

Wyoming Department of Education Required Virtual Education Course Syllabus

BIG HORN COUNTY SCHOOL DISTRICT #1

Program Name	WYCA	Content Area	Mathematics
Course ID	CAMA79292	Grade Level	9, 10, 11, 12
Course Name	Algebra 1 B, Part 2	# of Credits	0.5
SCED Code	02054G0.5022	Curriculum Type	Connections Academy

COURSE DESCRIPTION

This course includes the second half of the Algebra 1 B course content. In this course, the student will perform operations with radical expressions, graph square root functions, and explore trigonometric ratios. The student will solve both radical and rational equations and explore the graphs of rational functions. Finally, the student will be introduced to statistics and learn how to organize and display data. Lastly, the student will solve problems involving probability.

There are many opportunities for review and reflection in the course and the student is encouraged to monitor progress with the course content. Throughout the course, problem solving, critical thinking, and real-world application of mathematical concepts will be required.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK
N.RN.1	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 $[5^{(1/3)}]^3 = 5^{[(1/3) \times 3]}$ to hold, so $[5^{(1/3)}]^3$ must equal 5.
N.RN.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.
N.Q.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
A.SSE.1b	Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.
A.SSE.2	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 $(x^2 - y^2)(x^2 + y^2)$.
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. For example the expression 1.15^t can be rewritten as $[1.15^{(1/12)}]^{(12t)} \approx 1.012^{(12t)}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.
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.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.4	Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.
A.APR.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.
A.APR.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.
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.4	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.
A.REI.2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
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 $x^2 = 49$), 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 .
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 $x^2 + y^2 = 3$.
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.7b	Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
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. 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 and decay.
F.IF.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.
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 expressions for them.
F.BF.4a	Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse. For example, $f(x) = 2(x^3)$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$ (x not equal to 1).
F.BF.4c	(+)Read values of an inverse function from a graph or a table, given that the function has an inverse.
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 another.
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.5	Interpret the parameters in a linear or exponential function in terms of a context.
S.ID.1	Represent data with plots on the real number line (dot plots, histograms, and box plots).
S.ID.2	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
S.ID.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
S.ID.5	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.
S.IC.1	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.

S.IC.6	Evaluate reports based on data.	SCOPE AND SEQUENCE	
UNIT OUTLINE	STANDARD#	OUTCOMES	
Unit 1: Quadratic Functions and Equations In this unit, you will learn how to work with quadratic functions and quadratic equation. You will learn to graph quadratic functions in several forms and solve both quadratic equations and functions. You will also learn to choose between different models to display data, and finally, you will learn to solve systems of linear and quadratic equations. These topics are important foundational skills for your study of higher-level mathematics.	A.SSE.2, A.SSE.3, A.SSE.3a, A.SSE.3b, A.APR.3, A.REI.4, A.REI.4a, A.REI.4b, A.REI.7, F.IF.7, F.IF.7a, F.IF.7c, F.IF.8, F.IF.8a, F.IF.9, F.LE.1, F.LE.1a, F.LE.1c	<ul style="list-style-type: none"> Graph quadratic functions of the form $y = ax^2$ and $y = ax^2 + c$ Graph functions of the form $y = ax^2 + bx + c$ Solve quadratic equations by graphing and using square roots and by factoring Solve quadratic equations by completing the square and by using the quadratic formula Choose a linear, quadratic, or exponential model for data and solve systems of linear and quadratic equations 	
Unit 2: Radical Expressions and Data Analysis In this unit, you will work with radical expressions and learn various ways to analyze data. First, you will learn to simplify radicals and perform operations on radical expressions. You will learn to analyze square root functions by graphing them. Finally, you will learn to analyze data both graphically and numerically through the use of histograms, box-and-whisker plots, and measures of central tendency and dispersion.	N.RN.1, N.RN.2, N.Q.3, A.CED.4, A.REI.2, F.IF.7, F.IF.7b, F.BF.3, S.ID.1, S.ID.2, S.ID.3, S.ID.5, S.IC.1, S.IC.6	<ul style="list-style-type: none"> Simplify radicals involving products and quotients Simplify sums and differences of radical expressions Simplify products and quotients of radical expressions Find the mean, median, mode, and range of a data set Make and interpret box-and-whisker plots 	
Unit 3: Rational Expressions and Functions In this unit, you will work with rational expressions and equations. To begin, you will learn to simplify rational expressions. Then you will learn to multiply and divide rational expressions and polynomials. You will also learn to simplify complex fractions. You will learn to define and recognize inverse variations and compare direct and inverse variations.	A.APR.6, A.APR.7, A.CED.2, A.REI.2, F.IF.4, F.IF.7, F.BF.4a, F.BF.4c	<ul style="list-style-type: none"> Simplify rational expressions Multiply and divide rational expressions Add and subtract rational expressions Define and identify inverse variation 	
Unit 4: Semester Review and Exam In this unit, you will have the opportunity to prepare for and take the semester exam. Since this is a comprehensive exam, it may be helpful to organize your notes in the order of the course outline before you begin to review. Using the test-taking strategies that you have previously learned can help you be successful with both objective and essay questions.		<ul style="list-style-type: none"> Decide which strategies you will use to prepare for your exam Organize your time and study materials Review your notes, keywords and vocabulary terms, and all important concepts that may be covered on this exam 	