WGSD Curriculum - Algebra 3
DRAFT

High Priority Standards (CCSS, State, National, TILS, CREDE, etc.)

CCSS.Math.Content.HSF-IF.A.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 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*).

CCSS.Math.Content.HSF-IF.A.1 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

CCSS.Math.Content.HSF-IF.B.4 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.

CCSS.Math.Content.HSF-IF.B.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.

CCSS.Math.Content.HSF-IF.B.5 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

CCSS.Math.Content.HSF-LE.A.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

Learning Goal	**Proficiency Scales**
Students will be able to write and graph equations.	4: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal. 3: The student demonstrates mastery of the learning goal by: ● identifying the domain and range of a function. ● identifying the domain and range of a set of elements. ● graphing a function. ● writing equations of lines. 2: The student demonstrates he/she is nearing proficiency by: ● recognizing or recalling specific vocabulary, such as input, output, domain, range, function, linear, quadratic, exponential, functional notation f(x), slope, rate of change, intercepts, behavior, square roots, cube roots, families of functions, absolute value. ● performing specific processes, such as: ○ creating a table of values. ○ determining the family a function belongs to, namely linear, quadratic, exponential, or absolute value. ○ finding the slope between two points ○ writing equations lines ○ graphing linear equations using a table of values and their intercepts ○ recognizing x- and y-intercepts from a graph. 1: The student demonstrates limited understanding or skill with the learning goal.

Learning Targets

Learning Design

WGSD Curriculum -- Algebra 3
DRAFT

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CCSS.Math.Content.HSF-IF.A.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 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 $y = f(x)$.

CCSS.Math.Content.HSF-IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

Learning Goal	**Proficiency Scales**
Students will be able to use functional notation and perform operations on functions including compositions.	4: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal. 3: The student demonstrates mastery of the learning goal by: ● adding, subtracting, multiplying, and dividing functions and verifying the properties of the outcome with respect to domain and range. ● generating all compositions of functions without error. 2: The student demonstrates he/she is nearing proficiency by: ● recognizing or recalling specific vocabulary, such as sum, product, quotient, difference, substitution, composition, evaluate, domain, range, element, input, output, function, and relation. ● performing specific processes, such as: ○ Adding, subtracting, multiplying, and dividing functions. ○ Evaluating functions using specific input values. ○ Finding compositions with numerical inputs. ○ Finding compositions with no major errors regarding the simpler functions, but some errors or omissions regarding the more complex functions.

	1: The student demonstrates limited understanding or skill with the learning goal.

Learning Targets
Learning Design

WGSD Curriculum -- Algebra 3
DRAFT

High Priority Standards (CCSS, State, National, TILS, CREDE, etc.)

CCSS.Math.Content.HSA-SSE.B.3a Factor a quadratic expression to reveal the zeros of the function it defines.

CCSS.Math.Content.HSA-REI.A.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.

CCSS.Math.Content.HSA-APR.A.1 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.

CCSS.Math.Content.HSA-REI.B.4 Solve quadratic equations in one variable.

CCSS.Math.Content.HSA-REI.B.4b 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.

Learning Goal	**Proficiency Scales**
Students will be able to simplify polynomial expressions, along with solving equations using factoring.	4: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal. 3: The student demonstrates mastery with the learning goal as evidenced by ● multiplying polynomials by polynomials. ● simplifying expressions using multiple rules of exponents. ● factoring complex polynomials. ● developing equivalent forms of an expression to solve by factoring. 2: The student demonstrates he/she is nearing proficiency by: ● Recognizing and recalling specific vocabulary such as: polynomials, monomials, binomials, trinomials, base, exponent, coefficient, constant, greatest common factor,

	terms, like terms, expression, degree of term, degree of polynomial, factor, product, perfect square, perfect cube ● Performing processes such as: o Adding and subtracting polynomials. o Multiplying a polynomial by a monomial. o Writing a polynomial in standard form and determine degree of polynomial. o Simplifying expressions using a single rule of exponents. o Factoring polynomials o Solving polynomials 1: The student demonstrates limited understanding or skill with the learning goal.

Learning Targets
Learning Design

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CCSS.Math.Content.HSA-CED.A.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods*.

CCSS.Math.Content.HSA-REI.C.5 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.

CCSS.Math.Content.HSA-REI.C.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

CCSS.Math.Content.HSA-REI.C.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.

CCSS.Math.Content.HSA-REI.D.10 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).

CCSS.Math.Content.HSA-REI.D.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

Learning Goal	**Proficiency Scales**
Students will be able to solve systems of equations with two or three variables and solve systems of inequalities in two variables.	4: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal. 3: The student demonstrates mastery of the learning goal by: ● modeling real world situations using systems. ● evaluating the most efficient method (elimination, substitution, graphing) for solving a given system in two variables. ● solving a system using all aforementioned methods with no errors. ● solving a system with three variables using elimination and/or substitution with no errors. 2: The student demonstrates he/she is nearing proficiency by: ● recognizing or recalling specific vocabulary, such as: inconsistent, consistent system, elimination, substitution, graphing, and point of intersection ● performing specific processes, such as: ○ solving a system algebraically using substitution, elimination, but with some errors on the more complex systems. ○ recognizing that the point of intersection of the graphs is the solution to a system. 1: The student demonstrates limited understanding or skill with the learning goal.

Learning Targets
Learning Design

WGSD Curriculum -- Algebra 3
DRAFT

High Priority Standards (CCSS, State, National, TILS, CREDE, etc.)

CCSS.Math.Content.HSA-SSE.B.3a Factor a quadratic expression to reveal the zeros of the function it defines.

CCSS.Math.Content.HSA-REI.A.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.

CCSS.Math.Content.HSA-SSE.A.1a Interpret parts of an expression, such as terms, factors, and coefficients.

CCSS.Math.Content.HSA-APR.D.6 Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.

CCSS.Math.Content.HSA-APR.D.7 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.

CCSS.Math.Content.HSA-REI.B.4 Solve quadratic equations in one variable.

CCSS.Math.Content.HSA-REI.B.4b 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.

Learning Goal	**Proficiency Scales**
Students will be able to perform operations, simplify, and solve rational expressions.	4: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal. 3: The student demonstrates mastery with the learning goal as evidenced by ● simplifying rational expressions ● multiplying, dividing, adding and subtracting rational expressions. ● factoring complex polynomials. ● dividing polynomials 2: The student demonstrates he/she is nearing proficiency by: ● Recognizing and recalling specific vocabulary such as: polynomials, monomials, binomials, trinomials, base, exponent, coefficient, constant, greatest common factor, least common factor, terms, like terms, expression, factor, product, perfect square, perfect cube, complex fraction ● Performing processes such as: o Adding and subtracting rational expressions. o Multiplying and dividing rational expressions o Dividing polynomials. o Simplifying expressions using a single rule of exponents. o Factoring polynomials o Solving polynomials o Determining the least common denominator 1: The student demonstrates limited understanding or skill with the learning goal.

Learning Targets

Learning Design

WGSD Curriculum -- Algebra 3
DRAFT

High Priority Standards (CCSS, State, National, TILS, CREDE, etc.)

CCSS.Math.Content.HSN-CN.A.1 Know there is a complex number i such that $i^2 = -1$, and every complex number has the form a + bi with a and b real.

CCSS.Math.Content.HSN-CN.A.2 Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

CCSS.Math.Content.HSN-CN.A.3 Find the conjugate of a complex number, use conjugates to find the moduli and quotients of complex numbers.

CCSS.Math.Content.HSA-REI.A.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.

CCSS.Math.Content.HSA-REI.A.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may rise.

CCSS.Math.Content.HSA-REI.B.4 Solve quadratic equations in one variable.

CCSS.Math.Content.HSA-REI.B.4b 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.

Learning Goal	**Proficiency Scales**
Students will be able to simplify expressions and solve equations containing radicals and complex	4: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal. 3: The student demonstrates mastery with the learning goal as evidenced by

numbers.	● simplifying radicals. ● manipulating radicals and rational exponents. ● adding, subtracting, multiplying and dividing radical expressions. ● solving radical equations. ● adding, subtracting, multiplying, and dividing complex numbers. 2: The student demonstrates he/she is nearing proficiency by: ● Recognizing and recalling specific vocabulary such as: polynomials, base, exponent, extraneous, coefficient, conjugate, constant, terms, like terms, expression, factor, product, complex number, radical, imaginary number ● Performing processes such as: o Adding and subtracting radical expressions and complex numbers. o Multiplying and dividing rational expressions and complex numbers. o Simplifying expressions using a single rule of exponents. o Factoring polynomials o Solving polynomials 1: The student demonstrates limited understanding or skill with the learning goal.

Learning Targets
Learning Design