Test Design Blueprint **Date_____**

Mathematics for College Readiness	1200700	11th & 12th
Course Title	Course Number	Grade(s)

Main Idea *(Big Idea/Domain/Strand/Standard)*	**Standard Code**	**Percent of Test Based on Time Devoted to Standard**	**Number of Test Questions** *(60 total)*
Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. *For example, we define* $5^{1/3}$ *to be the cube root of 5 because we want* $(5^{1/3})^3$ $= 5^{(1/3)3}$ *to hold, so* $(5^{1/3})^3$ *must equal 5.*	MAFS.912.N-RN.1.1		1
Rewrite expressions involving radicals and rational exponents using the properties of exponents.	MAFS.912.N-RN.1.2		1
Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	MAFS.912.N-RN.2.3		1
Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	MAFS.912.N-Q.1.1		1
Define appropriate quantities for the purpose of descriptive modeling. **Remarks/Examples:** **Algebra 1 Content Notes:** Working with quantities and the relationships between them provides grounding for work with expressions, equations, and functions.	MAFS.912.N-Q.1.2		1
Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	MAFS.912.N-Q.1.3		1
Interpret expressions that represent a quantity in terms of its context.	MAFS.912.A-SSE.1.1		1

a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret* $\square$ *as the product of P and a factor not depending on P.*			
Use the structure of an expression to identify ways to rewrite it. *For example, see* $x^4 - y^4$ *as* $(x^2)^2 - (y^2)^2$*, thus recognizing it as a difference of squares that can be factored as* $(x^2 - y^2)(x^2 + y^2)$.	MAFS.912.A-SSE.1.2		1
Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. c. Use the properties of exponents to transform expressions for exponential functions. *For example the expression* $\square$ *can be rewritten as* $\square \approx 1.012^{12t}$ *to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.*	MAFS.912.A-SSE.2.3		2
Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. **Remarks/Examples:** **Algebra 1 - Fluency Recommendations** Fluency in adding, subtracting, and multiplying polynomials supports students throughout their work in algebra, as well as in their symbolic work with functions. Manipulation can be more mindful when it is fluent.	MAFS.912.A-APR.1.1		2

Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by 1the polynomial.	MAFS.912.A-APR.2.3		2
P1rove polynomial identities and use them to de2scribe numerical relationships. For example, the 2polynomial identity $(x^2 + y^2)^2 = (x^2 – y^2)^2 + (2xy)1^2$ can be used to generate Pythagorean triples1.	MAFS.912.A-APR.3.4		1
Rewrite1 simple rational expressions in different forms; w2rite a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x2), b(x), q(x), and r(x) are polynomials with the de2gree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.	MAFS.912.A-APR.4.6		1
Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.	MAFS.912.A-APR.4.7		2
Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational, absolute, and exponential functions.	MAFS.912.A-CED.1.1		2
Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	MAFS.912.A-CED.1.2		1
Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*	MAFS.912.A-CED.1.3		1
Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*	MAFS.912.A-CED.1.4		1
Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	MAFS.912.A-REI.1.1		2

Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	MAFS.912.A-REI.1.2		2
Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	MAFS.912.A-REI.2.3		2
Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x – p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.	MAFS.912.A-REI.2.4		2
Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	MAFS.912.A-REI.3.5		1
Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	MAFS.912.A-REI.3.6		2
Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	MAFS.912.A-REI.4.10		2
Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.	MAFS.912.A-REI.4.11		1
Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly	MAFS.912.F-IF.1.1		2

one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).			
For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*	MAFS.912.F-IF.2.4		2
Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*	MAFS.912.F-IF.2.5		2
Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	MAFS.912.F-IF.2.6		2
Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. d. Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude, and using phase shift.	MAFS.912.F-IF.3.7		2

Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. b. Use the properties of exponents to interpret expressions for exponential functions. *For example, identify percent rate of change in functions such as* $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{t/10}$, *and classify them as representing exponential growth or decay.*	MAFS.912.F-IF.3.8		1
Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.* c. Compose functions. *For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time.*	MAFS.912.F-BF.1.1		2
Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.*	MAFS.912.F-BF.2.3		2
Prove the slope criteria for parallel and perpendicular lines and use them to solve	MAFS.912.G-GPE.2.5		1

geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). **Remarks/Examples:** **Geometry - Fluency Recommendations** Fluency with the use of coordinates to establish geometric results, calculate length and angle, and use geometric representations as a modeling tool are some of the most valuable tools in mathematics and related fields.			
Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	MAFS.912.G-GPE.2.6		1
Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula. **Remarks/Examples:** **Geometry - Fluency Recommendations** Fluency with the use of coordinates to establish geometric results, calculate length and angle, and use geometric representations as a modeling tool are some of the most valuable tools in mathematics and related fields.	MAFS.912.G-GPE.2.7		1
Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.	MAFS.912.S-ID.2.5		2
Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. *Use given functions or choose a function suggested by the*	MAFS.912.S-ID.2.6		1

context. Emphasize linear, and exponential models. b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association. **Remarks/Examples:** Students take a more sophisticated look at using a linear function to model the relationship between two numerical variables. In addition to fitting a line to data, students assess how well the model fits by analyzing residuals.			
Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	MAFS.912.S-ID.3.7		2
TOTALS	100 %		60

List All Common Course Teachers:

_____Jones_____

_____Joyner_____

_____Garcia_____

_____King_____