

Montana Instructional Alignment

HPS Critical Competencies

Mathematics

Math II

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 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.				
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)
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.	<i>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.</i> Probability 2.4	Probability	Solve problems involving: <ul style="list-style-type: none"> • Combinations & Permutations • Pascal's Triangle • Counting Principles • Probability and Odds 	altitude, angle bisector, angle of depression, angle of elevation, arc, central angle, chord, circumscribed, collinear, coplanar, cosine, deductive reasoning, distance, equiangular, inductive reasoning, inscribed, median, midpoint, perpendicular bisector, plane, point, secant, sine, skew lines, space, tangent, tangent to a circle, transversal, vertex angle

**** Mathematics II does not cover all 4 standards, therefore only Standards 2, 3, and 4 are reflected in this document.**

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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.				
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)
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., 30-60-90) 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.	<i>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.</i> Right Triangle Trigonometry 3.3 Logic and Proof 3.1 3.4	<ul style="list-style-type: none"> • Geometry • Geometry • Reasoning and Proof 	<ul style="list-style-type: none"> • Ratio and proportion of similar triangles • Utilize similar triangles to develop trigonometric ratios • Use Pythagorean theorem and sin, cos, tan ratios to find measures of angles and sides with applications • Coordinate geometry & proof • Parallel and perpendicular lines with proof • Angle relationships (ex: vertical angles, linear pair, complementary, supplementary, angles of polygons, angles formed by a transversal) • Conditional statements and rules of logic • Deductive reasoning utilizing flow, paragraph, and 2-column proof formats • Similarity and Congruence of geometric figures, including ratios and proportions 	

