Montana Instructional Alignment
HPS Critical Competencies
Mathematics
Honors Math I

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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State Established Benchmark **At the end of Grade 12, a proficient Student will:**	**Essential Learning Expectation (ELE) / HPS Critical (Competencies)**	**NCTM Draft 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.* **Arithmetic manipulations of expressions 1.3 1.4** **Exponents and Radicals**	• **Algebra**	• Laws of exponents • Multiplication property • Power to a Power Property • Distributive Property • Division Property • Negative and Zero exponents • Rationalizing • Addition, subtraction, multiplication of polynomials • Factoring • FOIL	

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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.			
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2.1 **Represent Data:** Using technology when appropriate, select and create graphical or numerical representations for data set and compare different data sets using measures of central tendency and spread (e.g., percentiles, quartiles, inter-quartile range, and standard deviation). 2.2 **Evaluate Data:** Evaluate reports based on data collected and/or published by considering the source of the data, the design of the study, and the way data are analyzed and displayed (e.g. correlation does not prove causation). 2.3 **Regression:** Given two variable data, decide on an appropriate model, determine a regression equation using technology, and decide when predictions based on such regression equations are valid. 2.4 **Probability:** Use basic rules to compute probabilities and use probability to evaluate problem solving. 2.5 **Counting:** Determine the number of outcomes for an event or compound events using permutations, combinations, and other counting methods.	*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.* **Curve fitting/modeling 2.1 2.2 2.3**	• **Data Analysis and Probability** • **Algebra**	• Scatter Plots • Fitting curves to Data • Regression Lines	

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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.			
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3.1 **Reasoning:** Use inductive and deductive reasoning to verify conjectures about relationships (e.g., congruence) between two- and three-dimensional objects. 3.2 **Transformations:** Apply transformations on figures (e.g. dilations, rotations, translations, reflections) to solve problems, and interpret the results of composite transformations. 3.3 **Triangle Relationships:** Solve problems using triangles, including special triangles (e.g., 30-6-0-90) and properties of triangles (e.g. sine, cosine, tangent). 3.4 **Methods of Proof:** Make, test, and validate conjectures using a variety of techniques (e.g., counterexample, indirect proof). 3.5 **Applications:** Use spatial reasoning and geometric models to solve real world problems involving regular and irregular shapes.	*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.* **Transformational Geometry 3.2** **Constructions 3.1 3.2** **Logic and Inductive reasoning 3.1 3.4**	• **Geometry** • **Geometry** • **Geometry** • **Reasoning and Proof**	• Transformational Geometry • Dynamic Models • Congruent segments • Congruent Angles • Perpendicular to a line • Midpoint of Segment • Angle bisector • Deductive reasoning • Language of Logic • Counterexample • Venn Diagrams • Defined and Undefined terms • Theorem, conjectures, and postulates Conditional Statements	

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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.			
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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.* **Single variable equations 4.1 4.2 4.5** **Linear Relationships**	• **Algebra** • **Algebra**	• $ax + b = c$ • $ax + b = cx + d$ • $a(bx + c) = d$ • $a(bx + c)^2 = d$ • Absolute value • Radicals • Square root • Inequalities • Matrices • Absolute value • Inequalities • Compound Inequalities • Rational • Graphical, numerical, algebraic representations • Direct variation • Slope-intercept form • Standard form • Point-slope form	

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