Montana Instructional Alignment
HPS Critical Competencies
Mathematics
Pre-Algebra

Content Standards

Content Standard 1 - Number Sense and Operations

A student, applying reasoning and problem solving, will use number sense and operations to represent numbers in multiple ways, understand relationships among numbers and number systems, make reasonable estimates and compute fluently within a variety of relevant cultural contexts.

Content Standard 2 - Data Analysis

A student, applying reasoning and problem solving, will use data representation and analysis, probability, statistics and statistical methods to evaluate information and make informed decisions within a variety of relevant cultural contexts.

Content Standard 3 - Geometric Reasoning

A student, applying reasoning and problem solving, will understand geometric properties and spatial relationships, transformation of shapes, representational systems, spatial reasoning and geometric models to analyze mathematical situations within a variety of relevant cultural contexts.

Content Standard 4 - Algebraic Reasoning

A student, applying reasoning and problem solving, will use algebraic and functional concepts and procedures to understand patterns, quantitative and functional relationships, algebraic representations, models and change within a variety of relevant cultural contexts.

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Content Standard 1 - Number Sense and Operations

A student, applying reasoning and problem solving, will use number sense and operations to represent numbers in multiple ways, understand relationships among numbers and number systems, make reasonable estimates and compute fluently within a variety of relevant cultural contexts.

State Established Benchmark At the end of Grade 12, a proficient Student will:	Essential Learning Expectation (ELE) / HPS Critical (Competencies)	NCTM Standard	Assessment Statements (Specific Examples)	Vocabulary *(for instructional purposes)*
1.1 **(Magnitude):** Represent very large and very small numbers using multiple notations and interpret their effects in problem situations. 1.2 **Estimation:** Identify situations where estimation is appropriate and determine the needed degree of precision and accuracy. 1.3 **Equivalence:** Given a representation of a number or expression, find equivalent representations using multiple notations (e.g., exponents and roots). 1.4 **Properties:** Analyze and apply the properties of numbers and number systems. 1.5 **Modeling**: Identify givens and unknowns in an unfamiliar situation and describe relationships between variables (e.g., the effect of changing an interest rate on monthly payments).	*Implicit in all the standards below is the process standard specifying that all topics are taught with multiple representations through problem solving with appropriate technology* **Order of Operations & Properties Benchmark 1.4** **Integers & Fractions Benchmarks 1.3 1.4**	• Number and Operations • Number and Operations	• Students will simplify numerical expressions following order of operations and using properties, most particularly the distributive property. • The student will be able to perform all operations involving fractions and integers with a particular focus on negative numbers.	

***** Pre-Algebra does not cover all 4 standards, therefore only Standards 1 and 4 are reflected in this document.***

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Content Standard 4 -	**Algebraic Reasoning** A student, applying reasoning and problem solving, will use algebraic and functional concepts and procedures to understand patterns, quantitative and functional relationships, algebraic representations, models and change within a variety of relevant cultural contexts.			
State Established Benchmark **At the end of Grade 12, a proficient Student will:**	**Essential Learning Expectation (ELE) / HPS Critical (Competencies)**	**NCTM Standard**	**Assessment Statements (Specific Examples)**	**Vocabulary** ***(for instructional purposes)***
4.1 **Symbols:** Choose appropriate variables to construct expressions and equations representing given problem situations (e.g., linear, quadratic, exponential). 4.2 **Solving:** Solve a variety of equations, inequalities and their systems; justify the solution process using properties of numbers; and interpret solutions in context. 4.3 **Functions:** Represent functions in a variety of ways including tabular, graphic, symbolic, and verbal, and select an appropriate form for solving a given problem. 4.4 **Transforming Functions:** Analyze the effects of transformations on families of functions, recognize their characteristics, and represent functions in equivalent forms. 4.5 **Modeling:** Given data or a problem situation, select and use an appropriate function model to analyze results or make a prediction 4.6 **Connections with Geometry:** Represent geometric problems algebraically and algebraic situation geometrically.	*Implicit in all the standards below is the process standard specifying that all topics are taught with multiple representations through problem solving with appropriate technology.* **Variables and Substitution 4.1 4.4** **Solving Single Variable Equations & Inequalities 4.2** **Graphing Linear Equations 4.3**		• Students will exhibit an understanding of the purpose of a variable by evaluating expressions using substitution. • Students will be able to solve: o x+a=b o ax+b=c o ax+b=cx+d o x/a=b/c Constants will include integers, fractions and decimals • Students will be able to create a table of coordinate pairs illustrating solutions to the linear equation. • Students will be able to graph linear equations given in slope-intercept form. • Students will be able to calculate slopes of lines given two points.	