FCAT MATHEMATICS CONTENT MATRIX
GRADE 7

Benchmarks	Grade Level Expectation	Clarification Statement	Content Limits
MA.A.1.3.1: The student associates verbal names, written word name, and standard numerals with integers, fractions, decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.	1. Knows word names and standard numerals for integers, fractions, decimals, ratios, numbers expressed as percents, numbers with exponents, numbers expressed in scientific notation, and numbers expressed using the square root radical. 2. Reads and writes whole numbers and decimals in expanded form, including exponential notation.		
MA.A.1.3.2: The student understands the relative size of integers, fractions, and decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.	1. Compares and orders integers, fractions, decimals, numbers with exponents, and numbers expressed as percents or in scientific notation, including ordering on a number line.	Students will identify, order, and / or compare the relative size of numbers. MC	• Items involving scientific notation should be limited to whole numbers less than one billion.
MA.A.1.3.3: The student understands concrete and symbolic representations of rational numbers and irrational numbers in real-world situations.	1. Knows examples of rational and irrational numbers in real-world situations, including the irrational numbers π and $\sqrt{2}$. 2. Describes the meanings of rational and irrational numbers using physical or graphical displays. 3. Constructs models to represent rational numbers.		
MA.A.1.3.4: The student understands that numbers can be represented in a variety of equivalent forms, including integers, fractions, decimals, percents, scientific notation, exponents, radicals, and absolute value.	1. Knows the relationships among fractions, decimals, and percents. 2. Expresses a given quantity in a variety of ways (for example, integers, fractions, decimals, numbers expressed as a percent, numbers expressed in scientific notation, ratios). 3. Knows whether numbers expressed in different forms are equal. 4. Converts a number expressed in one form to its equivalent in another form.	Students will express numbers in equivalent forms. MC, GR	• The place values of the fractional parts of decimal numbers should range from tenths through ten thousandths. • Items involving scientific notation should be limited to whole numbers less than one billion. • Items will not include repeating decimals.

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MA.A.2.3.1: The student understands and uses exponential and scientific notation.	1. Expresses whole numbers in exponential notation (for example, $36 = 6^2$). 2. Evaluates numerical expressions that contain exponential notation. 3. Expresses numbers greater than one in scientific notation. 4. Expresses numbers in scientific notation as numbers in standard form.	Students will represent or solve a simple problem using numbers in exponential and / or scientific notation. MC, GR	• Items other than those using scientific notation will use exponents no greater than 5. • Items involving scientific notation should be limited to whole numbers less than one billion.
MA.A.2.3.2: The student understands the structure of number systems other than the decimal number system.	1. Applies knowledge of the decimal number system and of non-place-value systems.		
MA.A.3.3.1: The student understands and explains the effects of addition, subtraction, multiplication, and division on whole numbers, fractions, including mixed numbers, and decimals, including the inverse relationships of positive and negative numbers.	1. Knows the effects of the four basic operations on whole numbers, fractions, mixed numbers, and decimals. 2. Uses models or pictures to show the effects of addition, subtraction, multiplication, and division on whole numbers, decimals, fractions, mixed numbers, and integers. 3. Applies the properties of rational numbers to solve problems (commutative, associative, distributive, identity, inverse). 4. Knows the inverse relationship of positive and negative numbers.	Students will recognize the appropriate operation for a stated effect, the effects of operations, and / or the relationships between operations. MC	• Items will include the effects of the four basic operations on whole numbers, fractions, mixed numbers, and decimals, and the use of properties of real numbers to solve problems. • Items should include single digit positive fractions and / or decimals to the thousandths place only. • Items assessing the inverse relationship should be limited to integers.

MA.A.3.3.2: The student selects the appropriate operation to solve problems involving addition, subtraction, multiplication, and division of rational numbers, ratios, proportions, and percents, including the appropriate application of the algebraic order of operations.	1. Knows the appropriate operation to solve real-world problems involving fractions, decimals, and integers. 2. Solves real-world problems involving decimals and fractions using two- or three-step problems. 3. Solves real-world problems involving percents (for example, discounts, simple interest, taxes, tips). 4. Applies order of operations to solve problems (parentheses, exponents, multiplication, division, addition, and subtraction). 5. Knows proportional relationships and uses tables, graphs, or "constant ratio" relationships to solve and explain problems.	Students will simplify mathematical expressions using the correct order of operations or identify the correct order of operations. MC, GR	• Items should include one-or two-digit whole numbers and exponents up to the fifth power. • In order to focus the assessment on the order of operations, items should use numbers that students can solve without a calculator.
Benchmarks	**Grade Level Expectation**	**Clarification Statement**	**Content Limits**
MA.A.3.3.3: The student adds, subtracts, multiplies, and divides whole numbers, decimals, and fractions, including mixed numbers, to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator.	1. Solves multi-step real-world problems involving whole numbers, fractions or decimals using appropriate methods of computation, such as mental computation, paper and pencil, and calculator.	Students will solve a single- or multi-step problem using appropriate computations. MC, GR	• Items may include problems dealing with percent used to find sales tax, discount, simple interest, and percent increase or decrease. • Answers with percents should not be used with the GR format.
MA.A.4.3.1: The student uses estimation strategies to predict results and to check the reasonableness of results.	1. Knows an appropriate estimation technique for a given situation using whole numbers, fractions, and decimals. 2. Estimates to predict results and check reasonableness of results. 3. Determines whether an exact answer is needed or an estimate would be sufficient.	Students will determine estimates and / or their appropriateness. MC	• The data presented to students may be either precise values, a range of values, or a combination of precise values and estimates of other values.
MA.A.5.3.1: The student uses concepts about numbers, including primes, factors, and multiples, to build number sequences.	1. Knows if numbers are prime or composite. 2. Finds the greatest common factor and least common multiple of two or more numbers. 3. Determines the prime factorization of composite numbers. 4. Applies number theory concepts to determine the terms in a sequence. 5. Applies number theory concepts, including divisibility rules, to solve real-world or mathematical problems.		

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MA.B.1.3.1: The student uses concrete and graphic models to derive formulas for finding perimeter, area, surface area, circumference, and volume of two- and three-dimensional shapes, including rectangular solids and cylinders.	1. Uses concrete or graphic models to create formulas for finding volumes of solids (prisms and cylinders). 2. Uses concrete or graphic models to create formulas for finding surface area of prisms and cylinders. 3. Solves and explains problems involving perimeter, area, and circumference. 4. Solves and explains problems involving the surface area or volume of prisms and cylinders.	Students will solve a problem involving perimeter, area, surface area, circumference, or volume. Items may assess finding linear measure, weight, capacity, time, temperature, perimeter, area, circumference, and the surface area or volume of prisms and cylinders. MC, GR	• The number of two-or three dimensional figures assessed in an item should not exceed two. • Where possible, items involving circumferences and areas of circles should use $\frac{22}{7}$ numbers compatible with as a representation of π even though students may use 3.14 in solving the problem. • Items involving π should be multiple-choice.
Benchmarks	**Grade Level Expectation**	**Clarification Statement**	**Content Limits**
MA.B.1.3.2: The student uses concrete and graphic models to derive formulas for finding rates, distance, time, and angle measures.	1. Finds the measure of an angle by measuring with a protractor or applying angle relationships (for example, corresponding, complementary, supplementary, interior, exterior). 2. Develops and uses the distance formula in solving real-world problems (d = rt).	Students will solve a problem involving rate, distance, time, or angle measures. MC, GR	• Items assessing the measure of an angle may require students to identify angles using vocabulary, and provide angle measures for corresponding, complementary, supplementary, interior, or exterior angles. • Items assessing conversion of hours and minutes should involve only quarter hours.

MA.B.1.3.3: The student understands and describes how the change of a figure in such dimensions as length, width, height, or radius affects its other measurements such as perimeter, area, surface area, and volume.	1. Given a two- or three-dimensional figure, creates a new figure by increasing or decreasing the original dimensions. 2. Knows the relationships between the perimeters, areas, surface areas, or volumes of the original figure and those of the newly created figure. 3. Solves real-world or mathematical problems involving perimeter, area, circumference, surface area and volume and how these are affected by changes in the dimensions of the figures.	Students will determine the effects of changing dimensions on other measures or solve problems involving the effects of changing dimensions. MC, GR	• The changes in dimensions of a figure that are increases should result in similar figures using scale factors that are whole numbers. • The changes in dimensions of a figure that are decreases should result in similar figures using scale factors that are common-unit fractions with denominators of 2, 3, or 4. • Changes in figures involving volume should be based primarily on rectangular solids.

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MA.B.1.3.4: The student constructs, interprets, and uses scale drawings such as those based on number lines and maps to solve real-world problems.	1. Knows an appropriate scale needed to produce a proportional drawing or model. 2. Knows proportional relationships used in scale drawings. 3. Produces a scale drawing.	Students will interpret and solve a problem using scale drawings. MC, GR	• Measurements may be in either metric or customary units.
MA.B.2.3.1: The student uses direct (measured) and indirect (not measured) measures to compare a given characteristic in either metric or customary units.	1 Measures length, weight or mass, and capacity or volume using customary or metric units. 2 Knows relationships between metric units of mass and capacity (for example, one cubic centimeter of water weighs one gram). 3. Finds measures of length, weight or mass, and capacity or volume using proportional relationships and properties of similar geometric figures (for example, using shadow		

	measurement and properties of similar triangles to find the height of a flag pole).		
MA.B.2.3.2: The student solves problems involving units of measure and converts answers to a larger or smaller unit within either the metric or customary system.	1. Compares units of measurement within a system (metric or customary). 2. Performs operations on measurements within either the metric or customary system (for example, finds three times 27 inches and expresses the answer in yards). 3. Selects the appropriate unit of measurement when solving real-world problems (for example, linear, square, and cubic units). 4. Solves problems using the metric or customary system involving conversions within the same system.	Students will solve a problem involving conversions to other units. MC, GR	• All conversions of units must be within the same system of measurement (metric or customary). • Items should involve only one-unit conversions (e.g., converting seconds to hours) and not mixed units (e.g., converting hours and minutes to seconds).
MA.B.3.3.1: The student solves real-world and mathematical problems involving estimates of measurements including length, time, weight / mass, temperature, money, perimeter, area, and volume, in either customary or metric units.	1. Knows whether an exact answer is needed or if an estimate is sufficient. 2. Estimates solutions to real-world problems by estimating the length, volume or capacity, weight or mass, perimeter, or area of objects or shapes in either customary and metric units. 3. Estimates solutions to real-world problems involving measurement, including estimates of time, temperature, and money.		

Benchmarks	Grade Level Expectation	Clarification Statement	Content Limits
MA.B.4.3.1: The student selects appropriate units of measurement and determines and applies significant digits in a real-world context. (Significant digits should relate to both instrument precision and to the least precise unit of measurement).	1. Selects appropriate units of measurement in a real-world context. 2. Knows that measurements are always approximate and that the degree of accuracy of a measurement depends upon the precision of the instrument. 3. Knows the precision of different measuring instruments. 4. Determines the appropriate precision unit for a given situation.		

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MA.B.4.3.2: The student selects and uses appropriate instruments, technology, and techniques to measure quantities in order to achieve specified degrees of accuracy in a problem situation.	1. Selects a measurement tool (for example, scales, rulers, thermometers, measuring cups, protractors, gauges) appropriate to a given situation. 2. Measures accurately with the measurement tools to the specified degree of accuracy for the task and in keeping with the precision of the measurement tool.		
MA.C.1.3.1: The student understands the basic properties of, and relationships pertaining to regular and irregular geometric shapes in two- and three-dimensions.	1. Identifies, draws, and uses symbolic notation to denote the basic properties of geometric terms including lines (intersecting, skew, parallel, perpendicular) and congruent figures. 2. Determines the measure of various types of angles using a protractor or angle relationships (including complementary, supplementary, and vertical angles). 3. Compares and describes the attributes of regular and irregular polygons (for example, parallelogram, trapezoid, pentagon, hexagon). 4. Identifies and classifies triangles and quadrilaterals. 5. Knows the attributes of and draws three-dimensional figures (pyramid, cone, sphere, hemisphere). 6. Knows the properties of two- and three-dimensional figures.	Students will identify and/or analyze two- and three-dimensional shapes using their basic properties and relationships. MC, GR	• Items will assess identifying basic properties of lines, congruent figures, various types of angles, and angle relationships (including complementary, supplementary, and vertical angles). • Items will assess attributes of regular and irregular polygons represented as flat patterns, isometric drawings, nets, and three-dimensional figures. • Items assessing three dimensional figures will use rectangular prisms, right circular cylinders, pyramids, cones, spheres, or hemispheres. • Items should utilize only a single figure, with no comparisons to other figures or transformations.

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MA.C.2.3.1: The student understands the geometric concepts of symmetry, reflections, congruency, similarity, perpendicularity, parallelism, and transformations, including flips, slides, turns, and enlargements.	1. Uses manipulatives and drawings to solve problems requiring spatial visualization. 2. Describes and applies the properties of parallelism, perpendicularity and symmetry in real-world contexts. 3. Recognizes, draws, and describes congruent and similar figures. 4. Creates and describes the attributes of a figure either congruent or similar to a given figure. 5. Identifies and performs the various transformations (reflection, translation, rotation) of a given figure on a coordinate plane.	Students will identify and/or apply various geometric concepts, including parallelism, perpendicularity, symmetry, congruency, similarity, and transformations, including reflections, translations, or rotations. MC	• Items should assess only geometric concepts of two dimensional figures.
MA.C.2.3.2: The student predicts and verifies patterns involving tessellations (a covering of a plane with congruent copies of the same pattern with no holes and no overlaps, like floor tiles).	1. Predicts and verifies whether a given shape or shapes will tessellate. 2. Given a simple tessellated pattern, determines the shape(s) and transformation(s). 3. Tessellates using reflection, translation, or rotation and any desired combinations.	Students will predict and/or verify a pattern involving tessellations and/or identify figures that have been or can be tessellated. MC	• Items will assess tessellations or figures to be tessellated.
MA.C.3.3.1: The student represents and applies geometric properties and relationships to solve real-world and mathematical problems.	1. Observes, explains, and makes conjectures regarding geometric properties and relationships (among angles, lines, regular and irregular polygons). 2. Creates and solves angle measurement problems for triangles. 3. Demonstrates the Pythagorean relationship in right triangles using models or diagrams (for example, manipulatives, dot, graph, or isometric paper). 4. Given two sides of a right triangle, uses the Pythagorean Theorem to find the length of the third side.	Students will apply geometric properties and relationships to solve problems. MC	• Items will not assess three dimensional figures.
MA.C.3.3.2: The student identifies and plots ordered pairs in all four quadrants of a rectangular coordinate system (graph) and applies simple properties of lines.	1. Identifies each quadrant and the characteristics of points in each quadrant (positive and negative). 2. Identifies and plots ordered pairs in all four quadrants of the coordinate system.	Students will identify the coordinates of a point or identify a point, given its coordinates, and/or identify figures that have been or can be tessellated. MC	• Items will assess all four quadrants.

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MA.D.1.3.1: The student describes a wide variety of patterns, relationships, and functions through models, such a manipulatives, tables, graphs, expressions, equations, and inequalities.	1. Uses manipulatives and graphic materials to generate tables and charts (for example, input, output) to develop algebraic expressions, equations, or formulas. 2. Given instances of a pattern, expresses a generalization of the pattern using algebraic expressions. 3. Given an algebraic expressions of a relationship or pattern, supplies specific instances of the relationship or pattern. 4. Predicts outcomes based on a generalization of a pattern or relationship.	Students will recognize, analyze, and / or apply patterns, sequences, relationships, and functions in a variety of settings. MC, GR	• Items may use algebraic expressions, equations, or formulas to assess generalizations of patterns. • Items should not use more than two variables or include more than two operations. • Items involving function tables should be able to be solved using a pattern in the *y*-values or a pattern in the relationship between the *x*- and *y*-values.
MA.D.1.3.2: The student creates and interprets tables, graphs, equations, and verbal descriptions to explain cause-and-effect relationships.	1. Interprets and creates tables, function tables, and graphs (all four quadrants). 2. Writes expressions and equations to describe relationships. 3. Graphs equations to explain cause-and-effect relationships.	Students will interpret and identify expressions and equations. MC, GR	• Items may be from all four quadrants. • Items involving graphing functions should include no more than three operations. • Items involving graphing are limited to plotting points with integral coordinates. • Items involving graphs will involve linear relationships only. • Items should rely primarily on tables or graphs to present and / or interpret cause-and-effect relationships.

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MA.D.2.3.1: The student represents and solves real-world problems graphically with algebraic expressions, equations, and inequalities.	1. Translates verbal expressions and sentences into algebraic expressions and equations. 2. Translates algebraic expressions, equations, or formulas representing real-world relationships into verbal expressions or sentences. 3. Given an algebraic equation or expression of a real-world application, substitutes integral values for variables and simplifies the results. 4. Uses pictures, models, manipulatives or other strategies to solve one-step and simple multi step linear equations. 5. Graphs solutions to equations and inequalities on a number line. 6. Graphs linear equations on the coordinate plane from a table of values.	Students will recognize representations of or solutions for real-world problems presented verbally or graphically as equations and / or expressions, or inequalities. MC	• Items involving graphing of inequalities will be restricted to a number line. • Items may use pictures and graphics to present one-step and simple multi-step linear equations. • Items may include no more than two variables and no more than two operations. • The use of concrete and symbolic expressions should be limited to rational numbers.
MA.D.2.3.2: The student uses algebraic problem-solving strategies to solve real-world problems involving linear equations and inequalities.	1. Knows how to solve linear equations and inequalities representing real-world situations, using pictures, models, manipulatives (such as algebra tiles), or other strategies. 2. Simplifies algebraic expressions with one variable.	Students will represent and / or solve problems involving equations and / or inequalities. MC, GR	• Items should contain no more than two variables and no more than two operations. • Items should include only linear equations or inequalities.
MA.E.1.3.1: The student collects, organizes, and displays data in a variety of forms, including tables, line graphs, charts, bar graphs, to determine how different ways of presenting data can lead to different interpretations.	1. Generates and collects data for analysis. 2. Interprets and analyzes data presented in a variety of forms, including box-and-whisker graphs and scatter plots. 3. Constructs, interprets, and explains displays of data, such as tables and graphs (circle graphs, single- and multiple-bar graphs, and single and multiple-line graphs) and explains how different displays of data lead to different interpretations.	Students will read and interpret data displayed in a variety of forms and determine appropriate titles, scales, labels, keys, and intervals. MC, GR	• Items may include pictographs, stem-and-leaf plots, box-and-whisker plots, scatter plots, data tables, circle graphs, single- and multiple-bar graphs, single- and multiple-line graphs, and Venn diagrams. • No more than twelve pieces or pairs of data are to be displayed.

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MA.E.1.3.2: The student understands and applies the concepts of range and central tendency (mean, median, and mode).	1. Finds the range, mean, median, and mode of data from a table, chart, or graph. 2. Draws conclusions from an analysis of range and central tendency of a set of real-world data.	Students will apply the concepts of range, mean, median, and/or mode to solve a problem. MC, GR	• Items will assess finding the range, mean, median, or mode of a set of data presented in a chart, list, table, graph, or plot. • No more than ten pieces of data should be used for calculations of the mean. • Calculations of the mean should involve only whole number data. • No more than three categories of information should be used in data sets.
MA.E.1.3.3: The student analyzes real-world data by applying appropriate formulas for measures of central tendency and organizing data in a quality display, using appropriate technology, including calculators and computers.	1. Applies and analyzes appropriate measures of central tendency (mode, mean, median, range) for a set of data. 2. Uses technology, such as graphing calculators and computer spreadsheets, to analyze data and create graphs.		
MA.E.2.3.1: The student compares experimental results with mathematical expectations of probabilities.	1. Obtains experimental results using manipulatives. 2. Explains observed difference between mathematical and experimental results. 3. Calculates simple mathematical probabilities for independent and dependent events.	Students will identify possible outcomes and/or compare results of experiments (empirical data) with the expected results (theoretical probabilities) of experiments. MC	• Items may include probabilities for independent and dependent events. • Mathematical expectations of probabilities will be assessed using simple empirical data or theoretical probabilities.
MA.E.2.3.2: The student determines odds for and odds against a given situation.	1. Computes the mathematical odds for and against a specified outcome in given real world experiments.	Students will determine the odds for or odds against a specified outcome or the probability of a simple event occurring. MC	• Items developed for this benchmark should assess simple events.

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MA.E.3.3.1: The student formulates hypotheses, designs experiments, collects and interprets data, and evaluates hypotheses by making inferences and drawing conclusions based on statistics (range, mean, median, and mode) and tables, graphs, and charts.	1. Formulates a hypothesis and designs an experiment. 2. Performs the experiment and collects, organizes, and displays the data. 3. Evaluates the hypothesis by making inferences and drawing conclusions based on statistical results.	Students will formulate and evaluate hypotheses, use statistical results, and/or identify common uses or misuses of statistical information. MC	Common misuses of probability and statistics should be limited to: • inadequate or non-representative sample size • incomplete or incorrect graphs • over-generalized results • use of raw data, percents, or statistics (range, median, mean, mode) to misrepresent the data collected • misinterpretation of the likelihood and significance of the results
MA.E.3.3.2: The student identifies the common uses and misuses of probability or statistical analysis in the everyday world.	1. Knows appropriate uses of statistics and probability in real-world situations. 2. Knows when statistics and probability are used in misleading ways.		