

**EXPLORE
MATHEMATICS
TEST**

Table 4: The College Readiness Standards

The Standards describe what students who score in the specified score ranges are *likely* to know and to be able to do. The ideas for progress help teachers identify ways of enhancing students' learning based on the scores students receive. The score range at the Benchmark level of achievement is highlighted.

		<i>Basic Operations & Applications</i>	<i>Probability, Statistics, & Data Analysis</i>	<i>Numbers: Concepts & Properties</i>
1–12	Standards	<ul style="list-style-type: none"> Students who score in the 1–12 range are most likely beginning to develop the knowledge and skills assessed in the other score ranges. 		
	ideas for progress	<ul style="list-style-type: none"> practice and apply estimation and computation using whole numbers and decimals choose the appropriate method of computation to solve multistep problems (e.g., calculator, mental, or pencil and paper) practice selecting appropriate units of measure (e.g., inches or feet, hours or minutes, centimeters or meters) and converting between units model and connect physical, verbal, and symbolic representations of money 	<ul style="list-style-type: none"> interpret data from a variety of displays and use it in computation (e.g., mean, median, mode, range) organize, display, and analyze data in a variety of ways 	
13–15	Standards	<ul style="list-style-type: none"> Perform one-operation computation with whole numbers and decimals Solve problems in one or two steps using whole numbers Perform common conversions (e.g., inches to feet or hours to minutes) 	<ul style="list-style-type: none"> Calculate the average of a list of positive whole numbers Perform a single computation using information from a table or chart 	<ul style="list-style-type: none"> Recognize equivalent fractions and fractions in lowest terms
	ideas for progress	<ul style="list-style-type: none"> investigate and build understanding of the concept of percentage as a comparison of a part to a whole use multiple operations to solve multistep arithmetic problems 	<ul style="list-style-type: none"> solve real-world problems that involve measures of central tendency (e.g., mean, median, mode) interpret data from a variety of displays (e.g., box-and-whisker plot) and use it along with additional information to solve real-world problems conduct simple probability experiments and represent results using different formats 	<ul style="list-style-type: none"> recognize and apply place value, rounding, and elementary number theory concepts

<i>Expressions, Equations, & Inequalities</i>	<i>Graphical Representations</i>	<i>Properties of Plane Figures</i>	<i>Measurement</i>
<ul style="list-style-type: none"> ■ model a variety of problem situations with expressions and/or equations ■ use the inverse relationships for the basic operations of addition and subtraction to determine unknown quantities 	<ul style="list-style-type: none"> ■ locate and describe points in terms of their position on the number line 		<ul style="list-style-type: none"> ■ identify line segments in geometric figures and estimate or calculate their measure
<ul style="list-style-type: none"> ■ Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$) ■ Solve equations in the form $x + a = b$, where a and b are whole numbers or decimals 	<ul style="list-style-type: none"> ■ Identify the location of a point with a positive coordinate on the number line 		<ul style="list-style-type: none"> ■ Estimate or calculate the length of a line segment based on other lengths given on a geometric figure
<ul style="list-style-type: none"> ■ use mathematical symbols and variables to express a relationship between quantities (e.g., the number of 59¢ candy bars that you can buy for \$5 must satisfy $59n \leq 500$) ■ evaluate algebraic expressions and solve simple equations using integers 	<ul style="list-style-type: none"> ■ locate and describe objects in terms of their position on the number line and on a grid 	<ul style="list-style-type: none"> ■ describe, compare, and contrast plane and solid figures using their attributes 	<ul style="list-style-type: none"> ■ distinguish between area and perimeter, and find the area or perimeter when all relevant dimensions are given

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		<i>Basic Operations & Applications</i>	<i>Probability, Statistics, & Data Analysis</i>	<i>Numbers: Concepts & Properties</i>
16–19	Standards	<ul style="list-style-type: none"> ■ Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent ■ Solve some routine two-step arithmetic problems 	<ul style="list-style-type: none"> ■ Calculate the average of a list of numbers ■ Calculate the average, given the number of data values and the sum of the data values ■ Read tables and graphs ■ Perform computations on data from tables and graphs ■ Use the relationship between the probability of an event and the probability of its complement 	<ul style="list-style-type: none"> ■ Recognize one-digit factors of a number ■ Identify a digit's place value
	ideas for progress	<ul style="list-style-type: none"> ■ solve routine arithmetic problems that involve rates, proportions, and percents ■ model and solve problems that contain verbal and symbolic representations of money ■ do multistep computations with rational numbers 	<ul style="list-style-type: none"> ■ interpret data and use appropriate measures of central tendency to find unknown values ■ find the probability of a simple event in a variety of settings ■ gather, organize, display, and analyze data in a variety of ways to use in problem solving ■ conduct simple probability experiments, use a variety of counting techniques (e.g., Venn diagrams, Fundamental Counting Principle, organized lists), and represent results from data using different formats 	<ul style="list-style-type: none"> ■ apply elementary number concepts, including identifying patterns pictorially and numerically (e.g., triangular numbers, arithmetic and geometric sequences), ordering numbers, and factoring ■ recognize, identify, and apply field axioms (e.g., commutative)
20–23	Standards	<ul style="list-style-type: none"> ■ Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average 	<ul style="list-style-type: none"> ■ Calculate the missing data value, given the average and all data values but one ■ Translate from one representation of data to another (e.g., a bar graph to a circle graph) ■ Determine the probability of a simple event 	<ul style="list-style-type: none"> ■ Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor
	ideas for progress	<ul style="list-style-type: none"> ■ apply and use number properties to model and solve problems that involve reasoning with proportions ■ select and use appropriate units when solving problems that involve one or more units of measure 	<ul style="list-style-type: none"> ■ construct and analyze Venn diagrams to help determine simple probabilities 	<ul style="list-style-type: none"> ■ use the inverse relationships for the four basic operations, exponentiation, and root extractions to determine unknown quantities

<i>Expressions, Equations, & Inequalities</i>	<i>Graphical Representations</i>	<i>Properties of Plane Figures</i>	<i>Measurement</i>
<ul style="list-style-type: none"> ■ Substitute whole numbers for unknown quantities to evaluate expressions ■ Solve one-step equations having integer or decimal answers ■ Combine like terms (e.g., $2x + 5x$) 	<ul style="list-style-type: none"> ■ Locate points on the number line and in the first quadrant 	<ul style="list-style-type: none"> ■ Exhibit some knowledge of the angles associated with parallel lines 	<ul style="list-style-type: none"> ■ Compute the perimeter of polygons when all side lengths are given ■ Compute the area of rectangles when whole number dimensions are given
<ul style="list-style-type: none"> ■ create expressions that model mathematical situations using combinations of symbols and numbers ■ evaluate algebraic expressions and solve multistep first-degree equations 	<ul style="list-style-type: none"> ■ sketch and identify line segments, midpoints, intersections, and vertical and horizontal lines 	<ul style="list-style-type: none"> ■ describe angles and triangles using mathematical terminology and apply their properties 	<ul style="list-style-type: none"> ■ find area and perimeter of a variety of polygons by substituting given values into standard geometric formulas
<ul style="list-style-type: none"> ■ Evaluate algebraic expressions by substituting integers for unknown quantities ■ Add and subtract simple algebraic expressions ■ Solve routine first-degree equations ■ Perform straightforward word-to-symbol translations 	<ul style="list-style-type: none"> ■ Locate points in the coordinate plane 	<ul style="list-style-type: none"> ■ Find the measure of an angle using properties of parallel lines ■ Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°) 	<ul style="list-style-type: none"> ■ Compute the area and perimeter of triangles and rectangles in simple problems ■ Use geometric formulas when all necessary information is given
<ul style="list-style-type: none"> ■ identify, interpret, and generate symbolic representations that model the context of a problem ■ factor and perform the basic operations on polynomials ■ create and solve linear equations and inequalities that model real-world situations ■ solve literal equations for any variable 	<ul style="list-style-type: none"> ■ represent and interpret relationships defined by equations and formulas; translate between representations as ordered pairs, graphs, and equations; and investigate symmetry and transformations (e.g., reflections, translations, rotations) 	<ul style="list-style-type: none"> ■ recognize what geometric properties and relationships for parallel lines to apply to find unknown angle measures ■ recognize when to apply geometric properties and relationships of triangles to find unknown angle measures 	<ul style="list-style-type: none"> ■ apply a variety of strategies to determine the circumference or perimeter and the area for circles, triangles, rectangles, and composite geometric figures

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		<i>Basic Operations & Applications</i>	<i>Probability, Statistics, & Data Analysis</i>	<i>Numbers: Concepts & Properties</i>
24–25	Standards	<ul style="list-style-type: none"> ■ Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour) 	<ul style="list-style-type: none"> ■ Calculate the average, given the frequency counts of all the data values ■ Manipulate data from tables and graphs ■ Compute straightforward probabilities for common situations 	<ul style="list-style-type: none"> ■ Find and use the least common multiple ■ Order fractions ■ Work with numerical factors ■ Work with scientific notation ■ Work with squares and square roots of numbers
	ideas for progress	<ul style="list-style-type: none"> ■ model and solve real-world problems that involve a combination of rates, proportions, and/or percents 	<ul style="list-style-type: none"> ■ find the probability of simple events, disjoint events, compound events, and independent events in a variety of settings using a variety of counting techniques 	<ul style="list-style-type: none"> ■ apply and use elementary number concepts and number properties to model and solve nonroutine problems that involve new ideas

<i>Expressions, Equations, & Inequalities</i>	<i>Graphical Representations</i>	<i>Properties of Plane Figures</i>	<i>Measurement</i>
<ul style="list-style-type: none"> ■ Solve real-world problems using first-degree equations ■ Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions) ■ Identify solutions to simple quadratic equations 		<ul style="list-style-type: none"> ■ Use several angle properties to find an unknown angle measure 	<ul style="list-style-type: none"> ■ Compute the area of triangles and rectangles when one or more additional simple steps are required ■ Compute the area and circumference of circles after identifying necessary information
<ul style="list-style-type: none"> ■ create and use basic families of functions (which include linear, absolute value, and quadratic) to model and solve problems in common settings ■ explore and use different methods to solve systems of equations ■ manipulate radical expressions (e.g., rationalize denominators) 	<ul style="list-style-type: none"> ■ graph linear equations and inequalities, determine slopes of lines, identify parallel and perpendicular lines, and find distances ■ identify characteristics of figures from a general equation 	<ul style="list-style-type: none"> ■ apply special right-triangle properties and the Pythagorean theorem to solve congruent and similar shape problems 	<ul style="list-style-type: none"> ■ apply a variety of strategies using relationships between perimeter, area, and volume to calculate desired measures