## College Readiness Standards — Mathematics

| | Basic Operations & Applications | Probability, Statistics, & Data Analysis | Numbers: Concepts & Properties | Expressions, Equations, & Inequalities |
|---|---|---|---|---|
| **13–15** | Perform one-operation computation with whole numbers and decimals<br>Solve problems in one or two steps using whole numbers<br>Perform common conversions (e.g., inches to feet or hours to minutes) | Calculate the average of a list of positive whole numbers<br>Perform a single computation using information from a table or chart | Recognize equivalent fractions and fractions in lowest terms | Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)<br>Solve equations in the form $x + a = b$, where $a$ and $b$ are whole numbers or decimals |
| **16–19** | Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent<br>Solve some routine two-step arithmetic problems | Calculate the average of a list of numbers<br>Calculate the average, given the number of data values and the sum of the data values<br>Read tables and graphs<br>Perform computations on data from tables and graphs<br>Use the relationship between the probability of an event and the probability of its complement | Recognize one-digit factors of a number<br>Identify a digit's place value | Substitute whole numbers for unknown quantities to evaluate expressions<br>Solve one-step equations having integer or decimal answers<br>Combine like terms (e.g., $2x + 5x$) |
| **20–23** | 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 | Calculate the missing data value, given the average and all data values but one<br>Translate from one representation of data to another (e.g., a bar graph to a circle graph)<br>Determine the probability of a simple event<br>Exhibit knowledge of simple counting techniques* | Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor | Evaluate algebraic expressions by substituting integers for unknown quantities<br>Add and subtract simple algebraic expressions<br>Solve routine first-degree equations<br>Perform straightforward word-to-symbol translations<br>Multiply two binomials* |
| **24–27** | Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour) | Calculate the average, given the frequency counts of all the data values<br>Manipulate data from tables and graphs<br>Compute straightforward probabilities for common situations<br>Use Venn diagrams in counting* | Find and use the least common multiple<br>Order fractions<br>Work with numerical factors<br>Work with scientific notation<br>Work with squares and square roots of numbers<br>Work problems involving positive integer exponents*<br>Work with cubes and cube roots of numbers*<br>Determine when an expression is undefined*<br>Exhibit some knowledge of the complex numbers† | Solve real-world problems using first-degree equations<br>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)<br>Identify solutions to simple quadratic equations<br>Add, subtract, and multiply polynomials*<br>Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)*<br>Solve first-degree inequalities that do not require reversing the inequality sign* |
| **28–32*** | Solve word problems containing several rates, proportions, or percentages | Calculate or use a weighted average<br>Interpret and use information from figures, tables, and graphs<br>Apply counting techniques<br>Compute a probability when the event and/or sample space are not given or obvious | Apply number properties involving prime factorization<br>Apply number properties involving even/odd numbers and factors/multiples<br>Apply number properties involving positive/negative numbers<br>Apply rules of exponents<br>Multiply two complex numbers† | Manipulate expressions and equations<br>Write expressions, equations, and inequalities for common algebra settings<br>Solve linear inequalities that require reversing the inequality sign<br>Solve absolute value equations<br>Solve quadratic equations<br>Find solutions to systems of linear equations |
| **33–36†** | Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings) | Distinguish between mean, median, and mode for a list of numbers<br>Analyze and draw conclusions based on information from figures, tables, and graphs<br>Exhibit knowledge of conditional and joint probability | Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers<br>Exhibit knowledge of logarithms and geometric sequences<br>Apply properties of complex numbers | Write expressions that require planning and/or manipulating to accurately model a situation<br>Write equations and inequalities that require planning, manipulating, and/or solving<br>Solve simple absolute value inequalities |

* Statements apply to PLAN & ACT only

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## College Readiness Standards — Mathematics (continued)

| | Graphical Representations | Properties of Plane Figures | Measurement | Functions† |
|---|---|---|---|---|
| **13–15** | Identify the location of a point with a positive coordinate on the number line | | Estimate or calculate the length of a line segment based on other lengths given on a geometric figure | |
| **16–19** | Locate points on the number line and in the first quadrant | Exhibit some knowledge of the angles associated with parallel lines | Compute the perimeter of polygons when all side lengths are given<br>Compute the area of rectangles when whole number dimensions are given | |
| **20–23** | Locate points in the coordinate plane<br>Comprehend the concept of length on the number line*<br>Exhibit knowledge of slope* | Find the measure of an angle using properties of parallel lines<br>Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°) | Compute the area and perimeter of triangles and rectangles in simple problems<br>Use geometric formulas when all necessary information is given | Evaluate quadratic functions, expressed in function notation, at integer values |
| **24–27** | Identify the graph of a linear inequality on the number line*<br>Determine the slope of a line from points or equations*<br>Match linear graphs with their equations*<br>Find the midpoint of a line segment* | Use several angle properties to find an unknown angle measure<br>Recognize Pythagorean triples*<br>Use properties of isosceles triangles* | Compute the area of triangles and rectangles when one or more additional simple steps are required<br>Compute the area and circumference of circles after identifying necessary information<br>Compute the perimeter of simple composite geometric figures with unknown side lengths* | Evaluate polynomial functions, expressed in function notation, at integer values<br>Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths |
| **28–32*** | Interpret and use information from graphs in the coordinate plane<br>Match number line graphs with solution sets of linear inequalities<br>Use the distance formula<br>Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point<br>Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)† | Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles<br>Use the Pythagorean theorem | Use relationships involving area, perimeter, and volume of geometric figures to compute another measure | Evaluate composite functions at integer values<br>Apply basic trigonometric ratios to solve right-triangle problems |
| **33–36†** | Match number line graphs with solution sets of simple quadratic inequalities<br>Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$<br>Solve problems integrating multiple algebraic and/or geometric concepts<br>Analyze and draw conclusions based on information from graphs in the coordinate plane | Draw conclusions based on a set of conditions<br>Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas<br>Use relationships among angles, arcs, and distances in a circle | Use scale factors to determine the magnitude of a size change<br>Compute the area of composite geometric figures when planning or visualization is required | Write an expression for the composite of two simple functions<br>Use trigonometric concepts and basic identities to solve problems<br>Exhibit knowledge of unit circle trigonometry<br>Match graphs of basic trigonometric functions with their equations |

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