



Alignment Document
State of Oregon and Aventa Learning Trigonometry

Trigonometry
2005-2007 Benchmark Blueprint

Strand	Common Curriculum Goal	Standard	Unit Name	Course Topic Description
MA.CM.CE Calculations and Estimations	Understand numbers, ways of representing numbers, relationships among numbers, and number systems	<p>MA.CM.CE.01 Compare real numbers</p> <p>MA.CM.CE.02 Order and compare numbers expressed in scientific notation to each other and to other forms of real numbers</p> <p>MA.CM.CE.03 Recognize that the set of real numbers contains the set of irrational numbers and the set of rational numbers and know the difference between them</p> <p>MA.CM.CE.04 Locate real numbers on a number line (including approximations of irrational numbers)</p> <p>MA.CM.CE.05 Apply equivalent forms of real numbers to solve problems</p>		
MA.CM.CE Calculations and Estimations	Compute fluently and make reasonable estimates	<p>MA.CM.CE.06 Compute with real numbers, including absolute value and numbers expressed in scientific notation</p> <p>MA.CM.CE.07 Compute with integer exponents and whole number roots</p>		



		<p>MA.CM.CE.08 Mentally multiply and divide by powers of 10 to estimate results of computations involving numbers expressed in scientific notation</p> <p>MA.CM.CE.09 Develop and use strategies to estimate the results of real number computations, determine the amount of error, and judge the reasonableness of results</p> <p>MA.CM.CE.10 Estimate the results of computations with integer powers and roots of real numbers.</p>		
<p>MA.CM.CE Calculations and Estimations</p>	<p>Understand meanings of operations and how they relate to one another</p>	<p>MA.CM.CE.11 Recognize that taking the nth root of a number corresponds to prime factorization</p> <p>MA.CM.CE.12 Use the inverse operations of nth power and nth root to solve problems and check solutions</p> <p>MA.CM.CE.13 Apply the associative, commutative, and distributive properties to simplify computations with real numbers</p> <p>MA.CM.CE.14 Use properties of numbers to demonstrate whether assertions are true or false</p>		
<p>MA.CM.SP Statistics and Probability</p>	<p>Select and use appropriate statistical methods to analyze data</p>	<p>MA.CM.SP.01 Estimate from a graph or a set of data the mean and standard deviation of a normal distribution and draw conclusions about the distribution of data using measures of center and spread (e.g., analyze a variety of summary statistics and graphical displays)</p> <p>MA.CM.SP.02 Analyze bivariate data and identify the type of function (linear, quadratic, exponential) that could be used to model the data</p>		



<p>MA.CM.SP Statistics and Probability</p>	<p>Understand and apply basic concepts of probability</p>	<p>MA.CM.SP.03 Compute the probability of a compound event (e.g., toss a coin three times to find the probability of two heads)</p> <p>MA.CM.SP.04 Determine probabilities of dependent and independent events (e.g., use colored marbles with and without replacement)</p> <p>MA.CM.SP.05 Use conditional probability to solve problems (e.g., from a sample set for the roll of two tetrahedral die; given that a sum is even, what is the probability that the sum is 6?)</p> <p>MA.CM.SP.06 Determine all possible outcomes of a particular event or all possible arrangements of objects in a given set by applying counting strategies, combinations, and permutations</p>		
<p>MA.CM.SP Statistics and Probability</p>	<p>Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them</p>	<p>MA.CM.SP.07 Determine appropriate designs for simulations (surveys, observational studies, and experiments) and modeling to study a problem and construct empirical probability distributions to represent results</p> <p>MA.CM.SP.08 Use matrices, histograms, scatter plots, stem-and-leaf plots, and box-and whisker-plots to interpret data</p> <p>MA.CM.SP.09 Identify examples of populations that are normally distributed</p>		
<p>MA.CM.SP Statistics and Probability</p>	<p>Develop and evaluate inferences and predictions that are based on data</p>	<p>MA.CM.SP.10 Make inferences and predictions from data in histograms, scatter plots, and parallel box plots</p> <p>MA.CM.SP.11 Make predictions about populations based on reported sample statistics</p>		



		MA.CM.SP.12 Understand that inferences about a population drawn from a sample involve uncertainty and that the role of statistics is to measure that uncertainty		
MA.CM.AR Algebraic Relationships	Understand patterns, relations, and functions	<p>MA.CM.AR.01 Represent and generalize sequences resulting from linear, quadratic, and exponential relationships using recursive or explicit formulas, tables of values, and graphs</p> <p>MA.CM.AR.02 Produce a valid conjecture using inductive reasoning by generalizing from a pattern of observations</p> <p>MA.CM.AR.03 Evaluate and make a table for two-variable formulas and match a graph or table of values to its formula</p> <p>MA.CM.AR.04 Identify independent and dependent variables and determine the domain and range of a function in a problem situation</p>	Linear Relations and Functions	Relations, Functions and Graphs
MA.CM.AR Algebraic Relationships	Represent and analyze mathematical situations and structures using algebraic symbols	<p>MA.CM.AR.05 Algebraically represent situations and solve problems involving quadratic and exponential equations, including exponential growth and decay</p> <p>MA.CM.AR.06 Use graphs to solve non-linear equations, including quadratics</p> <p>MA.CM.AR.07 Represent and solve systems of linear equations with two variables using simultaneous equations and by graphing.</p> <p>MA.CM.AR.08 Recognize and generate equivalent forms for algebraic expressions, including combining like terms and expanding binomials</p>	<p>Graphs and Functions</p> <p>Graphs and Functions</p>	<p>Polynomial Functions, Roots and Zeroes</p> <p>Polynomial Functions, Roots and Zeroes</p>

		<p>MA.CM.AR.09 Evaluate algebraic expressions and formulas by substituting real numbers</p> <p>MA.CM.AR.10 Translate between and interpret quadratic and exponential relationships represented by words, symbols, tables, and graphs</p> <p>MA.CM.AR.11 Determine and interpret maxima or minima and zeros of quadratic functions, and linear functions where $y = \text{constant}$</p> <p>MA.CM.AR.12 Graph linear inequalities in two variables</p> <p>MA.CM.AR.13 Graph quadratic and exponential equations</p> <p>MA.CM.AR.14 Analyze how changing a parameter (i.e., k, b) in a quadratic or exponential function of the form $y=k^ax+b$, $y=kx^2+b$, or $y=k(x+b)^2$ affects its graph</p>	<p>Graphs and Functions</p> <p>Graphs and Functions</p> <p>Graphs and Functions</p> <p>Graphs and Functions</p> <p>Graphs and Functions</p>	<p>Polynomial Functions, Roots and Zeroes</p> <p>Polynomial Functions, Roots and Zeroes</p> <p>The Nature of Graphs</p> <p>The Nature of Graphs</p>
MA.CM.AR Algebraic Relationships	Use mathematical models to represent and understand quantitative relationships	<p>MA.CM.AR.15 Model situations, make predictions and inferences, and solve problems using linear, quadratic, and exponential functions</p> <p>MA.CM.AR.16 Determine when data represented in a table or graph represents a linear, quadratic, or exponential relationship</p>	Linear Relations and Functions	Linear Relations, Scatter Plots and Linear Equalities
MA.CM.AR Algebraic Relationships	Analyze change in various contexts	<p>MA.CM.AR.17 Approximate and interpret rates of change in graphical and numeric data</p> <p>MA.CM.AR.18 Analyze the nature of change of each variable in a non-linear relationship as suggested by a table of values, a graph, or a formula</p>	<p>Graphs and Functions</p> <p>Graphs and Functions</p>	<p>Polynomial and Rational Functions</p> <p>Inverse Functions, Continuity and Extrema</p>



<p>MA.CM.ME Measurement</p>	<p>Understand measurable attributes of objects and the units, systems and processes of measurement</p>	<p>MA.CM.ME.01 Determine the appropriate units, scales, and tools for problem situations involving measurement</p> <p>MA.CM.ME.02 Solve problems involving unit conversions (e.g., mile per hour to feet per second) given the unit equivalencies.</p> <p>MA.CM.ME.03 Determine the precision of a given measuring tool (e.g., 1 degree for a standard protractor)</p>		
	<p>Apply appropriate techniques, tools, and formulas to determine measurements</p>	<p>MA.CM.ME.04 Develop and use strategies and formulas for calculating surface area and volume of cones and spheres</p> <p>MA.CM.ME.05 Use formulas to solve problems involving finding missing dimensions given perimeter, area, surface area, and volume of polygons, circles, prisms, pyramids, cones, cylinders, and spheres</p> <p>MA.CM.ME.06 Develop and understand, and use the formula for determining arc length (e.g., portion of a circle).</p> <p>MA.CM.ME.07 Determine perimeter and area of shapes of circles and polygons (annulus, etc.) in context</p> <p>MA.CM.ME.08 Determine the surface area and volume of a complex figure composed of a combination of two or more geometric figures or a figure derived from a regular solid (e.g., hemisphere, frustum of a cone)</p>		



		<p>MA.CM.ME.09 Compare and contrast the formulas for surface area and volume of cylinders and cones</p> <p>MA.CM.ME.10 Determine a shape that has minimum or maximum perimeter, area, surface area, or volume under specified conditions</p> <p>MA.CM.ME.11 Make and use scale drawings and models to solve problems</p>		
MA.CM.GE Geometry	Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships	<p>MA.CM.GM.01 Determine defining properties that characterize classes of three-dimensional figures and their component parts</p> <p>MA.CM.GM.02 Recognize and represent three-dimensional figures and their component parts</p> <p>MA.CM.GM.03 Justify and use theorems involving the angles formed by parallel lines cut by a transversal</p> <p>MA.CM.GM.04 Develop, understand, and apply properties of circles and of inscribed and circumscribed polygons</p> <p>MA.CM.GM.05 Use measures of sides and of interior and exterior angles of polygons to classify figures and solve problems</p> <p>MA.CM.GM.06 Prove congruence of two triangles or their corresponding component parts</p> <p>MA.CM.GM.07 Determine the measures of corresponding angles, sides, and corresponding parts of congruent and similar figures</p>		



		<p>MA.CM.GM.08 Use angle, side length, and triangle inequality relationships to solve problems</p> <p>MA.CM.GM.09 Use trigonometric functions, and angle and side relationships of special right triangles (30- 60-right triangles and isosceles right triangles) to solve for an unknown length and determine distances and solve problems</p> <p>MA.CM.GM.10 Investigate relationships among chords, secants, tangents, inscribed angles, and inscribed and circumscribed polygons of circles</p> <p>MA.CM.GM.11 Construct and judge the validity of a logical argument and give counterexamples to disprove a statement</p> <p>MA.CM.GM.12 Justify and use theorems involving the properties of triangles, quadrilaterals, circles, and their component parts to verify congruence and similarity</p>	<p>Trigonometric Functions</p>	<p>Trigonometric Functions and Right Triangles</p>
<p>MA.CM.GE Geometry</p>	<p>Use visualization, spatial reasoning, and geometric modeling to solve problems</p>	<p>MA.CM.GM.13 Model, sketch, label and where appropriate construct cones and spheres, and basic elements of geometric figures (e.g., altitudes, midpoints, medians, angle bisectors, and perpendicular bisectors) using compass and straightedge or technology</p> <p>MA.CM.GM.14 Describe how two or more objects are related in space (e.g., skew lines, the possible ways three planes might intersect)</p> <p>MA.CM.GM.15 Make a model of a three-dimensional figure from a two-dimensional drawing and make a two-dimensional representation of a three-dimensional object through scale drawings, perspective drawings, blueprints, or computer</p>		

		simulations MA.CM.GM.16 Recognize representations of three-dimensional objects from different perspectives and identify cross-sections of three-dimensional objects		
MA.CM.GE Geometry	Specify locations and describe spatial relationships using coordinate geometry and other representational systems	MA.CM.GM.17 Determine the relative placement (e.g., intersecting, parallel, perpendicular) of two lines on a coordinate plane given the algebraic equations representing them MA.CM.GM.18 Calculate slope, distance and midpoint between points with an emphasis on practical applications (use coordinate formulas)	Linear Relations and Functions Linear Relations and Functions	Linear Relations, Scatter Plots and Linear Equalities Relations, Functions and Graphs
MA.CM.GE Geometry	Apply transformations and use symmetry to analyze mathematical situations	MA.CM.GM.19 Use coordinate geometry to determine whether a figure is symmetrical with respect to a line or a point MA.CM.GM.20 Determine whether a given pair of figures on a coordinate plane represent a translation, reflection, rotation, and/or dilation MA.CM.GM.21 Determine the image of a figure on a coordinate graph under translations, reflections, and rotations MA.CM.GM.22 Given a figure and its image on a coordinate graph, determine the translation vector or locate the axis of reflection MA.CM.GM.23 Determine the coordinates of and draw the dilation of a figure on a coordinate graph MA.CM.GM.24 Analyze the congruence, similarity, and line or rotational symmetry of figures using transformations	Graphs and Functions Graphs and Functions Graphs and Functions Graphs and Functions Graphs and Functions Graphs and Functions	The Nature of Graphs The Nature of Graphs The Nature of Graphs The Nature of Graphs The Nature of Graphs The Nature of Graphs



MA.CM.PS Mathematical Problem Solving	Select, apply, and translate among mathematical representations to solve problems.	MA.CM.PS.01 Interpret the concepts of a problem-solving task and translate them into mathematics	Graphs and Functions	Polynomial and Rational Functions
MA.CM.PS Mathematical Problem Solving	Apply and adapt a variety of appropriate strategies to solve problems.	MA.CM.PS.01 Choose strategies that can work and then carry out the strategies chosen	Graphs and Functions	Polynomial and Rational Functions
MA.CM.PS Mathematical Problem Solving	Monitor and reflect on the process of mathematical problem solving.	MA.CM.PS.03 Produce identifiable evidence of a second look at the concepts/strategies/calculations to defend a solution	Trigonometric Functions	Trigonometric Functions and Right Triangles
MA.CM.PS Mathematical Problem Solving	Communicate mathematical thinking coherently and clearly. Use the language of mathematics to express mathematical ideas precisely.	MA.CM.PS.04 Use pictures, symbols, and/or vocabulary to convey the path to the identified solution	Trigonometric and Parametric Equations	Vectors and Parametric Equations
MA.CM.PS Mathematical Problem Solving	Accurately solve problems that arise in mathematics and other contexts.	MA.CM.PS.05 Accurately solve problems using mathematics	Trigonometric Functions	The Trigonometric Functions and Law of Sines and Cosines