Wyoming Department of Education Required Virtual Education Course Syllabus

2201001 - Washakie County School District No. 1

Program Name	Washakie #1 Online	Content Area	MA
Course ID	WOL-PreAlgebra A	Grade Level	7
Course Name	WOL-PreAlgebra A-7	# of Credits	NA
SCED Code	NA	Curriculum Type	K-12 Fuel Education

COURSE DESCRIPTION

In PreAlgebra A, typically taught first semester of 7th grade, students take a broader look at computational and problem-solving skills while learning the language of algebra. Students will solidify their knowledge of the basic building blocks of mathematics beginning with order of operations and writing and comparing mathematical expressions. They will translate word phrases and sentences into mathematical expressions, expand their addition and subtraction skills to negative numbers and decimals solving complicated problems, deepen understanding of inverse operations, and understand the relationship between decimals and fractions. Students will combine equations and expressions with mixed operations as they solve complex problems. Students will student exponents, factors, and primes as they develop an understanding of scientific notation. They will study geometry and the application of geometric concepts into architecture and the arts.

Online lessons provide demonstrations of key concepts, as well as interactive problems with contextual feedback.

A textbook supplements the online material. Students who take Pre-Algebra A are expected to have mastered the skills and concepts presented in the (6th grade) K12 Fundamentals of Geometry and Algebra course (or its equivalent).

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK (Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
7.NS.1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
7.NS.1a	Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.
7.NS.1b	Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
7.NS.1c	Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
7.NS.1d	Apply properties of operations as strategies to add and subtract rational numbers.
7.NS.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
7.NS.2a	Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

WYOMING CONTENT AND PERFORMANCE STANDARDS	
STANDARD#	BENCHMARK_(Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
7.NS.2b	Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing real-world contexts.
7.NS.2c	Apply properties of operations as strategies to multiply and divide rational numbers.
7.NS.2d	Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)
7.EE.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
7.EE.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that “increase by 5%” is the same as “multiply by 1.05.”
7.EE.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations as strategies to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.
7.EE.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
7.EE.4a	Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?
7.EE.4b	Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example, As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.
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. Appendix A specification: Linear, and exponential (integer inputs only).
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) x 3] to hold, so [5^(1/3)]^3 must equal 5.
G-CO.1	Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
G-CO.4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
G-CO.5	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.
G-CO.9	Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment’s endpoints.
G-CO.10	Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.

SCOPE AND SEQUENCE		
UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/ STUDENT CENTERED GOALS
Unit 1: The Basics Let's start at the very beginning; it's a very good place to start. Just as you need to know basic grammar and vocabulary as you begin to learn any language, you need to know some basic building blocks as you begin to learn algebra. • Order of Operations • Variable Expressions • Writing Expressions for Word Phrases • Comparing Expressions • Replacement Sets • Related Equations • Solving Problems	7.EE.A.1 7.EE.A.2 7.EE.B.3	Student will . . . • Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. • Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. • Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
Unit 2: Addition and Subtraction If you have two oranges and a friend gives you three oranges, how many do you have? If you then give four oranges to your friend, how many are you left with? This sort of addition and subtraction problem with passing fruit back and forth is the type of simple math you have done since you were very young. When you expand your addition and subtraction skills to negative numbers and decimals, you can solve many more complicated problems. • Integers on a Number Line • Adding Integers • Subtracting Integers • Decimals on a Number Line • Adding Decimals • Subtracting Decimals • Addition and Subtraction Properties • Equations Involving Addition and Subtraction • Addition and Subtraction Applications	7.NS.A.1.a 7.NS.A.1.b 7.NS.A.1.c 7.NS.A.1.d	Student will . . . • Describe situations in which opposite quantities combine to make 0. • Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. • Understand subtraction of rational numbers as adding the additive inverse, p - q = p + (-q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. • Apply properties of operations as strategies to add and subtract rational numbers.
Unit 3: Multiplication and Division Isaac Newton's third law of motion is often paraphrased as "for every action, there is an equal and opposite reaction." Just as forces come in pairs, so can mathematical operations. Multiplication and division are inverse operations. They undo each other and can both be used to solve many types of problems. • Multiplying Integers and Decimals • Dividing Integers and Decimals • Multiplication and Division Properties • Rounding and Estimation • Equations Involving Multiplication and Division • Multiplication and Division Applications	7.NS.A.2.a 7.NS.A.2.b	• Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. • Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing realworld contexts.

SCOPE AND SEQUENCE		
UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/ STUDENT CENTERED GOALS
Unit 4: Fractions Every fraction can be written as a decimal and every decimal can be written as a fraction. As a result, you could do just about all math with only fractions or only decimals, but decimals are used for certain applications just as fractions are used for others. For example, carpenters use fractions and mixed numbers quite a bit; anybody building a house or a deck deals with lots of fractions. • Equivalent Fractions • Multiplying Fractions • Dividing Fractions • Common Denominators • Adding and Subtracting Fractions • Working with Improper Fractions and Mixed Numbers • Multiplying and Dividing Mixed Numbers • Equations with Fractions and Mixed Numbers	7.NS.A.2.c 7.NS.A.3	• Apply properties of operations as strategies to multiply and divide rational numbers. • Solve real-world and mathematical problems involving the four operations with rational numbers. * Computations with rational numbers extend the rules for manipulating fractions to complex fractions.
Unit 5: Combined Operations Many yachts can be powered by the wind, by a gas engine, or both. A hybrid automobile can run on gasoline or electric power. These combinations are very powerful. Combining addition or subtraction with multiplication or division is powerful as well. You can use equations and expressions with mixed operations to solve many complex problems. • The Distributive Property • Like Terms • Expressions with Mixed Operations • Equations with Mixed Operations • Error Analysis • Inequalities	7.EE.B.4.a 7.EE.B.4.b	Student will . . . • Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. • Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.
Unit 6: Number Properties Astronomers study things that are very, very far away. For example, the Horsehead Nebula is about 14,000 trillion kilometers away. On the other extreme, molecular geneticists study things that are very, very small. A double helix of DNA has a diameter of about one nanometer (a billionth of a meter.) With exponents, you can describe very great or very small distances. • Positive Exponents • Factors and Primes • GCF and Relative Primes • Negative Exponents • Powers of Ten • Scientific Notation	A-CED.1 N.RN.1	Student will . . . • Simplify and solve expressions involving exponents. • Find factors for given numbers. Determine whether a number is prime or composite. Find the prime factorization of a number. Find the greatest common factor of two numbers. • Write a power of ten in standard form. Write a number in standard form as a power of ten. • Multiply and divide decimals by a power of ten. Note: This unit moves beyond 7th Grade Math Standards.

SCOPE AND SEQUENCE		
UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/ STUDENT CENTERED GOALS
Unit 7: Geometry Basics Shapes such as polygons and circles provide us with shelter, art, and transportation. Some artists use geometric shapes in their art, but most painters and photographers use rectangular frames to surround their art. Look at any art museum, and you will see triangles, rectangles, and other polygons in the structure of the building and in the artwork inside. • Positive Exponents • Points, Lines and Planes • Rays and Angles • Parallel Lines and Transversals • Triangles • Polygons • Circles • Transformations • Congruence	G-CO.1 G-CO.4 G-CO.5 G-CO.9 G-CO.10	Student will . . . • Name a point, plan, line, ray, or angle. • Identify a pair of: alternate interior and exterior angles, corresponding angles, alternate interior or corresponding angles. • Determine unknown angle measures. • Use triangle properties to mind missing angles measures in a triangle. • Determine whether a triangle is acute, obtuse, or right. • Determine whether a figure is a polygon. Identify a polygon by the number of its sides. Determine whether a polygon is regular. • Name radii, chords, diameters. Find the radius or diameter when given the other. • Draw or identify a reflection. • Draw or identify a rotation of 90 or 180 degrees. Note: This unit moves beyond 7th Grade Math Standards.