# Wyoming Department of Education Required Virtual Education Course Syllabus

## BIG HORN COUNTY SCHOOL DISTRICT #1

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| Program Name | WYCA | Content Area | Mathematics |
| Course ID | CAMA79280 | Grade Level | 9, 10, 11, 12 |
| Course Name | Algebra 1 A, Part 2 | # of Credits | 0.5 |
| SCED Code | 02053G0.5021 | Curriculum Type | Connections Academy |

**COURSE DESCRIPTION**

*This course includes the second half of the Algebra 1 A course content. In this course, the student will study functions that are either linear or nOAar in nature and represent those functions on the coordinate plane. Also, the student will solve systems of equations and inequalities and represent those solutions graphically. Throughout the course, problem solving, critical thinking, and real-world application of mathematical concepts will be required.*

**WYOMING CONTENT AND PERFORMANCE STANDARDS**

| STANDARD# | BENCHMARK |
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| N.Q.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. |
| N.Q.2 | Define appropriate quantities for the purpose of descriptive modeling. |
| 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 non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. |
| 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.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.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. |
| 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.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, rational, absolute value, exponential, and logarithmic functions.* |
| 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.3 | Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1 (n is greater than or equal to 1). |
| F.IF.5 | 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. |
| 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. |

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| 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.BF.1 | Write a function that describes a relationship between two quantities. |
| F.BF.1a | Determine an explicit expression, a recursive process, or steps for calculation from a context. |
| F.BF.1b | 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. |
| F.BF.1c | (+)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. |
| F.BF.2 | Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. |
| 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.LE.1b | Recognize situations in which one quantity changes at a constant 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.5 | Interpret the parameters in a linear or exponential function in terms of a context. |
| S.ID.6 | Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. |
| S.ID.6a | 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 context. Emphasize linear, quadratic, and exponential models. |
| S.ID.6b | Informally assess the fit of a function by plotting and analyzing residuals. |
| S.ID.6c | Fit a linear function for a scatter plot that suggests a linear association. |
| S.ID.7 | Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. |
| S.ID.8 | Compute (using technology) and interpret the correlation coefficient of a linear fit. |
| S.ID.9 | Distinguish between correlation and causation. |
| S.IC.2 | Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0. 5. Would a result of 5 tails in a row cause you to question the model? |
| S.IC.4 | Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling. |
| S.IC.6 | Evaluate reports based on data. |

**SCOPE AND SEQUENCE**

| UNIT OUTLINE | STANDARD# | OUTCOMES |
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| **Unit 1: Introduction to Functions**<br>In this unit, you will explore functions and their applications. You will be introduced to the characteristics of a function and learn to compare linear and nonlinear functions. You will also graph functions on the coordinate plane and write functions given their graph. Functions are an important part of algebra because they lay a foundation for understanding higher-level mathematics problems that depend on your understanding of the characteristics of functions. | A.CED.2, A.REI.10, F.IF.1, F.IF.2, F.IF.3, F.IF.5, F.IF.7, F.BF.1, F.BF.1a, F.BF.1b, F.BF.1c, F.BF.2, F.LE.2 | • Write, graph, and identify the solutions to inequalities<br>• Represent mathematical relationships using graphs<br>• Identify linear and nonlinear functions<br>• Graph functions on the coordinate plane<br>• Write equations to represent a function |
| **Unit 2: Linear Functions**<br>In this unit, you will learn how to use several types of linear equations, including slope-intercept, point-slope, and standard forms. You will use slope to compare parallel and perpendicular lines and explore relationships between these types of lines. You will analyze scatter plots and fit regression lines to the data points. You will also graph and translate absolute value functions on the coordinate plane. | A.CED.1, F.IF.6, F.IF.7, F.IF.7a, F.BF.1, F.BF.3, F.LE.1b, F.LE.5, G.CO.1, G.GPE.5, S.ID.6, S.ID.6a, S.ID.6b, S.ID.6c, S.ID.7, S.ID.8, S.ID.9, S.IC.2, S.IC.4, S.IC.6, | •Write linear equations in standard form, point-slope form, and slope-intercept form<br>•Write equations of parallel and perpendicular lines<br>•Write equations to represent direct variation<br>•Graph linear equations, equations of direct variations, absolute value functions, and horizontal and vertical translations<br>•Describe the direction and strength of the relationship between two variables on a scatter plot |

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| **Unit 3: Systems of Equations and Inequalities**<br>In this unit, you will apply what you know about linear equations and inequalities to systems of linear equations or inequalities. You will solve systems of linear equations by graphing, substitution, or elimination. You will also be introduced to the topic of matrices and use them to solve systems of equations. You will graph linear inequalities and solve systems of two linear equalities. Finally, you will apply these topics to solve real-world scenarios. | N.Q.1, N.Q.2, A.CED.3, A.REI.5, A.REI.6, A.REI.11, A.REI.12 | •Solve systems of linear equations by graphing<br>•Solve systems of linear equations by elimination<br>•Solve systems of linear equations by substitution<br>•Graph linear inequalities and systems of linear inequalities |
| **Unit 4: Semester A Review and Exam**<br>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. | | •Decide which strategies you will use to prepare for your exam<br>•Organize your time and study materials<br>•Review your notes, key words and vocabulary terms, formulas, and all important concepts that may be covered on this exam |