Mathematics Curriculum Review Worksheets

Table 1. ACT Mathematics College and Career Readiness Standards for Score Range 13-15

		Mathematics College and Career Readiness Standards	For each skill, knowledge, or process:		
			Is it **included** in your Mathematics curriculum?	At what grade level (or in which course) are students **first introduced** to it?	At what grade level (or in which course) are students **expected to demonstrate proficiency**?
N	201	Perform one-operation computation with whole numbers and decimals			
N	202	Recognize equivalent fractions and fractions in lowest terms			
N	203	Locate positive rational numbers (expressed as whole numbers, fractions, decimals, and mixed numbers) on the number line			
AF	201	Solve problems in one or two steps using whole numbers and using decimals in the context of money			
A	201	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)			
A	202	Solve equations in the form $x + a = b$, where a and b are whole numbers or decimals			
F	201	Extend a given pattern by a few terms for patterns that have a constant increase or decrease between terms			
G	201	Estimate the length of a line segment based on other lengths in a geometric figure			
G	202	Calculate the length of a line segment based on the lengths of other line segments that go in the same direction (e.g., overlapping line segments and parallel sides of polygons with only right angles)			
G	203	Perform common conversions of money and of length, weight, mass, and time within a measurement system (e.g., dollars to dimes, inches to feet, and hours to minutes)			
S	201	Calculate the average of a list of positive whole numbers			
S	202	Extract one relevant number from a basic table or chart, and use it in a single computation			

Table 2. ACT Mathematics College and Career Readiness Standards for Score Range 16-19

		Mathematics College and Career Readiness Standards	For each skill, knowledge, or process:		
			Is it **included** in your Mathematics curriculum?	At what grade level (or in which course) are students **first introduced** to it?	At what grade level (or in which course) are students **expected to demonstrate proficiency**?
N	301	Recognize one-digit factors of a number			
N	302	Identify a digit's place value			
N	303	Locate rational numbers on the number line			
AF	301	Solve routine one-step arithmetic problems using positive rational numbers, such as single-step percent			
AF	302	Solve some routine two-step arithmetic problems			
AF	303	Relate a graph to a situation described qualitatively in terms of familiar properties such as before and after, increasing and decreasing, higher and lower			
AF	304	Apply a definition of an operation for whole numbers (e.g., $a \bullet b = 3a - b$)			
A	301	Substitute whole numbers for unknown quantities to evaluate expressions			
A	302	Solve one-step equations to get integer or decimal answers			
A	303	Combine like terms (e.g., $2x + 5x$)			
F	301	Extend a given pattern by a few terms for patterns that have a constant factor between terms			
G	301	Exhibit some knowledge of the angles associated with parallel lines			
G	302	Compute the perimeter of polygons when all side lengths are given			
G	303	Compute the area of rectangles when whole number dimensions are given			
G	304	Locate points in the first quadrant			
S	301	Calculate the average of a list of numbers			
S	302	Calculate the average given the number of data values and the sum of the data values			
S	303	Read basic tables and charts			
S	304	Extract relevant data from a basic table or chart and use the data in a computation			
S	305	Use the relationship between the probability of an event and the probability of its complement			

Table 3. ACT Mathematics College and Career Readiness Standards for Score Range 20-23

		Mathematics College and Career Readiness Standards	For each skill, knowledge, or process:		
			Is it **included** in your Mathematics curriculum?	At what grade level (or in which course) are students **first introduced** to it?	At what grade level (or in which course) are students **expected to demonstrate proficiency**?
N	401	Exhibit knowledge of elementary number concepts such as rounding, the ordering of decimals, pattern identification, primes, and greatest common factor			
N	402	Write positive powers of 10 by using exponents			
N	403	Comprehend the concept of length on the number line, and find the distance between two points			
N	404	Understand absolute value in terms of distance			
N	405	Find the distance in the coordinate plane between two points with the same x-coordinate or y-coordinate			
N	406	Add two matrices that have whole number entries			
AF	401	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and estimating by using a given average value in place of actual values			
AF	402	Perform straightforward word-to-symbol translations			
AF	403	Relate a graph to a situation described in terms of a starting value and an additional amount per unit (e.g., unit cost, weekly growth)			
A	401	Evaluate algebraic expressions by substituting integers for unknown quantities			
A	402	Add and subtract simple algebraic expressions			
A	403	Solve routine first-degree equations			
A	404	Multiply two binomials			
A	405	Match simple inequalities with their graphs on the number line $\left(\text{e.g., } x \geq -\frac{3}{5}\right)$			
A	406	Exhibit knowledge of slope			
F	401	Evaluate linear and quadratic functions, expressed in function notation, at integer values			
G	401	Use properties of parallel lines to find the measure of an angle			

		Mathematics College and Career Readiness Standards	Is it **included** in your Mathematics curriculum?	At what grade level (or in which course) are students **first introduced** to it?	At what grade level (or in which course) are students **expected to demonstrate proficiency**?
			For each skill, knowledge, or process:		
G	402	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)			
G	403	Compute the area and perimeter of triangles and rectangles in simple problems			
G	404	Find the length of the hypotenuse of a right triangle when only very simple computation is involved (e.g., 3-4-5 and 6-8-10 triangles)			
G	405	Use geometric formulas when all necessary information is given			
G	406	Locate points in the coordinate plane			
G	407	Translate points up, down, left, and right in the coordinate plane			
S	401	Calculate the missing data value given the average and all data values but one			
S	402	Translate from one representation of data to another (e.g., a bar graph to a circle graph)			
S	403	Determine the probability of a simple event			
S	404	Describe events as combinations of other events (e.g., using *and*, *or*, and *not*)			
S	405	Exhibit knowledge of simple counting techniques			

Table 4. ACT Mathematics College and Career Readiness Standards for Score Range 24-27

		Mathematics College and Career Readiness Standards	**For each skill, knowledge, or process:**		
			Is it **included** in your Mathematics curriculum?	At what grade level (or in which course) are students **first introduced** to it?	At what grade level (or in which course) are students **expected to demonstrate proficiency**?
N	501	Order fractions			
N	502	Find and use the least common multiple			
N	503	Work with numerical factors			
N	504	Exhibit some knowledge of the complex numbers			
N	505	Add and subtract matrices that have integer entries			
AF	501	Solve multistep arithmetic problems that involve planning or converting common derived units of measure (e.g., feet per second to miles per hour)			
AF	502	Build functions and 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)			
AF	503	Match linear equations with their graphs in the coordinate plane			
A	501	Recognize that when numerical quantities are reported in real-world contexts, the numbers are often rounded			
A	502	Solve real-world problems by using first-degree equations			
A	503	Solve first-degree inequalities when the method does not involve reversing the inequality sign			
A	504	Match compound inequalities with their graphs on the number line (e.g., $-10.5 < x \le 20.3$)			
A	505	Add, subtract, and multiply polynomials			
A	506	Identify solutions to simple quadratic equations			
A	507	Solve quadratic equations in the form $(x + a)(x + b) = 0$, where a and b are numbers or variables			
A	508	Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)			
A	509	Work with squares and square roots of numbers			
A	510	Work with cubes and cube roots of numbers			
A	511	Work with scientific notation			

		Mathematics College and Career Readiness Standards	For each skill, knowledge, or process:		
			Is it **included** in your Mathematics curriculum?	At what grade level (or in which course) are students **first introduced** to it?	At what grade level (or in which course) are students **expected to demonstrate proficiency**?
A	512	Work problems involving positive integer exponents			
A	513	Determine when an expression is undefined			
A	514	Determine the slope of a line from an equation			
F	501	Evaluate polynomial functions, expressed in function notation, at integer values			
F	502	Find the next term in a sequence described recursively			
F	503	Build functions and use quantitative information to identify graphs for relations that are proportional or linear			
F	504	Attend to the difference between a function modeling a situation and the reality of the situation			
F	505	Understand the concept of a function as having a well-defined output value at each valid input value			
F	506	Understand the concept of domain and range in terms of valid input and output, and in terms of function graphs			
F	507	Interpret statements that use function notation in terms of their context			
F	508	Find the domain of polynomial functions and rational functions			
F	509	Find the range of polynomial functions			
F	510	Find where a rational function's graph has a vertical asymptote			
F	511	Use function notation for simple functions of two variables			
G	501	Use several angle properties to find an unknown angle measure			
G	502	Count the number of lines of symmetry of a geometric figure			
G	503	Use symmetry of isosceles triangles to find unknown side lengths or angle measures			
G	504	Recognize that real-world measurements are typically imprecise and that an appropriate level of precision is related to the measuring device and procedure			
G	505	Compute the perimeter of simple composite geometric figures with unknown side lengths			
G	506	Compute the area of triangles and rectangles when one or more additional simple steps are required			
G	507	Compute the area and circumference of circles after identifying necessary information			

		Mathematics College and Career Readiness Standards	For each skill, knowledge, or process:		
			Is it **included** in your Mathematics curriculum?	At what grade level (or in which course) are students **first introduced** to it?	At what grade level (or in which course) are students **expected to demonstrate proficiency**?
G	508	Given the length of two sides of a right triangle, find the third when the lengths are Pythagorean triples			
G	509	Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths			
G	510	Determine the slope of a line from points or a graph			
G	511	Find the midpoint of a line segment			
G	512	Find the coordinates of a point rotated 180° around a given center point			
S	501	Calculate the average given the frequency counts of all the data values			
S	502	Manipulate data from tables and charts			
S	503	Compute straightforward probabilities for common situations			
S	504	Use Venn diagrams in counting			
S	505	Recognize that when data summaries are reported in the real world, results are often rounded and must be interpreted as having appropriate precision			
S	506	Recognize that when a statistical model is used, model values typically differ from actual values			

Table 5. ACT Mathematics College and Career Readiness Standards for Score Range 28-32

		Mathematics College and Career Readiness Standards	For each skill, knowledge, or process:		
			Is it **included** in your Mathematics curriculum?	At what grade level (or in which course) are students **first introduced** to it?	At what grade level (or in which course) are students **expected to demonstrate proficiency**?
N	601	Apply number properties involving prime factorization			
N	602	Apply number properties involving even/odd numbers and factors/multiples			
N	603	Apply number properties involving positive/negative numbers			
N	604	Apply the facts that p is irrational and that the square root of an integer is rational only if that integer is a perfect square			
N	605	Apply properties of rational exponents			
N	606	Multiply two complex numbers			
N	607	Use relations involving addition, subtraction, and scalar multiplication of vectors and of matrices			
AF	601	Solve word problems containing several rates, proportions, or percentages			
AF	602	Build functions and write expressions, equations, and inequalities for common algebra settings (e.g., distance to a point on a curve and profit for variable cost and demand)			
AF	603	Interpret and use information from graphs in the coordinate plane			
AF	604	Given an equation or function, find an equation or function whose graph is a translation by a specified amount up or down			
A	601	Manipulate expressions and equations			
A	602	Solve linear inequalities when the method involves reversing the inequality sign			
A	603	Match linear inequalities with their graphs on the number line			
A	604	Solve systems of two linear equations			
A	605	Solve quadratic equations			
A	606	Solve absolute value equations			
F	601	Relate a graph to a situation described qualitatively in terms of faster change or slower change			
F	602	Build functions for relations that are inversely proportional			
F	603	Find a recursive expression for the general term in a sequence described recursively			
F	604	Evaluate composite functions at integer values			

		Mathematics College and Career Readiness Standards	For each skill, knowledge, or process:		
			Is it **included** in your Mathematics curriculum?	At what grade level (or in which course) are students **first introduced** to it?	At what grade level (or in which course) are students **expected to demonstrate proficiency**?
G	601	Use relationships involving area, perimeter, and volume of geometric figures to compute another measure (e.g., surface area for a cube of a given volume and simple geometric probability)			
G	602	Use the Pythagorean theorem			
G	603	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles			
G	604	Apply basic trigonometric ratios to solve right-triangle problems			
G	605	Use the distance formula			
G	606	Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point			
G	607	Find the coordinates of a point reflected across a vertical or horizontal line or across $y = x$			
G	608	Find the coordinates of a point rotated 90° about the origin			
G	609	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)			
S	601	Calculate or use a weighted average			
S	602	Interpret and use information from tables and charts, including two-way frequency tables			
S	603	Apply counting techniques			
S	604	Compute a probability when the event and/or sample space are not given or obvious			
S	605	Recognize the concepts of conditional and joint probability expressed in real-world contexts			
S	606	Recognize the concept of independence expressed in real-world contexts			

Table 6. ACT Mathematics College and Career Readiness Standards for Score Range 33-36

		Mathematics College and Career Readiness Standards	For each skill, knowledge, or process:		
			Is it **included** in your Mathematics curriculum?	At what grade level (or in which course) are students **first introduced** to it?	At what grade level (or in which course) are students **expected to demonstrate proficiency**?
N	701	Analyze and draw conclusions based on number concepts			
N	702	Apply properties of rational numbers and the rational number system			
N	703	Apply properties of real numbers and the real number system, including properties of irrational numbers			
N	704	Apply properties of complex numbers and the complex number system			
N	705	Multiply matrices			
N	706	Apply properties of matrices and properties of matrices as a number system			
AF	701	Solve complex arithmetic problems involving percent of increase or decrease or requiring integration of several concepts (e.g., using several ratios, comparing percentages, or comparing averages)			
AF	702	Build functions and write expressions, equations, and inequalities when the process requires planning and/or strategic manipulation			
AF	703	Analyze and draw conclusions based on properties of algebra and/or functions			
AF	704	Analyze and draw conclusions based on information from graphs in the coordinate plane			
AF	705	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$			
AF	706	Given an equation or function, find an equation or function whose graph is a translation by specified amounts in the horizontal and vertical directions			
A	701	Solve simple absolute value inequalities			
A	702	Match simple quadratic inequalities with their graphs on the number line			
A	703	Apply the remainder theorem for polynomials, that $P(a)$ is the remainder when $P(x)$ is divided by $(x - a)$			
F	701	Compare actual values and the values of a modeling function to judge model fit and compare models			
F	702	Build functions for relations that are exponential			

		Mathematics College and Career Readiness Standards	**For each skill, knowledge, or process:**		
			Is it **included** in your Mathematics curriculum?	At what grade level (or in which course) are students **first introduced** to it?	At what grade level (or in which course) are students **expected to demonstrate proficiency**?
F	703	Exhibit knowledge of geometric sequences			
F	704	Exhibit knowledge of unit circle trigonometry			
F	705	Match graphs of basic trigonometric functions with their equations			
F	706	Use trigonometric concepts and basic identities to solve problems			
F	707	Exhibit knowledge of logarithms			
F	708	Write an expression for the composite of two simple functions			
G	701	Use relationships among angles, arcs, and distances in a circle			
G	702	Compute the area of composite geometric figures when planning and/or visualization is required			
G	703	Use scale factors to determine the magnitude of a size change			
G	704	Analyze and draw conclusions based on a set of conditions			
G	705	Solve multistep geometry problems that involve integrating concepts, planning, and/or visualization			
S	701	Distinguish between mean, median, and mode for a list of numbers			
S	702	Analyze and draw conclusions based on information from tables and charts, including two-way frequency tables			
S	703	Understand the role of randomization in surveys, experiments, and observational studies			
S	704	Exhibit knowledge of conditional and joint probability			
S	705	Recognize that part of the power of statistical modeling comes from looking at regularity in the differences between actual values and model values			