

Wyoming Department of Education Required Virtual Education Course Syllabus

2201000 - Washakie County School District No. 1

Program Name	Washakie #1 Online	Content Area	MA
Course ID	W02052G0.5012	Grade Level	8-12
Course Name	WOL-Algebra I-A	# of Credits	0.5
SCED Code	02052G0.5012	Curriculum Type	K-12 Fuel Education

COURSE DESCRIPTION

Students develop algebraic fluency by learning the skills needed to solve equations and perform Manipulations with numbers, variables, equations, and inequalities. They also learn concepts central to the abstraction and generalization that algebra makes possible. Topics include simplifying expressions involving variables, fractions, exponents, and radicals; working with integers, rational numbers, and irrational numbers; graphing and solving equations and inequalities; using factoring, formulas, and other techniques to solve quadratic and other polynomial equations; formulating valid mathematical arguments using various types of reasoning; and translating word problems into mathematical equations and then using the equations to solve the original problems. Compared to Algebra I (Core), this course has a more rigorous pace and more challenging assignments and assessments. It covers additional topics, including translating functions, higher degree roots, and more complex factoring techniques.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK (Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
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. 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.SSE.4	Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.*
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.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.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.1
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.

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STANDARD#	BENCHMARK (Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
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.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.2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
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 $x^2 = 49$), 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.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.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 $x^2 + y^2 = 3$.

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A.REI.8	(+)Represent a system of linear equations as a single matrix equation in a vector variable.
A.REI.9	(+)Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3×3 or greater).
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.

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
<p>Unit 1: Algebra Basics</p> <ul style="list-style-type: none"> • Semester Introduction Expressions • Variables Translating Words into Variable Expressions • Equations • Translating Words into Equations • Replacement Sets • Problem Solving • Unit Review • Unit Test 	<p>A-SSE A-SSE.1a A-CED.1 A-REI.3 F-LE.2</p>	<ul style="list-style-type: none"> • Interpret the structure of expressions • Write expressions in equivalent forms to solve problems. • Simplify a numerical expression without grouping symbols. • Simplify a numerical expression with grouping symbols. • Use a formula to solve a word problem. • Evaluate an algebraic expression. • Write a variable expression for a word problem. • Evaluate an expression to solve a word problem. • Use a formula to solve a word problem. • Translate a word phrase into a variable expression. • Write a variable expression, given the facts of a word problem. • Determine if two expressions form an equation. • Determine if a given value makes an open sentence true. • Translate a sentence into an equation. • Translate a word problem into an equation. • Use a formula to solve a word problem. • Find the solution set for an equation when given the replacement set. • Solve equations in word problems when given a replacement set. • Solve equations in word problems when given a replacement set. • Describe a strategy for solving a word problem. • Solve a word problem, given a choice of possible solutions.
<p>Unit 2: Properties of Real Numbers</p> <ul style="list-style-type: none"> • Number Lines • Sets • Comparing Expressions • Number Properties • Distributive Property • Algebraic Proof • Opposites and Absolute Value • Unit Review • Unit Test 	<p>N-RN.3 A-CED.1 A-REI.1</p>	<ul style="list-style-type: none"> • Make sense of problems and persevere in solving them. • Reason abstractly and quantitatively • Graph a number on a number line. • Identify a point on a number line. • Compare real numbers. • Describe a set using set notation. • Identify sets to which a given number belongs. • Find the union or intersection of sets. • Use the order of operations to compare two numerical or algebraic expressions. • Identify whether a value makes an equation or inequality true. • Identify whether a value makes an equation or inequality true. • Name the property used to write an expression that is equivalent to a given expression. • Simplify a numerical expression without grouping symbols. • Simplify an expression using the distributive property. • Collect like terms. • Identify like terms. • Name the property used to write an expression that is equivalent to a given expression. • Justify the steps in a proof of an algebraic statement. • Simplify an expression involving opposites. • Simplify an expression involving absolute value. • Evaluate an expression involving absolute value. • Solve an equation involving absolute value.

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
<p>Unit 3: Operations with Real Numbers</p> <ul style="list-style-type: none"> • Addition • Subtraction • Multiplication • Reciprocals and Division • Applications: Number Problems • Unit Review • Unit Test 		<ul style="list-style-type: none"> • Make sense of problems and persevere in solving them. • Reason abstractly and quantitatively. • Add real numbers. • Evaluate an expression involving addition of variable terms and constants. • Provide reasons for steps in a proof involving sums of real numbers. • Simplify an expression involving sums and differences of real numbers. • Evaluate a variable expression involving addition or subtraction of real numbers. • Write an expression that could be used to solve a word problem involving addition or subtraction. • Simplify an expression involving variable terms and constants. • Simplify a subtraction expression involving variables and constants. • Subtract real numbers. • Evaluate a variable expression involving sums and/or differences. • Multiply real numbers. • Evaluate a multiplication expression. • Simplify a multiplication expression involving real number variable terms and constants. • Find and simplify the reciprocal of a number. • Simplify an expression involving quotients. • Simplify an expression involving products and quotients of real numbers. • Evaluate a variable expression involving multiplication or division of real numbers. • Simplify an expression using number properties. • Identify the reciprocal of a number. • Describe and draw the six most common unit cell shapes. • Evaluate a multiplication expression involving real number variable terms and constants. • Evaluate numerical absolute value expressions. • Add and subtract fractions. • Multiply and divide fractions. • Simplify an expression involving sums and differences of real numbers. • Evaluate a variable expression involving addition or subtraction of real numbers. • Write an expression that could be used to solve a word problem involving addition or subtraction. • Simplify an expression involving variable terms and constants. • Simplify a subtraction expression involving variables and constants. • Subtract real numbers. • Evaluate a variable expression involving sums and/or differences. • Multiply real numbers. • Simplify a multiplication expression involving real number variable terms and constants. • Evaluate a multiplication expression. • Evaluate a multiplication expression involving real number variable terms and constants. • Find and simplify the reciprocal of a number. • Simplify an expression involving quotients.

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
<p>Unit 4: Solving Equations</p> <ul style="list-style-type: none"> • Addition and Subtraction Equations • Multiplication and Division Equations • Multiple Transformations • Variables on Both Sides of an Equation • Transforming Formulas • Estimating Solutions • Cost Problems • Unit Review • Unit Test 	<p>A-CED A-CED.1,4 A-SSE.1b A-REI A-REI.3</p>	<ul style="list-style-type: none"> • Create equations that describe numbers or relationships. • Understand solving equations as a process of reasoning and explain the reasoning. • Solve systems of equations. • Solve addition or subtraction equations. • Solve addition or subtraction equations involving simplification. • Solve an absolute value equation with addition or subtraction. • Solve a word problem involving addition or subtraction. • Write an equation that models a word problem involving addition or subtraction. • Solve an equation involving division. • Solve an equation involving multiplication. • Write an equation that models a word problem involving multiplication or division. • Solve a word problem that involves an equation with multiplication or division. • Determine whether or not a given isotope is likely to be stable or unstable. • Solve an absolute value equation with multiplication or division. • Solve an equation involving more than one transformation. • Write an equation that models a word problem involving multiplication or division. • Solve a word problem that involves an equation with multiplication or division. • Solve an equation that has a variable on both sides. • Solve word problems that involve equations with variables on both sides. • Rewrite a formula for a given variable. • Solve a word problem involving a transformed formula.
<p>Unit 5: Solving Inequalities</p> <ul style="list-style-type: none"> • Inequalities • Solving Inequalities • Combined Inequalities • Absolute Value • Equations and Inequalities • Applications: Inequalities • Unit Review • Unit Test 	<p>A-CED.1 A-REI A-REI.3</p>	<ul style="list-style-type: none"> • Solve equations and inequalities in one variable. • Translate a word phrase involving inequalities into symbols. • Determine whether an inequality is a true or false sentence. • Graph an inequality in one variable. • Graph an inequality with a restricted domain. • Determine whether an inequality is a true or false sentence. • Use a single transformation to solve an inequality. • Use multiple transformations to solve an inequality. • Solve a word problem involving an inequality. • Find the solution set of a combined inequality. • Graph the solution of a combined inequality. • Write a compound inequality for a given graph. • Identify operational or relational symbols to complete an inequality. • Solve simple equations (basic facts). • Solve an equation involving absolute value. • Solve an inequality involving absolute value. • Graph the solution of an equation or inequality involving absolute value. • Write a conjunction or disjunction that is equivalent to a given absolute value sentence.

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
<p>Unit 6: Applying Fractions</p> <ul style="list-style-type: none"> • Ratios • Proportions • Percents • Applications: Percents • Applications: Mixture Problems • Unit Review • Unit Test 	<p>N-Q.1</p>	<ul style="list-style-type: none"> • Reduce a fraction to simplest form. • Solve equations in the form $ax = b$. • Solve a percent of a whole problem. • Write a ratio in simplest form. • Convert between forms of a ratio. • Find the ratio of one variable to another for a given equation with two variables. • Write an equation to solve a word problem involving ratios. • Solve a word problem involving ratios. • Find the ratio of one variable to another for a given equation with two variables. • Solve for a variable in a proportion. • Find the ratio of one variable to another in a proportion with two variables. • Solve a word problem involving proportions. • Write a proportion to solve a word problem. • Solve for the unknown value in a percent equation. • Write a percent as a decimal. • Solve a percent of a whole problem. • Solve word problems involving percent of a whole. • Solve for the unknown value in a percent equation. • Solve a percent of a whole problem. • Solve a problem involving percent of increase or decrease. • Solve a word problem involving simple interest.
<p>Unit 7: Linear Equations and Inequalities</p> <ul style="list-style-type: none"> • Equations in Two Variables • Graphs • Lines and Intercepts • Slope • Slope-Intercept Form • Point-Slope Form • Parallel and Perpendicular Lines • Equations from Graphs • Applications: Linear Models • Graphing Linear Inequalities • Inequalities from Graphs • Unit Review • Unit Test 	<p>A-REI A-REI.7,12 F-LE.2 G-MG.7 G-MG.7 A-REI.12</p>	<ul style="list-style-type: none"> • Understand solving equations as a process of reasoning and explain the reasoning. • Represent and solve equations and inequalities graphically. • Identify a point on a graph, given specific criteria. • Graph a point when given an ordered pair. • Identify the quadrant for a point on a graph. • Solve an equation in two variables in terms of one of the variables. • Determine whether or not an ordered pair is a solution to a given equation. • Write the equation of a line in standard form. • Use a graph to determine if a set of points is collinear. • Use intercepts to graph a linear equation on a coordinate plane. • Find intercepts of a line when given the equation. • Find the slope of a line given two points. • Determine whether a line has positive slope, negative slope, zero slope, or undefined slope. • Find the slope of a line given the equation of the line. • Find the slope of a line given two points. • Find the slope and y-intercept of a line when given its equation in slope-intercept form. • Find the y-intercept of a line when given its equation in slope-intercept form. • Transform an equation into slope-intercept form. • Graph a line when its equation is given as or transformed into slope-intercept form. • Write an equation in slope-intercept form to model a given word problem. • Write an equation of a line in point-slope form when given specific criteria or a graph.

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
		<ul style="list-style-type: none"> • Solve a word problem using the point-slope form of an equation. • Graph a line in point-slope form. • Determine the slope of a line perpendicular to the graph of a given line. • Find an equation of a line passing through a given point and parallel or perpendicular to another line. • Determine whether the graph of two lines in a plane will be parallel, perpendicular, or neither when given the equation. • Write an equation of a line in point-slope form when given specific criteria. • Write an equation of a line in standard form when given specific criteria. • Write the equation of a horizontal or vertical line. • Write an equation of a line in slope-intercept form when given specific criteria. • Write an equation of a line in point-slope form when given specific criteria or a graph. • Calculate values for a linear equation in two variables. • Determine if a word problem is modeled by a linear relationship or not. • Graph a linear inequality in two variables. • Determine whether an ordered pair is a solution to a linear inequality.
<p>Unit 8: Systems of Equations</p> <ul style="list-style-type: none"> • Systems of Equations • Substitution Method • Linear Combination • Linear Combination with Multiplication • Applications: Systems of Linear Equations • Systems of Linear Inequalities • Unit Review • Unit Test 	<p>A.CED.3 5A-CED.3 A-REI.5,6,12</p>	<ul style="list-style-type: none"> • 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. • Use a graph to solve a system of linear equations. • Use a graph to determine whether a system of linear equations will have 0, 1, or an infinite number of solutions. • Use substitution to solve a system of linear equations. • Determine whether a system of linear equations will have 0, 1, or an infinite number of solutions. • Use the linear combination method to solve a system of linear equations in two variables. • Write a system of linear equations to solve a word problem. • Solve a word problem using a system of linear equations • Graph a system of linear inequalities. • Write a system of linear inequalities that corresponds to a given graph. • Use a system of linear inequalities to solve a word problem.
<p>Unit 9: Semester I Review and Test</p> <ul style="list-style-type: none"> • Semester Review • Semester Test 		