles.
Calculator	No
Context	Allowable

Sample Item	Item Type
A shape is shown.  not to scale What is the area, in square inches, of the shape?	Equation Editor
A pentagon, with dimensions in inches (in.), is shown.  not to scale What is the area, in square inches, of the pentagon?	Equation Editor
See Appendix A for the Practice Test item aligned to this standard.	

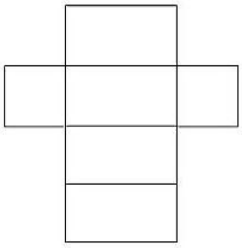
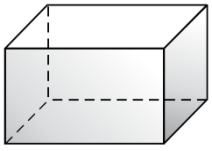
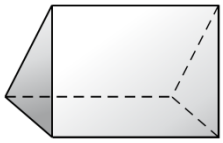
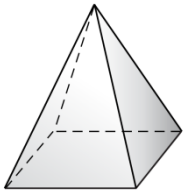
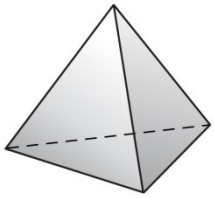
Content Standard	***MAFS.6.G*** *Geometry* ***MAFS.6.G.1*** *Solve real-world and mathematical problems involving area, surface area, and volume.* ***MAFS.6.G.1.2*** Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = Bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
Assessment Limits	Prisms in items must be right rectangular prisms. Unit fractional edge lengths for the unit cubes used for packing must have a numerator of 1.
Calculator	No
Context	Allowable

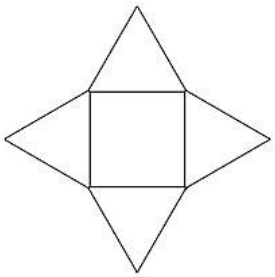
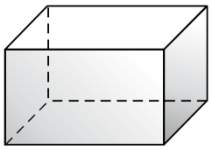
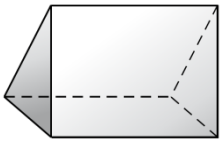
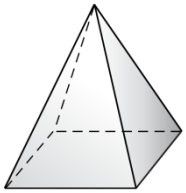
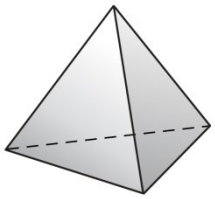
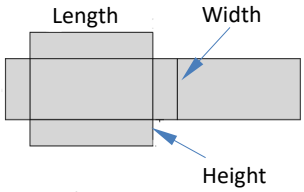
Sample Item	Item Type
A right rectangular prism has a length of 4 ½ feet, a width of 6 ½ feet, and a height of 8 feet. What is the volume of the prism?	Equation Editor

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

Content Standard	***MAFS.6.G*** *Geometry* ***MAFS.6.G.1*** *Solve real-world and mathematical problems involving area, surface area, and volume* ***MAFS.6.G.1.3*** Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
Assessment Limits	Items may use all four quadrants. When finding side length, limit polygons to traditional orientation (side lengths perpendicular to axes).
Calculator	No
Context	Allowable
See Appendix A for the Practice Test item aligned to this standard.	

Content Standard	***MAFS.6.G*** *Geometry* ***MAFS.6.G.1*** *Solve real-world and mathematical problems involving area, surface area, and volume* ***MAFS.6.G.1.4*** Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
Assessment Limits	Numbers in items must be positive rational numbers. Three-dimensional figures are limited to rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids.
Calculator	No
Context	Allowable

Sample Item	Item Type
A net is shown.  Which three-dimensional figure is represented by the net? A.  C.  B.  D. 	Multiple Choice

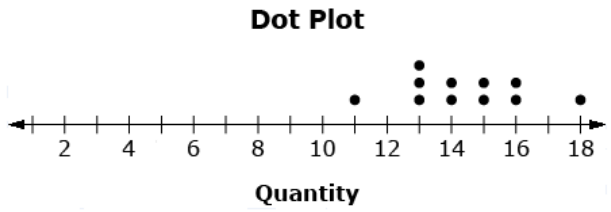
Sample Item	Item Type
A net is shown.  Which three-dimensional figure is represented by the net? A.  C.  B.  D. 	Multiple Choice
The surface area of a rectangular prism is 115 square inches. The net of the prism is shown.  not to scale What are possible dimensions of the prism? A. $2, 4, 6\frac{1}{2}$ B. $2, 4, 8\frac{1}{4}$ C. $3, 6, 6\frac{1}{2}$ D. $3, 6, 8\frac{1}{4}$	Multiple Choice
See Appendix A for the Practice Test item aligned to this standard.	

Content Standard	***MAFS.6.SP*** *Statistics & Probability* ***MAFS.6.SP.1*** *Develop understanding of statistical variability.* ***MAFS.6.SP.1.1*** Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.*
Assessment Limits	N/A
Calculator	No
Context	Required

Sample Item	Item Type
Select all of the statistical questions. A. How many days are in the year? B. How many people live in the county with the largest population in Florida? C. What is the typical length of study time for the students at Grove Middle School? D. What is the average temperature in January? E. When does Matchell Bank open in the morning?	Multiselect

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

Content Standard	***MAFS.6.SP*** *Statistics & Probability* ***MAFS.6.SP.1*** *Develop understanding of statistical variability.* ***MAFS.6.SP.1.2*** Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
Assessment Limits	Circle graphs and line graphs may not be used. Items should include a distribution.
Calculator	No
Context	Allowable

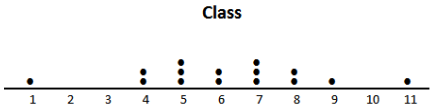
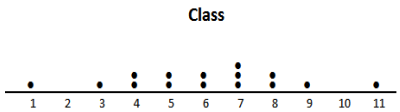
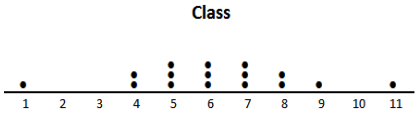
Sample Item	Item Type
A dot plot is shown.  If the quantities 3 and 4 are added to the data set, how would the distribution be affected? A. slightly skewed with median greater than mean B. slightly skewed with equal median and mean C. more symmetrical with median less than mean D. more symmetrical with equal median and mean	Multiple Choice

Content Standard	***MAFS.6.SP*** *Statistics & Probability* ***MAFS.6.SP.1*** *Develop understanding of statistical variability.* ***MAFS.6.SP.1.3*** Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
Assessment Limits	Data sets in items must be numerical data sets.
Calculator	No
Context	Allowable

Sample Item	Item Type
While driving the Grand Avenue bus route, Tim kept a record of how many people rode on his bus. He recorded the total number of people who rode the bus each week for 5 weeks, as shown in the table. **Week** / **Number of People** 1 / 16,325 2 / 18,140 3 / 17,362 4 / 16,697 5 / 16,786 What statistical measure would represent the average number of people who rode the bus? A. mean absolute deviation B. interquartile range C. median D. mean	Multiple Choice

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

Content Standard	***MAFS.6.SP*** *Statistics & Probability* ***MAFS.6.SP.2*** *Summarize and describe distributions.* ***MAFS.6.SP.2.4*** Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
Assessment Limits	All plots must be displayed on a number line or coordinate grid.
Calculator	No
Context	Allowable

Sample Item	Item Type
A class is surveyed with data as shown. $1, 4, 4, 5, 5, 5, 6, 6, 7, 7, 7, 8, 8, 9, 11$ Which dot plot represents the class? A.  C.  B.  D. 	Multiple Choice
See Appendix A for the Practice Test item aligned to this standard.	

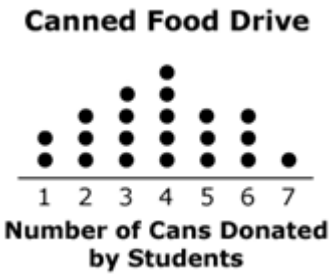
Content Standard	***MAFS.6.SP*** *Statistics & Probability* ***MAFS.6.SP.2*** *Summarize and describe distributions.* ***MAFS.6.SP.2.5*** *Summarize numerical data sets in relation to their context, such as by:* ***MAFS.6.SP.2.5a*** Reporting the number of observations. ***MAFS.6.SP.2.5b*** Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. ***MAFS.6.SP.2.5c*** Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. ***MAFS.6.SP.2.5d*** Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.
Assessment Limits	Displays should include only dot/line plots, box plots, or histograms.
Calculator	No
Context	Required

Sample Item	Item Type
Tim drives the Grand Avenue bus route. The total number of people who ride the bus each week for 5 weeks is shown in the data table. **Week** / **Number of People** 1 / 16,325 2 / 18,140 3 / 17,362 4 / 16,697 5 / 16,786 What is the range of the number of people who ride the bus each week?	Equation Editor
Alex found the mean number of food cans that were donated by students for the canned food drive at Epping Middle School. Alex's work is shown. $\frac{1+2+5+3+6+1+4+4+2+1+2+3+7+2+4+1}{16}=3$ How many students donated food cans?	Equation Editor

<table>
<tr><th>Sample Item</th><th>Item Type</th></tr>
<tr><td>Tim drives the Grand Avenue bus route. The total number of people who ride the bus each week for 5 weeks is shown in the data table.

<table>
<tr><th>Week</th><th>Number of People</th></tr>
<tr><td>1</td><td>17,012</td></tr>
<tr><td>2</td><td>18,140</td></tr>
<tr><td>3</td><td>17,362</td></tr>
<tr><td>4</td><td>16,697</td></tr>
<tr><td>5</td><td>14,387</td></tr>
</table>

What is the interquartile range of the data?</td><td>Equation Editor</td></tr>
<tr><td>A dot plot shows the number of cans students at Epping Middle School collected for a canned food drive.



Which pair of statistical measures would best represent the data set shown in the dot plot?

A. median and interquartile range
B. mean and interquartile range
C. median and mean absolute deviation
D. mean and mean absolute deviation</td><td>Multiple Choice</td></tr>
<tr><td colspan="2">See Appendix A for the Practice Test item aligned to this standard.</td></tr>
</table>

Appendix A

The chart below contains information about the standard alignment for the items in the Grade 6 Mathematics FSA Paper-Based Practice Test at http://fsassessments.org/students-and-families/practice-tests/.

Content Standards	Item Types	Paper-Based Practice Test Item Number
MAFS.6.RP.1.1	Editing Task Choice	7
MAFS.6.RP.1.2	Equation Editor	4
MAFS.6.RP.1.3e	Multiple Choice	21
MAFS.6.NS.1.1	Multiple Choice	5
MAFS.6.NS.2.2	Equation Editor	6
MAFS.6.NS.2.3	Equation Editor	19
MAFS.6.NS.2.4	Matching Item	15
MAFS.6.NS.3.5	Multiselect	26
MAFS.6.NS.3.6	Multiple Choice	9
MAFS.6.NS.3.7	Multiselect	3
MAFS.6.NS.3.8	Equation Editor	29
MAFS.6.EE.1.1	Equation Editor	13
MAFS.6.EE.1.2	Multiselect	17
MAFS.6.EE.1.3	Multiselect	18
MAFS.6.EE.1.4	Multiple Choice	1
MAFS.6.EE.2.5	Matching Item	2
MAFS.6.EE.2.6	Multiple Choice	20
MAFS.6.EE.2.7	Multi-Interaction: Multiple Choice and Editing Task Choice	10
MAFS.6.EE.2.8	Multi-Interaction: Multiple Choice and Multiple Choice	22
MAFS.6.EE.3.9	Selectable Hot Text	12
MAFS.6.G.1.1	Equation Editor	24
MAFS.6.G.1.2	Equation Editor	27
MAFS.6.G.1.3	Equation Editor	14
MAFS.6.G.1.4	Equation Editor	11
MAFS.6.SP.1.1	Multiple Choice	8
MAFS.6.SP.1.3	Equation Editor	25
MAFS.6.SP.1.3	Multiselect	28
MAFS.6.SP.2.4	Multiple Choice	16
MAFS.6.SP.2.5	Equation Editor	23

Appendix B: Revisions

Page(s)	Revision	Date
3	Revisions for paper-based testing (PBT) grades.	January 2020
11	Sample item revised.	January 2020
19	Sample item deleted.	January 2020
21	Sample item revised.	January 2020
26	Sample item revised.	January 2020
28	Sample item revised.	January 2020
30	Sample item revised.	January 2020
35	Sample item revised.	January 2020
37	Sample item revised.	January 2020
40	Appendix A updated to show January 2020 Practice Test information.	January 2020

Grade 6 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

$A = bh$

$A = lw$

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

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

$V = Bh$

$V = lwh$