AVENTA LEARNING

Alignment Document
State of Montana and Aventa Learning Pre-Calculus

Pre-Calculus

Standards	Benchmarks	Unit Name	Course Topic Description
1 Students engage in the mathematical processes of problem solving and reasoning, estimation, communication, connections and applications, and using appropriate technology.	**1.1** recognize and formulate problems from situations within and outside mathematics and apply solution strategies to those problems.	Exponential and Logarithmic Functions	Values and Applications
	1.2 select, apply, and evaluate appropriate estimation strategies throughout the problem-solving process.	Exponential and Logarithmic Functions	Values and Applications
	1.3 formulate definitions, make and justify inferences, express generalizations, and communicate mathematical ideas and relationships.	Conics, Polar Coordinates and Complex Numbers	Conics: Circles, Ellipses, Hyperbolas and Parabolas
	1.4 apply and translate among different representations of the same problem situation or of the same mathematical concept. Model connections between problem situations that arise in disciplines other than mathematics.	Exponential and Logarithmic Functions	Values and Applications
	1.5 select and use appropriate technology to enhance mathematical understanding. Appropriate technology may include, but is not limited to, paper and pencil, calculator, computer, and data collection devices.	Conics, Polar Coordinates and Complex Numbers	Parametric Equations
2 Students demonstrate understanding of and an ability to use numbers and operations.	**2.1** use and understand the real number system, its operations, notations, and the various subsystems.	Conics, Polar Coordinates and Complex Numbers	Polar Coordinates and Complex Numbers
	2.2 use definitions and basic operations of the complex number system.	Conics, Polar Coordinates and Complex Numbers	Polar Coordinates and Complex Numbers
3 Students use algebraic concepts,	**3.1** use algebra to represent patterns of	Exponential and Logarithmic	Properties and Graphs

processes, and language to model and solve a variety of real-world and mathematical problems.	change.	Functions	
	3.2 use basic operations with algebraic expressions.	Exponential and Logarithmic Functions	Values and Applications
	3.3 solve algebraic equations and inequalities: linear, quadratic, exponential, logarithmic, and power.	Exponential and Logarithmic Functions	Values and Applications
	3.4 solve systems of algebraic equations and inequalities, including use of matrices.	Conics, Polar Coordinates and Complex Numbers	Parametric Equations
	3.5 use algebraic models to solve mathematical and real-world problems.	Exponential and Logarithmic Functions	Values and Applications
4 Students demonstrate understanding of shape and an ability to use geometry.	**4.1** construct, interpret, and draw three-dimensional objects.	Conics, Polar Coordinates and Complex Numbers	Conics: Circles, Ellipses, Hyperbolas and Parabolas
	4.2 classify figures in terms of congruence and similarity and apply these relationships.	Conics, Polar Coordinates and Complex Numbers	Conics: Circles, Ellipses, Hyperbolas and Parabolas
	4.3 translate between synthetic and coordinate representations.	Conics, Polar Coordinates and Complex Numbers	Conics: Circles, Ellipses, Hyperbolas and Parabolas
	4.4 deduce properties of figures using transformations, coordinates, and vectors in problem solving.	Conics, Polar Coordinates and Complex Numbers	Conics: Circles, Ellipses, Hyperbolas and Parabolas
	4.5 apply trigonometric ratios (sine, cosine and tangent) to problem situations involving triangles.		
5 Students demonstrate understanding of measurable attributes and an ability to use measurement processes.	**5.1** apply concepts of indirect measurements (e.g., using similar triangles to calculate a distance).		
	5.2 use dimensional analysis to check reasonableness of procedures.		
	5.3 investigate systems of derived measures (e.g., km/sec, g/cm³).		
	5.4 apply the appropriate concepts of estimates in measurement, error in measurement, tolerance, and precision.		
6 The students demonstrate understanding of and an ability to use data analysis, probability, and	**6.1** use curve fitting to make predictions from data.	Exponential and Logarithmic Functions	Values and Applications
	6.2 apply measures of central tendency and		

statistics.	demonstrate understanding of the concepts of variability and correlation.		
	6.3 select an appropriate sampling method for a given statistical analysis.		
	6.4 use experimental probability, theoretical probability, and simulation methods to represent and solve problems, including expected values.		
	6.5 design a statistical experiment to study a problem and communicate the outcomes.		
	6.6 describe, in general terms, the normal curve and use its properties to answer questions about sets of data that are assumed to be normally distributed.		
7 Students demonstrate understanding of and an ability to use patterns, relations and functions.	**7.1** describe functions and their inverses using graphical, numerical, physical, algebraic, and verbal mathematical models or representations.	Exponential and Logarithmic Functions	Properties and Graphs
	7.2 analyze the graphs of the families of polynomial, rational, power, exponential, logarithmic, and periodic functions.	Exponential and Logarithmic Functions	Properties and Graphs
	7.3 analyze the effects of parameter changes on the graphs of functions and relations, including translations.	Conics, Polar Coordinates and Complex Numbers	Parametric Equations
	7.4 model real-world phenomena with a variety of functions.	Exponential and Logarithmic Functions	Values and Applications
	7.5 use graphing for parametric equations, three-dimensional equations, and recursive relations.	Conics, Polar Coordinates and Complex Numbers	Parametric Equations