



Alignment Document

State of Wisconsin And Aventa Learning Pre-Calculus

Pre-Calculus

2005-2007 Benchmark Blueprint

State Standard Number	State Standard Area / Description	Unit Name	Course Topic Description
A.12	Mathematical Processes		
A.12.1	Use reason and logic to		
A.12.1.a	evaluate information	Exponential and Logarithmic Functions	Values and Applications
A.12.1.b	perceive patterns	Discrete Mathematics	Sequences and Series: Terms, Sums and Limits
A.12.1.c	identify relationships	Discrete Mathematics	Sequences and Series: Terms, Sums and Limits
A.12.1.d	formulate questions, pose problems, and make and test conjectures	Conics, Polar Coordinates and Complex Numbers	Polar Coordinates and Complex Numbers
A.12.1.e	pursue ideas that lead to further understanding and deeper insight	Conics, Polar Coordinates and Complex Numbers	Polar Coordinates and Complex Numbers
A.12.2	Communicate logical arguments and clearly show		
A.12.2.a	why a result does or does not make sense	Exponential and Logarithmic Functions	Properties and Graphs
A.12.2.b	why the reasoning is or is not valid	Discrete Mathematics	Sequences and Series: Convergence, Divergence and Applications
A.12.2.c	an understanding of the difference between examples that support a conjecture and a proof of the conjecture		

A.12.3	Analyze non-routine problems and arrive at solutions by various means, including models and simulations, often starting with provisional conjectures and progressing, directly or indirectly, to a solution, justification, or counter-example	Exponential and Logarithmic Functions	Properties and Graphs
A.12.4	Develop effective oral and written presentations employing correct mathematical terminology, notation, symbols, and conventions for mathematical arguments and display of data	Exponential and Logarithmic Functions	Values and Applications
A.12.5	Organize work and present mathematical procedures and results clearly, systematically, succinctly, and correctly	Exponential and Logarithmic Functions	Values and Applications
A.12.6	Read and understand		
A.12.6.a	mathematical texts and other instructional materials	Conics, Polar Coordinates and Complex Numbers	Polar Coordinates and Complex Numbers
A.12.6.b	writing about mathematics (e.g., articles in journals)	Discrete Mathematics	Sequences and Series: Convergence, Divergence and Applications
0	mathematical ideas as they are used in other contexts	Discrete Mathematics	Sequences and Series: Convergence, Divergence and Applications
B.12	Number Operations and Relationships		
B.12.1	Use complex counting procedures such as union and intersection of sets and arrangements (permutations and combinations) to solve problems		
B.12.2	Compare real numbers using		
B.12.2.a	order relations ($>$, $<$) and transitivity		
B.12.2.b	ordinal scales including logarithmic (e.g., Richter, pH rating)	Exponential and Logarithmic Functions	Properties and Graphs
B.12.2.c	arithmetic differences		
B.12.2.d	ratios, proportions, percents, rates of change	Discrete Mathematics	Sequences and Series: Terms, Sums and Limits
B.12.3	Perform and explain operations on real numbers (add, subtract, multiply, divide, raise to a power, extract a root, take opposites and reciprocals, determine absolute value)		



B.12.4	In problem-solving situations involving the application of different number systems (natural, integers, rational, real) select and use appropriate		
B.12.4.a	computational procedures	Conics, Polar Coordinates and Complex Numbers	Polar Coordinates and Complex Numbers
B.12.4.b	properties (e.g., commutativity, associativity, inverses)		
B.12.4.c	modes of representation (e.g., rationals as repeating decimals, indicated roots as fractional exponents)		
B.12.5	Create and critically evaluate numerical arguments presented in a variety of classroom and real-world situations (e.g., political, economic, scientific, social)	Exponential and Logarithmic Functions	Values and Applications
B.12.6	Routinely assess the acceptable limits of error when		
B.12.6.a	evaluating strategies		
B.12.6.b	testing the reasonableness of results		
B.12.6.c	using technology to carry out computations		
C.12	Geometry		
C.12.1	Identify, describe, and analyze properties of figures, relationships among figures, and relationships among their parts by	Conics, Polar Coordinates and Complex Numbers	Conics: Circles, Ellipses, Hyperbolas and Parabolas
C.12.1.a	constructing physical models		
C.12.1.b	drawing precisely with paper-and-pencil, hand calculators, and computer software		
C.12.1.c	using appropriate transformations (e.g., translations, rotations, reflections, enlargements)	Conics, Polar Coordinates and Complex Numbers	Conics: Circles, Ellipses, Hyperbolas and Parabolas
C.12.1.d	using reason and logic	Discrete Mathematics	Sequences and Series: Convergence, Divergence and Applications
C.12.2	Use geometric models to solve mathematical and real-world problems		
C.12.3	Present convincing arguments by means of demonstration, informal proof, counter-examples, or any other logical means to show the truth of		

C.12.3.a	statements (e.g., these two triangles are not congruent)	Conics, Polar Coordinates and Complex Numbers	Conics: Circles, Ellipses, Hyperbolas and Parabolas
C.12.3.b	generalizations (e.g., the Pythagorean theorem holds for all right triangles)	Discrete Mathematics	Sequences and Series: Convergence, Divergence and Applications
C.12.4	Use the two-dimensional rectangular coordinate system and algebraic procedures to describe and characterize geometric properties and relationships such as slope, intercepts, parallelism, and perpendicularity	Conics, Polar Coordinates and Complex Numbers	Conics: Circles, Ellipses, Hyperbolas and Parabolas
C.12.5	Identify and demonstrate an understanding of the three ratios used in right-triangle trigonometry (sine, cosine, tangent)		
D.12	Measurement		
D.12.1	Identify, describe, and use derived attributes (e.g., density, speed, acceleration, pressure) to represent and solve problem situations	Exponential and Logarithmic Functions	Values and Applications
D.12.2	Select and use tools with appropriate degree of precision to determine measurements directly within specified degrees of accuracy and error (tolerance)		
D.12.3	Determine measurements indirectly, using		
D.12.3.a	estimation		
D.12.3.b	proportional reasoning, including those involving squaring and cubing (e.g., reasoning that areas of circles are proportional to the squares of their radii)		
D.12.3.c	techniques of algebra, geometry, and right triangle trigonometry		
D.12.3.d	formulas in applications (e.g., for compound interest, distance formula)	Exponential and Logarithmic Functions	Exponential and Logarithmic Functions: Introduction
D.12.3.e	geometric formulas to derive lengths, areas, or volumes of shapes and objects (e.g., cones, parallelograms, cylinders, pyramids)		
D.12.3.f	geometric relationships and properties of circles and polygons (e.g., size of central angles, area of a sector of a circle)		



D.12.3.g	conversion constants to relate measures in one system to another (e.g., meters to feet, dollars to Deutschmarks)		
E.12	Statistics and Probability		
E.12.1	Work with data in the context of real-world situations by		
E.12.1.a	formulating hypotheses that lead to collection and analysis of one- and two-variable data		
E.12.1.b	designing a data collection plan that considers random sampling, control groups, the role of assumptions, etc.		
E.12.1.c	conducting an investigation based on that plan		
E.12.1.d	using technology to generate displays, summary statistics, and presentations		
E.12.2	Organize and display data from statistical investigations using		
E.12.2.a	frequency distributions		
E.12.2.b	percentiles, quartiles, deciles		
E.12.2.c	line of best fit (estimated regression line)		
E.12.2.d	matrices		
E.12.3	Interpret and analyze information from organized and displayed data when given		
E.12.3.a	measures of dispersion, including standard deviation and variance		
E.12.3.b	measures of reliability		
E.12.3.c	measures of correlation		
E.12.4	Analyze, evaluate, and critique the methods and conclusions of statistical experiments reported in journals, magazines, news media, advertising, etc.		
E.12.5	Determine the likelihood of occurrence of complex events by		
E.12.5.a	using a variety of strategies (e.g., combinations) to identify possible outcomes		
E.12.5.b	conducting an experiment		
E.12.5.c	designing and conducting simulations		
E.12.5.d	applying theoretical probability		
F.12	Algebraic Relationships		



F.12.1	Analyze and generalize patterns of change (e.g., direct and inverse variation) and numerical sequences, and then represent them with algebraic expressions and equations	Discrete Mathematics	Sequences and Series: Terms, Sums and limits
F.12.2	Use mathematical functions (e.g., linear, exponential, quadratic, power) in a variety of ways, including		
F.12.2.a	recognizing that a variety of mathematical and real-world phenomena can be modeled by the same type of function	Exponential and Logarithmic Functions	Values and Applications
F.12.2.b	translating different forms of representing them (e.g., tables, graphs, functional notation, formulas)	Exponential and Logarithmic Functions	Properties and Graphs
F.12.2.c	describing the relationships among variable quantities in a problem	Exponential and Logarithmic Functions	Values and Applications
F.12.2.d	using appropriate technology to interpret properties of their graphical representations (e.g., intercepts, slopes, rates of change, changes in rates of change, maximum, minimum)	Conics, Polar Coordinates and Complex Numbers	Conics: Parametric Equations
F.12.3	Solve linear and quadratic equations, linear inequalities, and systems of linear equations and inequalities		
F.12.3.a	numerically		
F.12.3.b	graphically, including use of appropriate technology		
F.12.3.c	symbolically, including use of the quadratic formula		
F.12.4	Model and solve a variety of mathematical and real-world problems by using algebraic expressions, equations, and inequalities		