Wyoming Department of Education Required Virtual Education Course Syllabus

BIG HORN COUNTY SCHOOL DISTRICT #1

Program Name	WYCA	Content Area	Mathematics
Course ID	CAMA79476	Grade Level	9, 10, 11, 12
Course Name	Algebra 2 A, Part 1	# of Credits	0.5
SCED Code	02056G0.5012	Curriculum Type	Connections Academy

COURSE DESCRIPTION

In this first semester of Algebra 2 A, the student will review and expand on learning from previous math and algebra courses. This course will move at a slower pace than other Algebra 2 courses, and there will be a greater emphasis placed on instructional support. The units of this semester will focus mostly on the equation and the inequality; the student will write, solve, and graph these in a variety of real-world scenarios.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK
N.CN.1	Know there is a complex number i such that i2 = –1, and every complex number has the form a + bi with a and b real.
N.CN.2	Use the relation i2 = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.
N.CN.3	Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.
N.CN.4	Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.
N.CN.5	Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation.
N.CN.6	Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.
N.CN.7	Solve quadratic equations with real coefficients that have complex solutions.
N.CN.8	Extend polynomial identities to the complex numbers.
N.CN.9	Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.
N.VM.6	Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.
N.VM.8	Add, subtract, and multiply matrices of appropriate dimensions.
A.SSE.1	Interpret expressions that represent a quantity in terms of its context:
A.SSE.1a	Interpret parts of an expression, such as terms, factors, and coefficients.
A.SSE.1b	Interpret complicated expressions by viewing one or more of their parts as a single entity.
A.SSE.2	Use the structure of an expression to identify ways to rewrite it.
A.SSE.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression:
A.SSE.3a	Factor a quadratic expression to reveal the zeros of the function it defines.
A.SSE.3b	Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
A.SSE.3c	Use the properties of exponents to transform expressions for exponential functions.
A.APR.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.
A.APR.2	Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).
A.APR.3	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.
A.APR.C.4	Prove polynomial identities and use them to describe numerical relationships.
A.APR.5	Know and apply the Binomial Theorem for the expansion of (x + y)n in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.
A.CED.1	Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.
A.CED.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
A.CED.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.
A.CED.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

A.REI.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.
A.REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
A.REI.4	Solve quadratic equations in one variable:
A.REI.4a	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.
A.REI.4b	Solve quadratic equations by inspection (e.g., for x2 = 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 ± bi for real numbers a and b.
A.REI.6	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
A.REI.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 x2 + y2 = 3.
A.REI.8	Represent a system of linear equations as a single matrix equation in a vector variable.
A.REI.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).
A.REI.11	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,
A.REI.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.
F.IF.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).
F.IF.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
F.IF.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.
F.IF.5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
F.IF.6	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.
F.IF.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases:
F.IF.7a	Graph linear and quadratic functions and show intercepts, maxima, and minima.
F.IF.7c	Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
F.IF.7e	Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
F.IF.8	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function:
F.IF.8a	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.
F.IF.8b	Use the properties of exponents to interpret expressions for exponential functions.
F.IF.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
F.BF.1	Write a function that describes a relationship between two quantities:
F.BF.3	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
F.BF.4	Find inverse functions:
F.BF.5	Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.

F.LE.1	Distinguish between situations that can be modeled with linear functions and with exponential functions:
F.LE.1a	Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.
F.LE.1b	Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
F.LE.1c	Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to
F.LE.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).
F.LE.3	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
F.LE.4	For exponential models, express as a logarithm the solution to abct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.
F.LE.5	Interpret the parameters in a linear or exponential function in terms of a context.
G.GPE.5	Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES
Unit 1: Focus on Success in Algebra 2 In this unit, you will focus on ways to think about success in Algebra 2. You will learn how to set personal goals, establish study strategies that reduce anxiety, and review ways to be an active learner. The goal of this unit is to help you establish a positive mindset at the start of the course. This includes understanding how effort impacts goal obtainment, appreciating the importance of taking initiative with learning, and embracing the many resources available to help you throughout the course, such as your fellow students, your teacher, online tools, and your Learning Coach.		•Use strategies such as self-assessment and reflection in order to improve mathematical performance •Distinguish between effort-based and ability-based models of learning •Assess personal readiness for study and learning •Use resources to assist with goal-setting and attainment
Unit 2: Expressions, Equations, and Inequalities In this unit, you will explore algebraic expressions, equations, and inequalities, including how to model and solve real-world applications using these concepts. Some of these concepts, such as those involved in simplifying algebraic expressions and solving equations, are a review from previous math courses, and other concepts, such as those concerned with writing and solving equations and inequalities involving absolute value, are new for this course. The concepts presented in this unit will be used throughout this course, as they are the basics of Algebra 2.	A.SSE.1, A.SSE.2, A.CED.1, A.CED.4, A.REI.1, A.REI.3	•Use variables to represent unknown quantities in order to identify and use patterns to solve problems •Represent quantities with algebraic expressions and use properties to manipulate and evaluate algebraic expressions •Use properties to solve equations and inequalities, including compound inequalities and those involving absolute value •Write, graph, and use equations and inequalities to model and solve problems
Unit 3: Functions, Equations, and Graphs In this unit, you will expand your knowledge of equations by exploring relations that can be represented by special equations, called functions. Direct variation, linear, and absolute value functions and their graphs will be used to solve a variety of problems. In addition, you will learn the different forms in which a linear equation can be written as well as identify transformations of functions, such as vertical and horizontal translations, reflection, stretching, and compressing.	A.CED.2, A.REI.10, A.REI.12, F.IF.1, F.IF.2, F.IF.4, F.IF.5, F.IF.6, F.IF.7, F.IF.7a, F.IF.7c, F.IF.8, F.BF.1, F.BF.3, F.LE.1, F.LE.1a, F.LE.1b, F.LE.5, G.GPE.5	•Identify and graph relations and functions, including direct variation and absolute value •Model real-world data and make predictions using linear equations •Identify and graph transformations of functions •Graph two-variable inequalities, including absolute value inequalities •Use functions and inequalities to model and solve real-world problems

Unit 4: Linear Systems In this unit, you will learn about linear systems and how to use them to solve problems that come up in real situations. Throughout the unit, you will explore the different methods for solving systems, such as using tables, graphs, or matrices, and the different ways in which a system can be solved algebraically. Linear programming will be used to solve real-world problems, such as those involving maximizing profit.	N.VM.6, N.VM.8, A.CED.2, A.CED.3, A.REI.6, A.REI.8, A.REI.11, A.REI.12	•Write, solve, and use systems of linear equations to solve problems •Write, solve, and use systems of linear inequalities to solve problems •Use linear programming to model and solve real-world problems •Solve systems in three variables using elimination, substitution, and matrices
Unit 5: Quadratic Functions and Equations In this unit, you will explore quadratic equations and functions. You will see that when a quadratic equation is graphed, it forms a particular type of curve called a parabola. Some real-world situations can be modeled by parabolas—for example, the path a baseball makes when thrown up in the air. You will learn how to use multiple methods for solving quadratic equations including graphing, factoring, and applying the quadratic formula. You will also explore the set of complex numbers and quadratic systems.	N.CN.1, N.CN.2, N.CN.3, N.CN.4, N.CN.5, N.CN.6, N.CN.7, A.SSE.1b, A.SSE.2, A.SSE.3, A.SSE.3a, A.SSE.3b, A.CED.1, A.CED.2, A.CED.3, A.REI.4, A.REI.4a, A.REI.4b, A.REI.7, F.IF.4, F.IF.5, F.IF.7, F.IF.7a, F.IF.8, F.IF.8a, F.IF.9, F.BF.1, F.BF.3	•Identify and graph quadratic functions and transformations •Model and interpret real-world problems using quadratic equations •Write and solve quadratic equations by graphing, factoring, and using the quadratic formula •Identify, graph, and solve quadratic equations with complex solutions •Solve and graph systems of linear and quadratic equations and inequalities
Unit 6: Algebra 2 A, Part 1 Semester Test In this unit you will review the information you learned in this semester in order to prepare for the semester exam. You can expect the semester exam to cover many topics, which may seem overwhelming. However, everything you will see on the semester exam is something you've already learned. The purpose of this unit is to remind you of what you've done, identify areas of strength and weakness, and give you the tools you'll need to set yourself up for success on the exam.		•Review for the semester exam •Identify areas of strength and weakness in the material •Complete a practice assessment and analyze your results