

Grade 11	Mathematics: Algebra I, Algebra II, Geometry and Trigonometry	
Cluster	Algebra I	
<i>Objectives</i>	<i>Students will</i>	DOK
M.O.A1.2.2	create and solve multi-step linear equations, absolute value equations, and linear inequalities in one variable, (with and without technology); apply skills toward solving practical problems such as distance, mixtures or motion and judge the reasonableness of solutions.	2
M.O.A1.2.4	develop and test hypotheses to derive the laws of exponents and use them to perform operations on expressions with integral exponents.	2
M.O.A1.2.5	analyze a given set of data and prove the existence of a pattern numerically, algebraically and graphically, write equations from the patterns and make inferences and predictions based on observing the pattern.	3
M.O.A1.2.7	analyze situations and solve problems by determining the equation of a line given a graph of a line, two points on the line, the slope and a point, or the slope and y intercept.	2
M.O.A1.2.8	Identify a real life situation that involves a constant rate of change; pose a question; make a hypothesis as to the answer; develop, justify and implement a method to collect, organize, and analyze related data; extend the nature of collected, discrete data to that of a continuous linear function that describes the known data set; generalize the results to make a conclusion; compare the hypothesis and the conclusion; present the project numerically, analytically, graphically and verbally using the predictive and analytic tools of algebra (with and without technology)	4
M.O.A1.2.9	create and solve systems of linear equations graphically and numerically using the elimination method and the substitution method, given a real-world situation.	2
M.O.A1.2.10	simplify and evaluate algebraic expressions <ul style="list-style-type: none"> • add and subtract polynomials • multiply and divide binomials by binomials or monomials 	1
M.O.A1.2.13	simplify radical expressions <ul style="list-style-type: none"> • through adding, subtracting, multiplying and dividing • exact and approximate forms 	1
M.O.A1.2.14	solve quadratic equations by <ul style="list-style-type: none"> • graphing (with and without technology), • factoring • quadratic formula and draw reasonable conclusions about a situation being modeled.	2
M.O.A1.2.16	simplify and evaluate rational expressions <ul style="list-style-type: none"> • add, subtract, multiply and divide • determine when an expression is undefined. 	1
M.O.A1.2.19	gather data to create histograms, box plots, scatter plots and normal distribution curves and use them to draw and support conclusions about the data.	3
M.O.A1.2.20	design experiments to model and solve problems using the concepts of sample space and probability distribution.	3

Cluster	Algebra II	
<i>Objectives</i>	<i>Students will</i>	DOK
M.O.A2.2.2	factor higher order polynomials by applying various methods including factoring by grouping and the sum and difference of two cubes; analyze and describe the relationship between the factored form and the graphical representation.	2
M.O.A2.2.3	define complex numbers, simplify powers of 'i', perform basic operations with complex numbers, and give answers as complex numbers in simplest form.	1
M.O.A2.2.4	simplify expressions involving radicals and fractional exponents, convert between the two forms, and solve equations containing radicals and exponents.	1
M.O.A2.2.5	solve quadratic equations over the set of complex numbers: apply the techniques of factoring, completing the square, and the quadratic formula; use the discriminate to determine the number and nature of the roots; identify the maxima and minima; use words, graphs, tables, and equations to generate and analyze solutions to practical problems..	2
M.O.A2.2.7	define a function and find its zeros; express the domain and range using interval notation; find the inverse of a function; find the value of a function for a given element in its domain; and perform basic operations on functions including composition of functions.	2
M.O.A2.2.8	analyze families of functions and their transformations; recognize linear, quadratic, radical, absolute value, step, piecewise, and exponential functions; analyze connections among words, graphs, tables and equations when solving practical problems with and without technology.	2
M.O.A2.2.13	solve absolute value inequalities graphically, numerically and algebraically and express the solution set in interval notation.	2
Cluster	Geometry	
<i>Objectives</i>	<i>Students will</i>	DOK
M.O.G.3.2	differentiate and apply inductive and deductive reasoning, justify conclusions in real-world settings.	3
M.O.G.3.4	Validate conclusions by constructing logical arguments using both formal and informal methods with direct and indirect reasoning.	3
M.O.G.3.5	construct formal and informal proofs by applying definitions, theorems, and postulates related to such topics as <ul style="list-style-type: none"> • complementary, • supplementary, • vertical angles, • angles formed by perpendicular lines, and justify the steps.	3
M.O.G.3.6	compare and contrast the relationships between angles formed by two lines cut by a transversal when lines are parallel and when they are not parallel, and use the results to develop concepts that will justify parallelism.	2
M.O.G.3.7	make conjectures and justify congruence relationships with an emphasis on triangles and employ these relationships to solve problems.	2
M.O.G.3.8	identify general properties of and compare and contrast the properties of convex and concave quadrilaterals <ul style="list-style-type: none"> • parallelograms • rectangles • rhombuses 	2

	<ul style="list-style-type: none"> • squares • trapezoids 	
M.O.G.3.9	Identify a real life situation that involves similarity in two or three dimensions; pose a question; make a hypothesis as to the answer; develop, justify, and implement a method to collect, organize, and analyze related data; generalize the results to make a conclusion; present the project numerically, analytically, graphically and verbally using predictive and analytic tools of algebra and geometry (with and without technology).	4
M.O.G.3.10	investigate measures of angles and lengths of segments to determine the existence of a triangle (triangle inequality) and to establish the relationship between the measures of the angles and the length of the sides (with and without technology).	2
M.O.G.3.11	verify and justify the basis for the trigonometric ratios by applying properties of similar triangles and use the results to find inaccessible heights and distances. Using the ratios of similar triangles to find unknown side lengths and angle measures, construct a physical model that illustrates the use of a scale drawing in a real-world situation.	2
M.O.G.3.12	apply the Pythagorean Theorem and its converse to solve real-world problems and derive the special right triangle relationships (i.e. 30-60-90, 45-45-90).	2
M.O.G.3.13	investigate measures of angles formed by chords, tangents, and secants of a circle and draw conclusions for the relationship to its arcs.	2
M.O.G.3.14	find angle measures of interior and exterior angles; given a polygon, find the length of sides from given data; and use properties of regular polygons to find any unknown measurements of sides or angles.	2
M.O.G.3.15	develop properties of tessellating figures and use those properties to tessellate the plane.	2
M.O.G.3.16	derive and justify formulas for area, perimeter, surface area, and volume using nets and apply them to solve real-world problems.	2
M.O.G.3.17	apply concepts of analytical geometry such as formulas for distance, slope, and midpoint and apply these to finding dimensions of polygons on the coordinate plane.	2
M.O.G.3.18	construct a triangle's medians, altitudes, angle and perpendicular bisectors using various methods; and develop logical concepts about their relationships to be used in solving real-world problems.	2
M.O.G.3.19	create and apply concepts using transformational geometry and laws of symmetry, of a <ul style="list-style-type: none"> • reflection, • translation, • rotation, • glide reflection, • dilation of a figure, and develop logical arguments for congruency and similarity.	3
Cluster	Trigonometry	
<i>Objectives</i>	<i>Students will</i>	DOK
M.O.T.3.1	apply the right triangle definition of the six trigonometric functions of an angle to determine the values of the function values of an angle in standard position given a point on the terminal side of the angle. <ul style="list-style-type: none"> • determine the value of the other trigonometric functions given the value of one of the trigonometric functions and verify these values with technology. 	2

	<ul style="list-style-type: none"> • using geometric principles and the Pythagorean Theorem, determine the six function values for the special angles and the quadrantal angles and use them in real-world problems. • compare circular functions and the trigonometric function values to draw inferences about coterminal angles and co-functions. 	
M.O.T.3.8	investigate real-world problems within a project based investigation involving triangles using the trigonometric functions, the law of sines and the law of cosines, justify and present results.	3