DRAFT

Grade 7 Mathematics Test Item Specifications

**INTENDED FOR
TEST ITEM WRITERS AND
REVIEWERS FOR FLORIDA'S
STATEWIDE ASSESSMENTS.
NOT FOR INSTRUCTIONAL USE.**

The contents of these draft *Test Item Specifications (Specifications)* are based on the benchmarks provided in Florida's Benchmarks for Excellent Student Thinking (B.E.S.T.) Standards. The *Specifications* define the content and format of the tests and test items and indicate the alignment of items with the benchmarks for test item writers and reviewers. **The *Specifications* are not intended for instructional use.**

With the adoption of Florida's B.E.S.T. Standards for ELA and Mathematics, the following comprehensive resource has been developed to support educators.

- Within the standards, **benchmark clarifications** provide helpful information for educators to understand and to implement each standard.

Given the availability of B.E.S.T. resources, and to prevent any misuse of the *Specifications* by educators, item specifications for ELA and Mathematics assessments aligned to the B.E.S.T. Standards will be reserved for their intended purpose of guiding item writers and reviewers. B.E.S.T. Standards implementation should be driven by the instructional support provided by the Just Read, Florida! Office (JRF) and the Bureau of Standards and Instructional Support (BSIS) to ensure that the focus remains on the content and skills students will engage with in the classroom.

Origin of the Specifications

The Florida Department of Education convened committees of Florida educators to help develop and approve the specifications documents.

Technology-Enhanced Item Descriptions

The Florida B.E.S.T. Standards Assessments are composed of test items that include traditional multiple-choice items as well as enhanced items that require students to select and/or support their answers.

The various enhanced item types are described below.

- **Technology-Enhanced Item Types—Mathematics**
  - **Editing Task Choice**—The student clicks a drop-down menu containing options to complete an equation or expression, a statement, or other component. The student then selects the correct response from the drop-down menu. For paper-based assessments, this item type is modified; the student fills in a bubble to indicate a selection.
  - **Selectable Hot Text**—The student is directed to click on one or more correct answers from among a number of options. When the student hovers over the options (e.g., phrases, sentences, numbers, or expressions), the text will highlight. This indicates that the text is selectable ("hot"). The options may be presented in various ways (e.g., as a list, embedded within text, or in a table). The student can then click on an option to select it. For paper-based assessments, this item type is modified; the student fills in a bubble to indicate a selection.
  - **Multiselect**—The student is directed to select all 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.
  - **Graphic Response Item Display (GRID)**—The student uses the point, line, or arrow tools to create a response on a graph. The item type may also require the student to select numbers, words, phrases, or images and use the drag-and-drop feature to place them into a graphic. For paper-based assessments, this item type will be replaced with another item type.
  - **Equation Editor**—The student enters a number, variable, expression, or equation, as appropriate to the test item, in a response box. The student is presented with a toolbar that includes a variety of mathematical symbols that can be used to create a response. The response box may be separate from the text of the item, or it may be embedded within text of the item (e.g., in line with a sentence or within a table). For paper-based assessments, this item type is modified; the student writes a response in the response box.
  - **Matching Item**—The student checks a box to indicate whether information from a column header matches information from a row. The number of correct answer options per row or column may vary. These items appear in the online and paper-based assessments.

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, different item types (multiple choice, multiselect, editing task choice, selectable hot text, matching, and equation editor) may be combined into a single item.

Item Specifications Definitions

- **Assessment Limits** define the range of content knowledge and degree of difficulty that should be assessed in the assessment items for the benchmark(s).
- **Meaning of Also Assesses**—Where mastery of overlapping mathematical skills of associated benchmark(s) could be assessed through primary benchmark(s).
- **Calculator Availability**

  The following chart displays the type of calculator that is available for each grade or course B.E.S.T. Assessment. Note: For grades 6, 7, 8, Algebra 1, and Geometry, calculators are available for the entire assessment.

Grade/Course	Calculator
3, 4, 5	None
6	Basic four-function
7, 8	Desmos scientific
Algebra 1, Geometry	Desmos scientific

  - **Calculator Designations**
    - **None**—Items for this benchmark **may not** allow for the availability of a calculator.
    - **Available**—Items for this benchmark **must** allow for the availability of a calculator.

- **Context Designations**

  Any item could include justifying and error analysis through reasoning.

  - **Real-world**—authentic application of mathematics to real-world situations
  - **Mathematical**—using models, equations, or evaluation of mathematical reasoning in the absence of a real-world context
  - **Both**—items could either use a real-world context or be strictly mathematical

Number Sense and Operations

MA.7.NSO.1	*Rewrite numbers in equivalent forms.*
MA.7.NSO.1.1	Know and apply the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions, limited to whole-number exponents and rational number bases.
Benchmark Clarifications	*Clarification 1:* Instruction focuses on building the Laws of Exponents from specific examples. Refer to the K-12 Formulas (Appendix E) for the Laws of Exponents. *Clarification 2:* Problems in the form $\frac{a^n}{a^m} = a^p$ must result in a whole-number value for p.
Context	Mathematical
Calculator	Available
Assessment Limits	Items requiring the student to evaluate numerical expressions must incorporate at least one Law of Exponents. Items will require the student to generate an equivalent expression, evaluate an expression, or generate and evaluate an expression.

MA.7.NSO.1	*Rewrite numbers in equivalent forms.*
MA.7.NSO.1.2	Rewrite rational numbers in different but equivalent forms including fractions, mixed numbers, repeating decimals and percentages to solve mathematical and real-world problems. *Example:* Justin is solving a problem where he computes $\frac{17}{3}$ and his calculator gives him the answer 5.6666666667. Justin makes the statement that $\frac{17}{3}$ = 5.6666666667; is he correct?
Benchmark Clarifications	
Context	Both
Calculator	Available
Assessment Limits	Items will focus on rewriting fractions that result in repeating decimals only. Repeating decimals are limited to no more than two repeating digits. Items will not focus only on rewriting fractions in mixed number form or improper form.

MA.7.NSO.2	Add, subtract, multiply and divide rational numbers.
MA.7.NSO.2.1	Solve mathematical problems using multi-step order of operations with rational numbers including grouping symbols, whole-number exponents and absolute value.
Benchmark Clarifications	*Clarification 1:* Multi-step expressions are limited to 6 or fewer steps.
Context	Mathematical
Calculator	Available
Assessment Limits	Numerical expressions must be given and must include the use of nested grouping, exponents, and/or absolute value. Decimals given in expression are limited to the hundredths place or less. Whole number exponents are limited to a value of three or less.

MA.7.NSO.2	Add, subtract, multiply and divide rational numbers.
MA.7.NSO.2.2	Add, subtract, multiply and divide rational numbers with procedural fluency.
Benchmark Clarifications	
Context	Mathematical
Calculator	Available
Assessment Limits	Numerical expressions must be given or items may include a missing term. Values in expressions must incorporate at least one negative value and/or rational numbers represented in various forms.

MA.7.NSO.2	Add, subtract, multiply and divide rational numbers.
MA.7.NSO.2.3	Solve real-world problems involving any of the four operations with rational numbers.
Benchmark Clarifications	*Clarification 1:* Instruction includes using one or more operations to solve problems.
Context	Real-world
Calculator	Available
Assessment Limits	Items will incorporate at least one negative value and/or rational numbers represented in various forms. Items are not limited to one procedural step.

Algebraic Reasoning

MA.7.AR.1	*Rewrite algebraic expressions in equivalent forms.*
MA.7.AR.1.2	Determine whether two linear expressions are equivalent. *Example:* Are the expressions $\frac{4}{3}(6-x) - 3x$ and $8 - \frac{5}{3}x$ equivalent?
Benchmark Clarifications	*Clarification 1:* Instruction includes using properties of operations accurately and efficiently. *Clarification 2:* Instruction includes linear expressions in any form with rational coefficients. *Clarification 3:* Refer to Properties of Operations, Equality and Inequality (Appendix D).
Also Assesses	
MA.7.AR.1.1	Apply properties of operations to add and subtract linear expressions with rational coefficients. *Example:* $(7x - 4) - (2 - \frac{1}{2}x)$ is equivalent to $\frac{15}{2}x - 6$.
Benchmark Clarifications	Clarification 1: Instruction includes linear expressions in the form a ± bx or b ± ax where a and b are rational numbers. Clarification 2: Refer to Properties of Operations, Equality and Inequality (Appendix D).
Context	Mathematical
Calculator	Available
Assessment Limits	Items assessing MA.7.AR.1.1 must give linear expressions. Items assessing MA.7.AR.1.1 are limited to the addition or subtraction of only two linear expressions.

MA.7.AR.2	*Write and solve equations and inequalities in one variable.*
MA.7.AR.2.1	Write and solve one-step inequalities in one variable within a mathematical context and represent solutions algebraically or graphically.
Benchmark Clarifications	*Clarification 1:* Instruction focuses on the properties of inequality. Refer to Properties of Operations, Equality and Inequality (Appendix D). *Clarification 2:* Instruction includes inequalities in the forms $px > q; \frac{x}{p} > q; x \pm p > q$ and $p \pm x > q$, where p and q are specific rational numbers and any inequality symbol can be represented. *Clarification 3:* Problems include inequalities where the variable may be on either side of the inequality symbol.
Context	Both
Calculator	Available
Assessment Limits	Items will require the student to write an inequality, solve an inequality, or write and solve an inequality. Inequalities will be represented in the form $px > q, \frac{x}{p} > q, x \pm p > q$, or $p \pm x > q$, and will use the relational symbols >, ≥, <, or ≤.

MA.7.AR.2	*Write and solve equations and inequalities in one variable.*
MA.7.AR.2.2	Write and solve two-step equations in one variable within a mathematical or real-world context, where all terms are rational numbers.
Benchmark Clarifications	*Clarification 1:* Instruction focuses the application of the properties of equality. Refer to Properties of Operations, Equality and Inequality (Appendix D). *Clarification 2:* Instruction includes equations in the forms $px \pm q = r$ and $p(x \pm q) = r$, where p, q and r are specific rational numbers. *Clarification 3:* Problems include linear equations where the variable may be on either side of the equal sign.
Context	Both
Calculator	Available
Assessment Limits	Items will require the student to write an equation, solve an equation, or write and solve an equation. Equations will be represented in the form $px \pm q = r$ or $p(x \pm q) = r$.

MA.7.AR.3	*Use percentages and proportional reasoning to solve problems.*
MA.7.AR.3.1	Apply previous understanding of percentages and ratios to solve multi-step real-world percent problems. *Example:* 23% of the junior population are taking an art class this year. What is the ratio of juniors taking an art class to juniors not taking an art class? *Example:* The ratio of boys to girls in a class is 3:2. What percentage of the students are boys in the class?
Benchmark Clarifications	*Clarification 1:* Instruction includes discounts, markups, simple interest, tax, tips, fees, percent increase, percent decrease and percent error.
Context	Real-world
Calculator	Available
Assessment Limits	Items may use, but are not limited to, discounts, markups, simple interest, tax, tips, fees, percent increase, percent decrease, or percent error.

MA.7.AR.3	*Use percentages and proportional reasoning to solve problems.*
MA.7.AR.3.3	Solve mathematical and real-world problems involving the conversion of units across different measurement systems.
Benchmark Clarifications	*Clarification 1:* Problem types are limited to length, area, weight, mass, volume and money.
Context	Both
Calculator	Available
Assessment Limits	Items that require the student to convert money must give the necessary exchange rate(s).

MA.7.AR.4.1	Determine whether two quantities have a proportional relationship by examining a table, graph or written description.
Benchmark Clarifications	*Clarification 1:* Instruction focuses on the connection to ratios and on the constant of proportionality, which is the ratio between two quantities in a proportional relationship.
Context	Both
Calculator	Available
Assessment Limits	Items will not give an equation. Items having graphs may include at least two exact points marked on the line and may be labeled with coordinates.

MA.7.AR.4	*Analyze and represent two-variable proportional relationships.*
MA.7.AR.4.2	Determine the constant of proportionality within a mathematical or real-world context given a table, graph or written description of a proportional relationship. *Example:* A graph has a line that goes through the origin and the point (5, 2). This represents a proportional relationship and the constant of proportionality is $\frac{2}{5}$. *Example:* Gina works as a babysitter and earns \$9 per hour. She can only work 6 hours this week. Gina wants to know how much money she will make. Gina can use the equation $e = 9h$, where e is the amount of money earned, h is the number of hours worked and 9 is the constant of proportionality.
Benchmark Clarifications	
Context	Both
Calculator	Available
Assessment Limits	Items must state that a relationship is proportional. Items will not give an equation. Items having graphs may include at least two exact points marked on the line and may be labeled with coordinates.

MA.7.AR.4	*Analyze and represent two-variable proportional relationships.*
MA.7.AR.4.3	Given a mathematical or real-world context, graph proportional relationships from a table, equation or a written description.
Benchmark Clarifications	*Clarification 1:* Instruction includes equations of proportional relationships in the form of $y = px$, where p is the constant of proportionality.
Context	Both
Calculator	Available
Assessment Limits	Items must state that a relationship is proportional. When given a written description, the constant of proportionality must be stated. Items will not require a table of values to be generated. Items that give an equation will be presented in the form $y = px$.

MA.7.AR.4	*Analyze and represent two-variable proportional relationships.*
MA.7.AR.4.4	Given any representation of a proportional relationship, translate the representation to a written description, table or equation. *Example:* The written description, there are 60 minutes in 1 hour, can be represented as the equation $m = 60h$. *Example:* Gina works as a babysitter and earns \$9 per hour. She would like to earn \$100 to buy a new tennis racket. Gina wants to know how many hours she needs to work. She can use the equation $h = \frac{1}{9}e$, where e is the amount of money earned, h is the number of hours worked and $\frac{1}{9}$ is the constant of proportionality.
Benchmark Clarifications	*Clarification 1:* Given representations are limited to a written description, graph, table or equation. *Clarification 2:* Instruction includes equations of proportional relationships in the form of $y = px$, where p is the constant of proportionality.
Context	Both
Calculator	Available
Assessment Limits	Items must state that a relationship is proportional. Items will not require the student to determine whether a given relationship is proportional. Items that give an equation or require the student to write an equation will be presented in the form $y = px$.

MA.7.AR.4	*Analyze and represent two-variable proportional relationships.*
MA.7.AR.4.5	Solve real-world problems involving proportional relationships. *Example:* Gordy is taking a trip from Tallahassee, FL to Portland, Maine which is about 1,407 miles. On average his SUV gets 23.1 miles per gallon on the highway and his gas tanks holds 17.5 gallons. If Gordy starts with a full tank of gas, how many times will he be required to fill the gas tank?
Benchmark Clarifications	
Also Assesses	
MA.7.AR.3	*Use percentages and proportional reasoning to solve problems.*
MA.7.AR.3.2	Apply previous understanding of ratios to solve real-world problems involving proportions. *Example:* Scott is mowing lawns to earn money to buy a new gaming system and knows he needs to mow 35 lawns to earn enough money. If he can mow 4 lawns in 3 hours and 45 minutes, how long will it take him to mow 35 lawns? Assume that he can mow each lawn in the same amount of time. *Example:* Ashley normally runs 10-kilometer races which is about 6.2 miles. She wants to start training for a half-marathon which is 13.1 miles. How many kilometers will she run in the half-marathon? How does that compare to her normal 10K race distance?
Benchmark Clarifications	
Context	Real-world
Calculator	Available
Assessment Limits	N/A

Geometric Reasoning

MA.7.GR.1	*Solve problems involving two-dimensional figures, including circles.*
MA.7.GR.1.1	Apply formulas to find the areas of trapezoids, parallelograms and rhombi.
Benchmark Clarifications	*Clarification 1:* Instruction focuses on the connection from the areas of trapezoids, parallelograms and rhombi to the areas of rectangles or triangles. *Clarification 2:* Within this benchmark, the expectation is not to memorize area formulas for trapezoids, parallelograms and rhombi.
Context	Mathematical
Calculator	Available
Assessment Limits	Dimensions that are labeled on figures are limited to base(s) and vertical height only. Given parallelograms will not be rectangles or squares.

MA.7.GR.1	*Solve problems involving two-dimensional figures, including circles.*
MA.7.GR.1.2	Solve mathematical or real-world problems involving the area of polygons or composite figures by decomposing them into triangles or quadrilaterals.
Benchmark Clarifications	*Clarification 1*: Within this benchmark, the expectation is not to find areas of figures on the coordinate plane or to find missing dimensions.
Context	Both
Calculator	Available
Assessment Limits	Composed figures must be a polygon with more than four sides. Items using trapezoids, rhombi, or parallelograms are limited to real-world context. Given parallelograms will not be rectangles or squares. Dimensions that are labeled on quadrilaterals are limited to base(s) and vertical height only.

MA.7.GR.1	Solve problems involving two-dimensional figures, including circles.
MA.7.GR.1.3	Explore the proportional relationship between circumferences and diameters of circles. Apply a formula for the circumference of a circle to solve mathematical and real-world problems.
Benchmark Clarifications	*Clarification 1:* Instruction includes the exploration and analysis of circular objects to examine the proportional relationship between circumference and diameter and arrive at an approximation of pi (π) as the constant of proportionality. *Clarification 2:* Solutions may be represented in terms of pi (π) or approximately.
Context	Both
Calculator	Available
Assessment Limits	Items may state whether an answer is to be represented as the exact measure in terms of pi (π) or as an approximation. Items that ask for an approximate answer must allow for the use of the exact value of pi (π) or any common approximation of pi (π).

MA.7.GR.1	Solve problems involving two-dimensional figures, including circles.
MA.7.GR.1.4	Explore and apply a formula to find the area of a circle to solve mathematical and real-world problems. *Example:* If a 12-inch pizza is cut into 6 equal slices and Mikel ate 2 slices, how many square inches of pizza did he eat?
Benchmark Clarifications	*Clarification 1:* Instruction focuses on the connection between formulas for the area of a rectangle and the area of a circle. *Clarification 2:* Problem types include finding areas of fractional parts of a circle. *Clarification 3:* Solutions may be represented in terms of pi (π) or approximately.
Context	Both
Calculator	Available
Assessment Limits	Items may state whether an answer is to be represented as the exact measure in terms of pi (π) or as an approximation. Items that ask for an approximate answer must allow for the use of the exact value of pi (π) or any common approximation of pi (π).

MA.7.GR.1	Solve problems involving two-dimensional figures, including circles.
MA.7.GR.1.5	Solve mathematical and real-world problems involving dimensions and areas of geometric figures, including scale drawings and scale factors.
Benchmark Clarifications	*Clarification 1:* Instruction focuses on seeing the scale factor as a constant of proportionality between corresponding lengths in the scale drawing and the original object. *Clarification 2:* Instruction includes the understanding that if the scaling factor is k, then the constant of proportionality between corresponding areas is k^2. *Clarification 3:* Problem types include finding the scale factor given a set of dimensions as well as finding dimensions when given a scale factor.
Context	Both
Calculator	Available
Assessment Limits	N/A

MA.7.GR.2	Solve problems involving three-dimensional figures, including right circular cylinders.
MA.7.GR.2.1	Given a mathematical or real-world context, find the surface area of a right circular cylinder using the figure's net.
Benchmark Clarifications	*Clarification 1:* Instruction focuses on representing a right circular cylinder with its net and on the connection between surface area of a figure and its net. *Clarification 2:* Within this benchmark, the expectation is to find the surface area when given a net or when given a three-dimensional figure. *Clarification 3:* Within this benchmark, the expectation is not to memorize the surface area formula for a right circular cylinder. *Clarification 4:* Solutions may be represented in terms of pi (π) or approximately.
Context	Both
Calculator	Available
Assessment Limits	Items will not require the student to use the surface area formula. Items may give an image of the three-dimensional figure and require the student to identify the appropriate net with dimensions and find the surface area. Items may state whether an answer is to be represented as the exact measure in terms of pi (π) or as an approximation. Items that ask for an approximate answer must allow for the use of the exact value of pi (π) or any common approximation of pi (π).

MA.7.GR.2	*Solve problems involving three-dimensional figures, including right circular cylinders.*
MA.7.GR.2.2	Solve real-world problems involving surface area of right circular cylinders.
Benchmark Clarifications	*Clarification 1:* Within this benchmark, the expectation is not to memorize the surface area formula for a right circular cylinder or to find radius as a missing dimension. *Clarification 2:* Solutions may be represented in terms of pi (π) or approximately.
Context	Real-world
Calculator	Available
Assessment Limits	Items must include a formula for surface area of a right circular cylinder, including context where the right circular cylinder may include one or two circular bases. Items may state whether an answer is to be represented as the exact measure in terms of pi (π) or as an approximation. Items that ask for an approximate answer must allow for the use of the exact value of pi (π) or any common approximation of pi (π).

MA.7.GR.2	*Solve problems involving three-dimensional figures, including right circular cylinders.*
MA.7.GR.2.3	Solve mathematical and real-world problems involving volume of right circular cylinders.
Benchmark Clarifications	*Clarification 1:* Within this benchmark, the expectation is not to memorize the volume formula for a right circular cylinder or to find radius as a missing dimension. *Clarification 2:* Solutions may be represented in terms of pi (π) or approximately.
Context	Both
Calculator	Available
Assessment Limits	Items may state whether an answer is to be represented as the exact measure in terms of pi (π) or as an approximation. Items that ask for an approximate answer must allow for the use of the exact value of pi (π) or any common approximation of pi (π).

Data Analysis and Probability

MA.7.DP.1	Represent and interpret numerical and categorical data.
MA.7.DP.1.1	Determine an appropriate measure of center or measure of variation to summarize numerical data, represented numerically or graphically, taking into consideration the context and any outliers.
Benchmark Clarifications	*Clarification 1:* Instruction includes recognizing whether a measure of center or measure of variation is appropriate and can be justified based on the given context or the statistical purpose. *Clarification 2:* Graphical representations are limited to histograms, line plots, box plots and stem-and-leaf plots. *Clarification 3:* The measure of center is limited to mean and median. The measure of variation is limited to range and interquartile range.
Context	Real-world
Calculator	Available
Assessment Limits	Items may require the student to select the reasons why a certain measure should be chosen based on given context, statistical purpose, or outliers in data.

MA.7.DP.1	Represent and interpret numerical and categorical data.
MA.7.DP.1.2	Given two numerical or graphical representations of data, use the measure(s) of center and measure(s) of variability to make comparisons, interpret results and draw conclusions about the two populations.
Benchmark Clarifications	*Clarification 1:* Graphical representations are limited to histograms, line plots, box plots and stem-and-leaf plots. *Clarification 2:* The measure of center is limited to mean and median. The measure of variation is limited to range and interquartile range.
Context	Real-world
Calculator	Available
Assessment Limits	Numerical data sets are limited to no more than 20. Items will not require the student to calculate mean with data sets containing more than 10 data points.

MA.7.DP.1	*Represent and interpret numerical and categorical data.*
MA.7.DP.1.3	Given categorical data from a random sample, use proportional relationships to make predictions about a population. *Example:* O'Neill's Pillow Store made 600 pillows yesterday and found that 6 were defective. If they plan to make 4,300 pillows this week, predict approximately how many pillows will be defective. *Example:* A school district polled 400 people to determine if it was a good idea to not have school on Friday. 30% of people responded that it was not a good idea to have school on Friday. Predict the approximate percentage of people who think it would be a good idea to have school on Friday from a population of 6,228 people.
Benchmark Clarifications	
Context	Real-world
Calculator	Available
Assessment Limits	The random sample of a population must have a size of at least 100.

MA.7.DP.1	*Represent and interpret numerical and categorical data.*
MA.7.DP.1.4	Use proportional reasoning to construct, display and interpret data in circle graphs.
Benchmark Clarifications	*Clarification 1:* Data is limited to no more than 6 categories.
Context	Real-world
Calculator	Available
Assessment Limits	Category data in the circle graph will be represented as a fraction or percentage of the whole data set.

MA.7.DP.1	*Represent and interpret numerical and categorical data.*
MA.7.DP.1.5	Given a real-world numerical or categorical data set, choose and create an appropriate graphical representation.
Benchmark Clarifications	*Clarification 1:* Graphical representations are limited to histograms, bar charts, circle graphs, line plots, box plots and stem-and-leaf plots.
Context	Real-world
Calculator	Available
Assessment Limits	Items must include a real-world scenario with a data set to provide reasoning for the most appropriate graphical representation. For circle graphs, data is limited to no more than six categories.

MA.7.DP.2	*Develop an understanding of probability. Find and compare experimental and theoretical probabilities.*
MA.7.DP.2.1	Determine the sample space for a simple experiment.
Benchmark Clarifications	*Clarification 1:* Simple experiments include tossing a fair coin, rolling a fair die, picking a card randomly from a deck, picking marbles randomly from a bag and spinning a fair spinner.
Context	Real-world
Calculator	Available
Assessment Limits	Items including a deck of cards are not limited to a standard 52-card deck, and can include, but are not limited to, cards containing names, letters of the alphabet, a variety of colors, or the like. Items including a fair die are not limited to a standard 6-sided die and can include a variety of sides. Items including a fair die are not limited to including consecutive sequential numbers and can include repeated or not repeated, colors, shapes, words, numbers, or the like.

MA.7.DP.2	*Develop an understanding of probability. Find and compare experimental and theoretical probabilities.*
MA.7.DP.2.2	Given the probability of a chance event, interpret the likelihood of it occurring. Compare the probabilities of chance events.
Benchmark Clarifications	*Clarification 1:* Instruction includes representing probability as a fraction, percentage or decimal between 0 and 1 with probabilities close to 1 corresponding to highly likely events and probabilities close to 0 corresponding to highly unlikely events. *Clarification 2:* Instruction includes ($event$) notation. *Clarification 3:* Instruction includes representing probability as a fraction, percentage or decimal.
Context	Real-world
Calculator	Available
Assessment Limits	Probability will be represented using a fraction or decimal with a value between 0 and 1, inclusive, or by a percentage. Items may require the student to identify probabilities that are closer to 1 as likely or probabilities that are closer to 0 as unlikely. Items may use the notation $P(event)$ to state probability of an event.

MA.7.DP.2	*Develop an understanding of probability. Find and compare experimental and theoretical probabilities.*
MA.7.DP.2.3	Find the theoretical probability of an event related to a simple experiment.
Benchmark Clarifications	*Clarification 1:* Instruction includes representing probability as a fraction, percentage or decimal. *Clarification 2:* Simple experiments include tossing a fair coin, rolling a fair die, picking a card randomly from a deck, picking marbles randomly from a bag and spinning a fair spinner.
Context	Real-world
Calculator	Available
Assessment Limits	Probability will be represented using a fraction or decimal with a value between 0 and 1, inclusive, or by a percentage. Items including a deck of cards are not limited to a standard 52-card deck, and can include, but are not limited to, cards containing names, letters of the alphabet, a variety of colors, or the like. Items including a fair die are not limited to a standard 6-sided die and can include a variety of sides. Items including a fair die are not limited to including consecutive sequential numbers and can include repeated or not repeated, colors, shapes, words, numbers, or the like.

MA.7.DP.2	*Develop an understanding of probability. Find and compare experimental and theoretical probabilities.*
MA.7.DP.2.4	Use a simulation of a simple experiment to find experimental probabilities and compare them to theoretical probabilities. *Example:* Investigate whether a coin is fair by tossing it 1,000 times and comparing the percentage of heads to the theoretical probability 0.5.
Benchmark Clarifications	*Clarification 1:* Instruction includes representing probability as a fraction, percentage or decimal. *Clarification 2:* Instruction includes recognizing that experimental probabilities may differ from theoretical probabilities due to random variation. As the number of repetitions increases experimental probabilities will typically better approximate the theoretical probabilities. *Clarification 3:* Experiments include tossing a fair coin, rolling a fair die, picking a card randomly from a deck, picking marbles randomly from a bag and spinning a fair spinner.
Context	Real-world
Calculator	Available
Assessment Limits	Probability will be represented using a fraction or decimal with a value between 0 and 1, inclusive, or by a percentage. If given a simulation, the item must have a minimum number of 100 trials. Items including a deck of cards are not limited to a standard 52-card deck, and can include, but are not limited to, cards containing names, letters of the alphabet, a variety of colors, or the like. Items including a fair die are not limited to a standard 6-sided die and can include a variety of sides. Items including a fair die are not limited to including consecutive sequential numbers and can include repeated or not repeated, colors, shapes, words, numbers, or the like.

Appendix A
Grade 7 FAST Mathematics Reference Sheet

Conversions within a System of Measure

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 week = 7 days
1 year = 365 days
1 year = 52 weeks

Conversions between Systems of Measure

Customary to Metric Conversion Approximations

1 inch = 2.54 centimeters
1 foot = 0.305 meters
1 mile = 1.61 kilometers

1 cup = 0.24 liters
1 gallon = 3.785 liters
1 ounce = 28.35 grams
1 pound = 0.454 kilograms

Metric to Customary Conversion Approximations

1 centimeter = 0.39 inches
1 meter = 3.28 feet
1 kilometer = 0.62 miles

1 liter = 4.23 cups
1 liter = 0.264 gallons
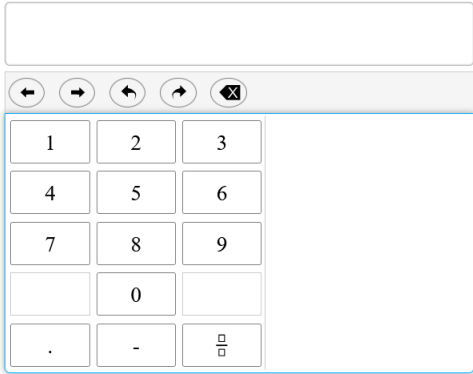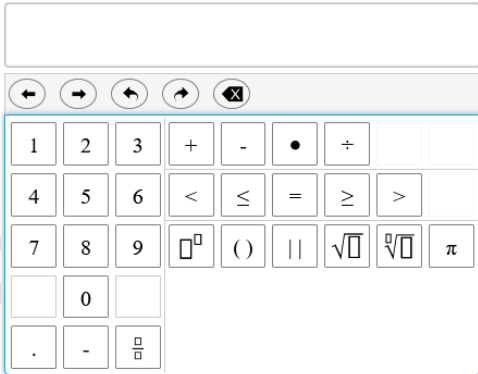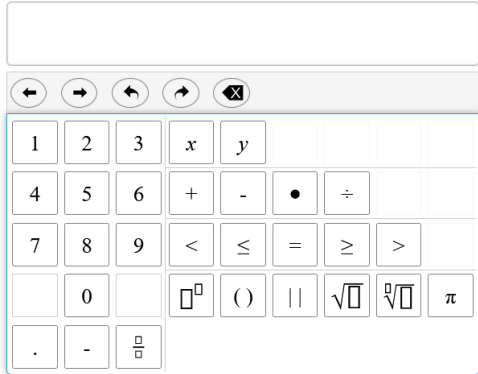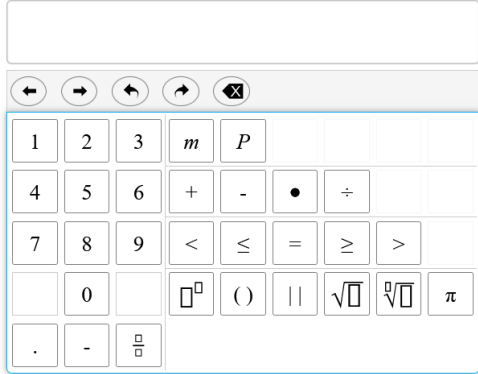1 gram = 0.0352 ounces
1 kilogram = 2.204 pounds

Grade 7 FAST Mathematics Reference Sheet

Formulas

Parallelogram $\quad A = bh$

Or Rhombus $\quad A = lw$

Trapezoid $\quad A = \dfrac{1}{2}h(b_1 + b_2)$

Circle $\quad C = 2\pi r$ or $C = \pi d$

$A = \pi r^2$

Right Circular Cylinder $\quad V = Bh$ or $V = \pi r^2 h$

Key	
b = base	A = area
h = height	C = circumference
l = length	V = volume
w = width	
r = radius	
d = diameter	
B = area of base	

Simple Interest Formula
$$I = prt$$ where I = interest, p = principal, r = rate, t = time
Percent Error Formula
$$\dfrac{|Estimate - Actual|}{Actual} \times 100$$
Percent of Change
$$\dfrac{final\ value - initial\ value}{initial\ value} \times 100$$

Appendix B
Keypads for Grade 7 Computer-Based Tests

Numeric Only	Full Keypad

Full Keypad with Variables:
Variables may change but the rest of the keys are always the same as the full keypad above.

Appendix C: Change Log

Page(s)	Change	Date
5	Updated calculator information	November 2022
6	Updated Calculator Designation for MA.7.NSO.1.1	November 2022
7	Updated Calculator Designation for MA.7.NSO.2.1 and MA.7.NSO.2.2	November 2022
11	Updated Calculator Designation for MA.7.AR.4.3	November 2022
18	Updated Calculator Designation for MA.7.DP.1.1	November 2022
20	Updated Calculator Designations	November 2022
1	Added "AND REVIEWERS" after "ITEM WRITERS"	June 2023
3	Removed "of" after "select all" in the multi-select section.	June 2023
25	Added "the" after "same as" in Full Keypad With Variables section. Added period to end of statement.	June 2023
3-4	Updated language to remove "scanned and scored electronically."	August 2023