Trigonometry

Unit 1 Functions

Estimated Time Frame for Unit	Big Ideas	Essential Question	Concepts	Competencies	Lesson Plans and Suggested Resources	Vocabulary	Standards/Eligible Content
18 Days	Mathematical functions are relationships that assign each member of one set (domain) to a unique member of another set (range), and the relationship is recognizable across representations.	How can students identify the domain and range for a relation, equation of a graph?	Functions	Students should be able to determine whether a relation is a function. Students should be able to use function notation. Students should be able to identify the domain and range of a relation or function. Students should be able to evaluate functions. Students should be able to evaluate difference quotients. Students should be able to use functions to model and solve real life problems.	**Relations and Functions** Suggested Resources: Trigonometry (Hosteteler/Larson) Section P-5 Pgs.55 - 68 Advanced Mathematical Concepts Section 1-1 (Pgs. 5-12) Glencoe-Precalulus /2012- Section 1-1 (PC Pgs 4 – 12) Algebra and Trigonometry with Analytic Geometry (Swokowski) Section 3-4 (Pg 175-188) 2 days	relation, domain, range, function, vertical line test, function notation,	Domain: F-IF Interpreting Functions. Standard: Analyze Functions using different representations 7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic equations and show intercepts, maxima and minima. c. Graph polynomial functions, identify zeros when suitable factorizations are available, and show end behavior.

	Mathematical functions are relationships that assign each member of one set (domain) to a unique member of another set (range), and the relationship is recognizable across representations.	What are the important features of a graph of a polynomial and why are they important?	Functions	Students should be able to use the vertical line test for functions. Students should be able to use graphs to estimate function values and find domains, ranges, y-intercepts, and zeros of functions. Students should be able to explore symmetries of graphs, and identify even and odd functions. Students should be able to determine intervals on which functions are increasing, decreasing, and determine maxima and minima of functions. Students should be able to determine the average rate of change of a function.	**Analyze Graphs of Functions and Relations-** Suggested Resources: Trigonometry (Hosteteler/Larson) Section P-6 Pgs.69 - 80 Glencoe- Pre-calculus /2010 Section 1-2 (Pgs 13 – 23) Section 1-4 (Pgs 34 – 43) Algebra and Trigonometry with Analytic Geometry (Swokowski Pg 141-156, 175-193, 262-272) 2 Days	relation, domain, range, function, vertical line test, function notation, composition, composite, linear equation, x-intercept, y-intercept, standard form, slope-intercept form, zeros of the function, constant function, family of graphs, mathematical model, point-slope form	Domain: F-IF Interpreting Functions. Standard: Analyze Functions using different representations 7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic equations and show intercepts, maxima and minima. c. Graph polynomial functions, identify zeros when suitable factorizations are available, and show end behavior.
	Families of functions exhibit properties and behaviors that can be recognized across representations. Functions can be transformed, combined, and composed to create new functions in	How can students manipulate functions through transformations, operations, and compositions?	Functions	Students should be able to identify and graph linear and squaring functions. Students should be able to identify and graph cubic, square	**Parent Function and Transformation-** Suggested Resources: Trigonometry (Hosteteler/Larson) Section P-7	Linear function Point-slope form Constant function Squaring Function Cubic function	Domain: F-BF Building Functions Standard: Build a new function from and existing function 3. Identify the effect on the graph of

	mathematical and real world situations.			root, and reciprocal functions. Students should be able to identify and graph step and piece-wise functions. Students should be able to recognize graph of parent functions.	Pgs.81-88 Glencoe-Precalculus/2010-Section 1- 5 (PC Pgs 45 – 55) Algebra and Trigonometry with Analytic Geometry (Swokowski Pg 192 – 208) 8 Days	Square root function Reciprocal function Step functions Piece-wise function Parent functions	replacing *f (x)* by *f (x) + k, k f(x), f (kx),* and *f (x + k)* for specific values of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.*
	Families of functions exhibit properties and behaviors that can be recognized across representations. Functions can be transformed, combined, and composed to create new functions in mathematical and real world situations.	How can students manipulate functions through transformations, operations, and compositions?	Factors	Student should be able to use vertical and horizontal shifts to sketch graphs of functions. Students should be able to use reflections to sketch graphs. Students should be able to use nonrigid transformations to sketch graphs of functions.	**Parent Function and Transformation-** Suggested Resources: Trigonometry (Hosteteler/Larson) Section P-8 Pgs.89-98 Glencoe-Precalculus/2010-Section 1- 5 (PC Pgs 45 – 55) Algebra and Trigonometry with Analytic Geometry (Swokowski Pg 192 – 208) 4 Days	Vertical shift Horizontal shift Reflection Rigid transformations Nonrigid transformations Vertical stretch Vertical shrink Horizontal shrink	Domain: F-BF Building Functions Standard: Build a new function from and existing function 3. Identify the effect on the graph of replacing *f (x)* by *f (x) + k, k f(x), f (kx),* and *f (x + k)* for specific values of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.*
Review Unit 1 Functions 1 Day							
Test Unit 1 Functions 1 Day							

Unit 2 Conic Sections

Estimated Time Frame for Unit	Big Ideas	Essential Question	Concepts	Competencies	Lesson Plans and Suggested Resources	Vocabulary	Standards/Eligible Content
15 days	Relations and functions are mathematical relationships that can be represented and analyzed using words, tables, graphs, and equations.	What is a conic section and how does it relate to other areas of mathematics? Why is it important to write equations of various shapes?	Conic Sections	Students should be able to analyze and graph equations of parabolas. Students should be able to write equations of parabolas.	Parabolas – Suggested Resources: Advanced Mathematical Concepts Section 10-5 (Pgs.653-661) Sullivan-Precalculus Section 10.2 Pgs. 656-664 Glencoe Precalculus -2011 Section 7-1 (Pgs 422 – 431) Algebra and Trigonometry with Analytic Geometry (Swokowski) (Pg 806 - 816) 3 Days	Conic sections Degenerate conic Locus Parabola Focus Directrix Axis of symmetry Vertex Latus rectum	Domain: G-GPE Expressing Geometric Properties with Equations Standard: Translate between a geometric description and the equation for a conic section 2. Derive the equation of a parabola given a focus and directrix
	Relations and functions are mathematical relationships that can be represented and analyzed using words, tables, graphs, and equations.	What is a conic section and how does it relate to other areas of mathematics?	Conic Sections	Students should be able to analyze and graph equations of circles. SWBA to write equations of circles.	**Circles** Suggested Resources: Advanced Mathematical Concepts Section 10-2 (Pgs.623-630)	Conic Section Circle Concentric Circle Degenerate Conic Center Radius	Domain: G-GPE Expressing Geometric Properties with Equations Standard: Translate between a geometric description and the equation for a conic section

					Sullivan- Precalculus Section 1-4 Pgs. 35-41 Glencoe Precalculus -2011 Section 7-2 (Pgs 432 – 441) Algebra and Trigonometry with Analytic Geometry (Swokowski) (Pg 816 - 830) 3 Days		1. Derive the equation of a circle of a given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation. 3. Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.
	Relations and functions are mathematical relationships that can be represented and analyzed using words, tables, graphs, and equations.	What is a conic section and how does it relate to other areas of mathematics?	Conic Sections	Students should be able to analyze and graph equations of ellipses. SWBA to write equations of ellipses.	**Ellipses** Suggested Resources: Advanced Mathematical Concepts Section 10-3 (Pgs.631-641) Sullivan- Precalculus Section 10-3 Pgs. 634-644 Glencoe Precalculus - 2011 Section 7-2 (Pgs 432 – 441) Algebra and Trigonometry with Analytic Geometry (Swokowski) (Pg 816 - 830) 3 Days	Ellipse Foci Major axis Center Minor axis Vertices Co-vertices Eccentricity	Domain: G-GPE Expressing Geometric Properties with Equations Standard: Translate between a geometric description and the equation for a conic section 1. Derive the equation of a circle of a given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation. 3. Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.

	Relations and functions are mathematical relationships that can be represented and analyzed using words, tables, graphs, and equations.	What is a conic section and how does it relate to other areas of mathematics? Why is it important to write equations of various shapes?	Conic Sections	Students should be able to analyze and graph equations of hyperbolas. Students should be able to use equations to identify the types of conic sections.	**Hyperbolas-** Suggested Resources: Advanced Mathematical Concepts Section 10-4 (Pgs.642-652) Sullivan- Precalculus Section 10.4 Pgs. 644-656 Glencoe Precalculus - 2011 Section 7-3 (PC Pgs 442 – 442) Algebra and Trigonometry with Analytic Geometry (Swokowski) (Pg 830 - 842) 3 Days	Hyperbola Transverse axis Conjugate axis	Domain: G-GPE Expressing Geometric Properties with Equations Standard: Translate between a geometric description and the equation for a conic section 3. Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.
	Relations and functions are mathematical relationships that can be represented and analyzed Using words, tables, graphs, and equations.	What is a conic section and how does it relate to other areas of mathematics? Why is it important to write equations of various shapes?	Conic Sections and Parametric Equations	*Objectives:* SWBA to find rotation of axes to write equations of rotates conics sections. SWBA to use equations to identify the types of conic sections.	**Rotations of Conic Sections-** Suggested Resources: Glencoe-Pre-calculus/2010-Section 7-4 (PC Pgs 454 – 461) Day 118,119,120	identity, trigonometric identity, reciprocal identities, quotient identity, Pythagorean identities, symmetry identities, opposite-angle identities, sum identities for sine,	Domain: G-GPE Expressing Geometric Properties with Equations Standard: Translate between a geometric description and the equation for a conic section 1. Derive the equation of a circle of a given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

						cosine, difference identities for sine and cosine, reduction identities, double-angle identities, half-angles identities	2. Derive the equation of a parabola given a focus and directrix 3. Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.
Review Unit 2 Conic Sections 1 Day							
Test Unit 2 Conic Sections 1 Day							
Unit 3 Trigonometry and Angles							
Estimated Time Frame for Unit	**Big Ideas**	**Essential Question**	**Concepts**	**Competencies**	**Lesson Plans and Suggested Resources**	**Vocabulary**	**Standards/Eligible Content**
20 days	Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms.	In what ways might radians be more useful than degrees in various situations (or vice versa)?	Trigonometric Functions	Students should be able to convert decimal degree measures to degrees, minutes and seconds. Students should be able to convert degrees, minutes and seconds to decimal degrees. Students should be able to find the number of degrees	**Radian and Degree Measure** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 1-1 Pgs.130-141 Advanced Mathematical Concepts Section 5-1 (Pgs.277--283)	Vertex Initial side Terminal side Standard Position Degree Minute Seconds Radian	Domain: F-TF Trigonometric Functions Standard: Extend the domain of trigonometric functions using the unit circle 1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.

				in a given number of rotations. Students should be able to identify angles that are coterminal with a given angle. Students should be able to use angle measures to solve real-world problems.	Glencoe-Pre-calculus(2012) Section 4-2 (Pgs 231 – 241) Algebra and Trigonometry with Analytic Geometry (Swokowski) Pg 392 - 403) 4 Days	Quadrantal Angle Coterminal Angle	2. Explain how the unit circle in the coordinate plane enables the extension of the trigonometric functions to all real numbers, interpreted as radian measure of angles traversed counterclockwise around the unit circle.
	Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms	How is the unit circle a useful device in the solving of trigonometric problems?	Trigonometric Functions	Students should be able to identify a unit circle and describe its relationship to real numbers. Students should be able to evaluate trigonometric functions using the unit circle. Students should be able to use the domain and period to evaluate sine and cosine functions. Students should be able to use a calculator tor to evaluate trigonometric functions.	**Trigonometric Functions : The Unit Circle-** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 1-2 Pgs.142-148 Advanced Mathematical Concepts Section 5-3 (Pgs.291-298) Glencoe Pre-calculus(2012) Section 4-3 (Pgs 242 – 253) Algebra and Trigonometry with Analytic Geometry (Swokowski) Pg 421 - 439) 5 days	Unit circle Sine Cosine Tangent Cosecant Secant Cotangent Circular functions Periodic function Period Trigonometric functions Quadrantal angle Reference angle	Domain: F-TF Trigonometric Functions Standard: Extend the domain of trigonometric functions using the unit circle 2. Explain how the unit circle in the coordinate plane enables the extension of the trigonometric functions to all real numbers, interpreted as radian measure of angles traversed counterclockwise around the unit circle. 4. Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions

	Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms.	In what ways might radians be more useful than degrees in various situations (or vice versa)?	Trigonometric Functions	Students should be able to determine Linear Displacement. Students should be able to determine Linear velocity. Students should be able to find Angular Displacement. Students should be able to find Angular velocity.	**Angular Motion Applications** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 1-1 Pgs.130-141 Advanced Mathematical Concepts Section 5-1 (Pgs.277--283) Glencoe-Pre-calculus(2012) Section 4-2 (Pgs 231 – 241) Algebra and Trigonometry with Analytic Geometry (Swokowski) Pg 392 - 403) 5 Days	Linear Displacement Linear velocity Angular Displacement Angular velocity	Domain: F-TF Trigonometric Functions Standard: Extend the domain of trigonometric functions using the unit circle 1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle. 2. Explain how the unit circle in the coordinate plane enables the extension of the trigonometric functions to all real numbers, interpreted as radian measure of angles traversed counterclockwise around the unit circle.
Review Unit 3 Trigonometry and Angles 1 Day							
Test Unit 3 Trigonometry and Angles 1 Day							
Unit 4 Inverse Trigonometric Functions							
Estimated Time Frame for Unit	**Big Ideas**	**Essential Question**	**Concepts**	**Competencies**	**Lesson Plans and Suggested Resources**	**Vocabulary**	**Standards/Eligible Content**

15 Days	Families of functions exhibit properties and behaviors that can be recognized across representations. Functions can be transformed, combined, and composed to create new functions in mathematical and real world situations.	How can students manipulate functions through transformations, operations, and compositions?	Functions	Students should be able to perform operations on functions. Students should be able to find compositions of functions Students should be able to use combinations and compositions of functions to model real-world problems.	**Function Operations and Composition of Function-** Suggested Resources: Trigonometry (Hosteteler/Larson) Section P-9 Pgs.99-107 Glencoe- Precalulus /2010- Section 1- 6 (PC Pgs 57 – 64) Algebra and Trigonometry with Analytic Geometry (Swokowski Pg 224 - 234) 6 Days	Arithmetic combinations Composition of Functions Decompose a Function	Domain: F-BF Building Functions Standard: Build a function that models a relationship between quantities 1. Write a function that describes a relationship between two quantities. b. Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.* c. Compose functions. *For example, if T (y) is the temperature in the atmosphere as a function of height, and h (t) is the height of the weather balloon as a function of time, the T (h(t)) is the temperature at the location of the weather balloon as a function of time.*
	Families of functions exhibit properties and behaviors that can be recognized across representations. Functions can be transformed, combined,	How can students manipulate functions through transformations, operations, and compositions?	Functions	Students should be able to use the graphs of functions to determine if they are inverse functions.	**Inverse Relations and Functions-** Suggested Resources: Trigonometry	Inverse Function One-to-One Functions Horizontal Line test	Domain: F-BF Building Functions Standard: Build new functions from existing functions.

	and composed to create new functions in mathematical and real world situations.			Students should be able to find inverse functions algebraically and graphically. Students should be able to use the horizontal line test to determine if functions are one – to-one	(Hosteteler/Larson) Section P-10 Pgs.108-117 Glencoe- Precalulus - Section 1- 7 (PC Pgs 65 – 73) Algebra and Trigonometry with Analytic Geometry (Swokowski Pg 235 - 245) 4 Days		4. Find inverse functions. a. Solve an equation of the form *f (x) = c* for a simple function *f* that has an inverse and write an expression for the inverse. b. Verify by composition that one function is the inverse of another. c. Read values of an inverse function from a graph or a table given that the function has an inverse.
	Families of functions exhibit properties and behaviors that can be recognized across representations.Functions can be transformed, combined, and composed to create new functions in mathematical and real world situations.	What are the various methods in which a trig expression may be verified or that a trig equation may be solved?	Trigonometric Functions	Student should be able to evaluate and graph inverse trigonometric functions. Student should be able to evaluate and graph compositions of trigonometric functions.	**Inverse Trigonometric Functions –** Suggested Resources: Trigonometry (Hosteteler/Larson) Section P-10 Pgs.108-117 Glencoe-Pre-calculus/2010- Section 4-6 (PC Pgs 280 – 290) Algebra and Trigonometry with Analytic Geometry (Swokowski Pg 541 – 557)- 2 Days	Inverse Sine Function Inverse cosine function Inverse tangent function	Domain: F-TF Trigonometric Functions Standard: Model periodic phenomena with trigonometric functions. 5. Choose trigonometric functions to model periodic phenomena with specific amplitude, frequency, and midline. 6. Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows it's inverse to be constructed. Domain: F-BF Building Functions

							Standard: Build a function that models a relationship between quantities. c. Compose functions. *For example, if T (y) is the temperature in the atmosphere as a function of height, and h (t) is the height of the weather balloon as a function of time, the T (h(t)) is the temperature at the location of the weather balloon as a function of time.*
Review Unit 4 Inverse Trigonometric Functions 1 Day							
Test Unit 4 Inverse Trigonometric Functions 1 Day							
Unit 5 Graphing Trigonometric Functions							
Estimated Time Frame for Unit	**Big Ideas**	**Essential Question**	**Concepts**	**Competencies**	**Lesson Plans and Suggested Resources**	**Vocabulary**	**Standards/Eligible Content**
17 days	Relations and functions are mathematical relationships that can be represented and analyzed using, words, tables, graphs, and equations.	What are the various methods in which a trig expression may be verified or that a trig equation may be solved?	Trigonometric Functions	Students should be able to sketch graphs of basic sine and cosine functions. Students should be able to graph transformations of the sine and cosine functions.	**Graphing Sine and Cosine Functions** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 1-5 Pgs.169-179	Sinusoid Amplitude Period Frequency Phase shift Vertical shift	Domain: F-TF Trigonometric Functions Standard: Model periodic phenomena with trigonometric functions. 5. Choose trigonometric

				Students should be able to use sinusoidal functions to solve real-world problems.	Advanced Mathematical Concepts Section 6-3,6-4, 6-5 (Pgs.359-386) Glencoe- Precalculus 2011- Section 4-4 (Pgs 256 – 266) Algebra and Trigonometry with Analytic Geometry (Swokowski) (Pg 448 - 462) 5 days	Midline	functions to model periodic phenomena with specific amplitude, frequency, and midline.
Review Unit 5 (Part 1) Graphing Trigonometric Functions 1 Day							
Test Unit 5 (Part 1) Graphing Trigonometric Functions 1 Day							
	Relations and functions are mathematical relationships that can be represented and analyzed using, words, tables, graphs, and equations.	What are the various methods in which a trig expression may be verified or that a trig equation may be solved?	Trigonometric Functions	Students should be able to graph tangent and cotangent functions. Students should be able to sketch graphs of damped trigonometric functions. Students should be able to write equations of trigonometric functions.	**Graphing Tangent and Cotangent** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 1-6 Pgs.180-190 Advanced Mathematical Concepts Section 6-7 (Pgs.395-403) Section 4-5 Glencoe- Precalculus 2011 (PC Pgs 269 – 279)	Damped trigonometric function Damping factor Damped oscillation Damped wave Damped harmonic motion	Domain: F-TF Trigonometric Functions Standard: Model periodic phenomena with trigonometric functions. 5. Choose trigonometric functions to model periodic phenomena with specific amplitude, frequency, and midline. 6. Understand that restricting a trigonometric function

					Algebra and Trigonometry with Analytic Geometry (Swokowsk) (Pg 463 - 471) 2 Days		to a domain on which it is always increasing or always decreasing allows it's inverse to be constructed.
	Relations and functions are mathematical relationships that can be represented and analyzed using, words, tables, graphs, and equations.	What are the various methods in which a trig expression may be verified or that a trig equation may be solved?	Trigonometric Functions	Students should be able to graph Secant and cosecant functions. Students should be able to sketch graphs of damped trigonometric functions. Students should be able to write equations of trigonometric functions.	**Graphing Secant and Cosecant.** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 1-6 Pgs.180-190 Advanced Mathematical Concepts Section 6-7 (Pgs.395-403) Section 4-5 Glencoe- Precalculus 2011 (PC Pgs 269 – 279) Algebra and Trigonometry with Analytic Geometry (Swokowsk) (Pg 463 - 471) 2 Days	Damped trigonometric function Damping factor Damped oscillation Damped wave Damped harmonic motion	Domain: F-TF Trigonometric Functions Standard: Model periodic phenomena with trigonometric functions. 5. Choose trigonometric functions to model periodic phenomena with specific amplitude, frequency, and midline. 6. Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows it's inverse to be constructed.
Review Unit 5 (Part 2) Graphing Trigonometric Functions 1 Day							
Test Unit 5 (Part 2) Graphing Trigonometric Functions 1 Day							

Unit 6 Trigonometric Identities

Estimated Time Frame for Unit	Big Ideas	Essential Question	Concepts	Competencies	Lesson Plans and Suggested Resources	Vocabulary	Standards/Eligible Content
21 Days	Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms.	What are trigonometric identities and why are they useful?	Trigonometric Identities and Equations	Students should be able to use reciprocal identifies, quotient identities, Pythagorean Identities, symmetry identities and opposite angle identities. Students should be able to identify and use basic trigonometric identities to find trigonometric values. Students should be able to use, simplify and rewrite trigonometric identities.	**Trigonometric Identities -** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 2-1 Pgs.222-229 Advanced Mathematical Concepts Section 7-1 (Pgs.421-430) Glencoe Precalculus - 2011 Chapter 5-Section 5-1 (Pgs 312 – 319) Algebra and Trigonometry with Analytic Geometry (Swokowski) (Pg 494 - 500) 2 Days	Identity Trigonometric identity Reciprocal identity Quotient identity Pythagorean Identity Symmetry Identity Opposite Angle Identity Cofunction Odd-even identity	Domain: F-TF Trigonometric Functions Standard: Prove and apply trigonometric identities. 8. Prove the Pythagorean Identity and use it to find sin(ɵ), cos(ɵ), or tan(ɵ), and the quadrant of the angle
	Families of functions exhibit properties and behaviors that can be recognized across representations Functions can be transformed, combined, and composed to create new functions	What are trigonometric identities and why are they useful?	Trigonometric Identities and Equations	Students should be able to use the basic identities to verify other trigonometric Identities. Students should be	**Verifying Trigonometric Identities** Suggested Resources: Trigonometry (Hosteteler/Larson)	Verify an identity	Domain: F-TF Trigonometric Functions Standard: Prove and apply trigonometric identities.

	in mathematical and real world situations.			able to determine whether equations are identities. Students should be able to find numerical values of trigonometric functions.	Section 2-2 Pgs.230-236 Advanced Mathematical Concepts Section 7-1 (Pgs.431-436) Glencoe Precalculus - 2011 Section 5-2 (Pgs 320 – 326) Algebra and Trigonometry with Analytic Geometry (Swokowski) (Pg 494 - 500) 4 Days		8. Prove the Pythagorean Identity and use it to find sin(ɵ), cos(ɵ), or tan(ɵ), and the quadrant of the angle.
	There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.	What are the various methods in which a trig expression may be verified or that a trig equation may be solved?	Trigonometric Identities and Equations	Students should be able to solving trigonometric equations using algebraic techniques. SWBA to solve trigonometric equations using basic techniques.	**Solving Trigonometric Equations** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 2-3 Pgs.237-247 Glencoe-Pre-calculus/2010- Section 5-3 (PC Pgs 327 – 333) Algebra and Trigonometry with Analytic Geometry (Swokowski Pg 500 - 514) 5 Days		Domain: A-REI Reasoning with equations and Inequalities Standard: Understand solving equations as a process of reasoning and explain the reasoning. 1. Explain each step in solving simple equations as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

							Domain: F-TF Trigonometric Functions Standard: Model periodic phenomena with trigonometric functions. 7. Use inverse functions to solve trigonometric equations that arise in modeling contexts: evaluate the solution using technology and interpret them in terms of the context
Review Unit 6 (Part 1) Trigonometric Identities 1 Day							
Test Unit 6 (Part 1) Trigonometric Identities 1 Day							
	There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.	What are trigonometric identities and why are they useful?	Trigonometric Identities and Equations	Students should be able to use the sum and difference identities to evaluate trigonometric functions. Students should be able to use the sum and difference identities to solve trigonometric equations.	**Sum and Difference Identities –** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 2-4 Pgs.248-254 Advanced Mathematical Concepts Section 7-3 (Pgs.437-447) Glencoe Precalculus - 2011		Domain: F-TF Trigonometric Functions Standard: Prove and apply trigonometric identities 9. Prove the addition and subtraction formulas for sine, cosine and tangent and use them to solve problems. Domain: A-REI Reasoning with equations and Inequalities

					Section 5-4 (Pgs 336 – 343) Algebra and Trigonometry with Analytic Geometry (Swokowski) (Pg 515 - 525) 3 Days		Standard: Understand solving equations as a process of reasoning and explain the reasoning. 1. Explain each step in solving a simple equations as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
	There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.	What are trigonometric identities and why are they useful?	Trigonometric Identities and Equations	Students should be able to use multiple angle formulas to rewrite and evaluate trigonometric functions. Students should be able to use power reducing formulas to rewrite and evaluate trigonometric functions. Students should be able to use half-angle formulas to rewrite and evaluate trigonometric functions. Students should be able to use sum-to-	**Double Angle and Half Angle Identities** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 2-5 Pgs.255-266 Advanced Mathematical Concepts Section 7-3 (Pgs.437-447) Glencoe Precalculus - 2011 Section 5-4 (Pgs 336 – 343) Algebra and Trigonometry with Analytic Geometry (Swokowski) (Pg 515 - 525)	Double-Angle Formulas Power-Reducing Formulas Half-Angle Formulas Product to Sum Formulas	Domain: F-TF Trigonometric Functions Standard: Prove and apply trigonometric identities 9. Prove the addition and subtraction formulas for sine, cosine and tangent and use them to solve problems. Domain: A-REI Reasoning with equations and Inequalities Standard: Understand solving equations as a process of reasoning and explain the reasoning.

				product formulas to rewrite and evaluate trigonometric functions. Students should be able to use trigonometric formulas to rewrite real-world models.	3 Day		1. Explain each step in solving a simple equations as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
Review Unit 6 (Part 2) Trigonometric Identities 1 Day							
Test Unit 6 (Part 2) Trigonometric Identities 1 Day							
Unit 7 Trigonometry and Right Triangles							
Estimated Time Frame for Unit	**Big Ideas**	**Essential Question**	**Concepts**	**Competencies**	**Lesson Plans and Suggested Resources**	**Vocabulary**	**Standards/Eligible Content**
14 Days	Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms	Why should you know more than one way to solve a trigonometric problem?	Trigonometric Functions	Students should be able to find values of trigonometric functions for acute angles of right triangles. Students should be able to use the Fundamental trigonometric identities.	**Right Triangle Trigonometry** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 1-3 Pgs.149-159 Advanced Mathematical Concepts	Hypotenuse Leg Side adjacent Side opposite Trigonometric ratios Sine Cosine	Domain: G-SRT Similarity, Right Triangles, and Trigonometry Standard: Define trigonometric ratios and solve problems involving right triangles 6. Understand that by similarity, side ratios in right triangles are

				Students should be able to use a calculator tor to evaluate trigonometric functions.	Section 5-2 (Pgs.277--283) Glencoe-Precalculus(2012) Section 4-1 (Pgs 220 – 230) Algebra and Trigonometry with Analytic Geometry (Swokowski (Pg 392 - 420) 4 days	Tangent Cosecant Secant Cotangent	properties of the triangles, leading to the definitions of trigonometric ratios for acute angles. Domain: F-TF Trigonometric Functions Standard: Extend the domain of trigonometric functions using the unit circle. 3. Use special triangles to determine geometrically the values of sine, cosine, tangent for π-*x*, π + *x*, *2* π-*x*, *2* π + *x* in terms of their values for *x* , where *x* is any real number.
	Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms	Why should you know more than one way to solve a trigonometric problem?	Trigonometric Functions	Students should be able to use trigonometric functions to model and solve real-life problems. Students should be able to solve real life problems involving right triangles. Students should be able to solve real life problems involving directional bearings. Students should be able to solve real	**Applications and Models** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 1-3 Pgs.149-159 Section 1-8 Pgs. 201-211 Advanced Mathematical Concepts Section 5-2 (Pgs.277--283) Glencoe-Precalculus(2012) Section 4-1	Hypotenuse Leg Side adjacent Side opposite Trigonometric ratios Sine Cosine Tangent Cosecant Secant Cotangent	Domain: G-SRT Similarity, Right Triangles, and Trigonometry Standard: Define trigonometric ratios and solve problems involving right triangles 6. Understand that by similarity, side ratios in right triangles are properties of the triangles, leading to the definitions of trigonometric ratios for acute angles.

				life problems involving harmonic motion.	(Pgs 220 – 230) Algebra and Trigonometry with Analytic Geometry (Swokowski (Pg 392 - 420) 8 days	Bearing Harmonic motion	Domain: F-TF Trigonometric Functions Standard: Extend the domain of trigonometric functions using the unit circle. 3. Use special triangles to determine geometrically the values of sine, cosine, tangent for π-*x*, π + *x*, *2* π-*x*, *2* π + *x* in terms of their values for *x* , where *x* is any real number.
Review Unit 7 Trigonometry and Right Triangles 1 Day							
Test Unit 7 Trigonometry and Right Triangles 1 Day							
Unit 8 Trigonometry and Oblique Triangles							
Estimated Time Frame for Unit	**Big Ideas**	**Essential Question**	**Concepts**	**Competencies**	**Lesson Plans and Suggested Resources**	**Vocabulary**	**Standards/Eligible Content**
15 Days	Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms.	In what ways might radians be more useful than degrees in various situations (or vice versa)?	Trigonometric Functions	Students should be able to evaluate trigonometric functions of any angle. Students should be able to use reference angles to evaluate trigonometric functions.	**Trigonometric Functions of Any Angle** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 1-4 Pgs.160-168	Reference angles	Domain: F-TF Trigonometric Functions Standard: Extend the domain of trigonometric functions using the unit circle 1. Understand radian measure of an angle as

				Students should be able to evaluate trigomonetric functions of real numbers.	Advanced Mathematical Concepts Section 5-1 (Pgs.277--283) Glencoe- Pre-calculus(2012) Section 4-2 (Pgs 231 – 241) Algebra and Trigonometry with Analytic Geometry (Swokowski) Pg 392 - 403) 1 Day		the length of the arc on the unit circle subtended by the angle. 2. Explain how the unit circle in the coordinate plane enables the extension of the trigonometric functions to all real numbers, interpreted as radian measure of angles traversed counterclockwise around the unit circle.
	There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.	How does one know when to use the Law of Sines versus the Law of Cosines?	Trigonometric Functions	Students should be able to use the Law of Sines to solve oblique triangles (AAS or ASA) Students should be able to use the Law of Sines to solve oblique triangles (SSA).	**The Law of Sines** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 3-1 Pgs.278-286 Advanced Mathematical Concepts Section 5-6 (Pgs.313--318) Glencoe Pre-calculus(2012) Section 4-7 (Pgs 291 – 301) Algebra and Trigonometry with Analytic Geometry (Swokowski) (Pg 562 - 581) 3 Days	Law of Sines	Domain: G-SRT Similarity, Right Triangles, and Trigonometry Standard: Apply trigonometry to general triangles. 10. Prove the Laws of Sines and Cosines and use them to solve problems. 11. Understand and apply the Laws of Sines and the laws of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces)

	There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.	How does one know when to use the Law of Sines versus the Law of Cosines?	Trigonometric Functions	Students should be able to use the Law of Cosines to solve oblique triangles (SSS or SAS)	**The Law of Cosines** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 3-2 Pgs.287-2294 Advanced Mathematical Concepts Section 5-6 (Pgs.313--318) Glencoe Pre-calculus(2012) Section 4-7 (Pgs 291 – 301) Algebra and Trigonometry with Analytic Geometry (Swokowski) (Pg 562 - 581) 5 Days	Law of Cosines	Domain: G-SRT Similarity, Right Triangles, and Trigonometry Standard: Apply trigonometry to general triangles. 10. Prove the Laws of Sines and Cosines and use them to solve problems. 11. Understand and apply the Laws of Sines and the laws of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces)
	There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.	How does one know when to use the Law of Sines versus the Law of Cosines?	Trigonometric Functions	Students should be able to use the Law of SInes to model and solve real-world problems. Students should be able to use the Law of CosInes to model and solve real-world problems.	**Applications of the Use of the Laws of Sines and Cosines.** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 3-1 Pgs.278-286 Section 3-2 Pgs.287-2294 Advanced Mathematical Concepts Section 5-6 (Pgs.313--318)	Law of Cosines	Domain: G-SRT Similarity, Right Triangles, and Trigonometry Standard: Apply trigonometry to general triangles. 10. Prove the Laws of Sines and Cosines and use them to solve problems. 11. Understand and apply the Laws of Sines and the laws of Cosines to find unknown

					Glencoe Pre-calculus(2012) Section 4-7 (Pgs 291 – 301) Algebra and Trigonometry with Analytic Geometry (Swokowski) (Pg 562 - 581) 4 Days		measurements in right and non-right triangles (e.g., surveying problems, resultant forces)
Review Unit 8 Trigonometry and Oblique Triangles 1 Day							
Test Unit 8 Trigonometry and Oblique Triangles 1 Day							
Unit 9 Vectors							
Estimated Time Frame for Unit	**Big Ideas**	**Essential Question**	**Concepts**	**Competencies**	**Lesson Plans and Suggested Resources**	**Vocabulary**	**Standards/Eligible Content**
12 days	Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms.	How are vectors drawn, computed and manipulated?	Vectors	Students should be able to represent vectors as directed line segments. Students should be able to write the component forms of vectors. Students should be able to perform basic operations and represent them graphically.	**Vectors in a Plane** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 3-3 Pgs.295-307 Glencoe-Pre-calculus/2010-Chapter 8 Section 8-1 (Pgs 482 – 491) Section 8-2	Directed line segment Standard position Component form of a vector Scalars Magnitude Unit vector	Domain: N-VM Vector and Matrix Quantities Standard: Represent and model with vector quantities 1. Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols

				Students should be able to use vectors to model and solve real – world problems.	(Pgs 492 – 499) Algebra and Trigonometry with Analytic Geometry (Swokowski Pg 581 – 596) 5 Days		for vectors and their magnitudes. Standard: Perform operations on vectors 4. Add and subtract vectors. a. Add vectors end-to-end, component wise and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes. b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum. c. Understand that vector subtraction is the additive inverse with the same magnitude and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise. 5. Multiply a vector by a scalar. a. Represent scalar multiplication graphically by scaling

							vectors and possibly reversing their direction; perform scalar multiplication component-wise
	There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.	How is the direction of a vector determined?	Vectors	Students should be able to find the dot products of two vectors and use the properties of Dot Product. Students should be able to use dot products to find the angle between two vectors. Students should be able to determine whether two vectors are orthogonal. Students should be able to write a vector as the sum of two vector components. Students should be able to find the projection of one vector onto another Students should be able to use vectors to model and solve real –world problems.	**Vectors and Dot Products** Suggested Resources: Trigonometry (Hosteteler/Larson) Section 3-3 Pgs.295-307 Glencoe-Pre-calculus/2010- Section 8-3 (PC Pgs 500 – 508) Algebra and Trigonometry with Analytic Geometry (Swokowski Pg 596 - 607 5 Days	Dot Product Orthogonal Vectors Vector Components	Domain: N-VM Vector and Matrix Quantities Standard: Represent and model with vector quantities 1. Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes. 2. Find the components of a vector by subtracting the coordinates of the initial point from the coordinates of the terminal points. 3. Solve vector problems involving velocity and other quantities that can be represented by vectors. Standard: Perform operations on vectors 4. Add and subtract vectors. a. Add vectors end-to-end, component wise and by the

							parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes. b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum. c. Understand that vector subtraction is the additive inverse with the same magnitude and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise. 5. Multiply a vector by a scalar. a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise. b. Compute the magnitude of a scalar multiple. Compute the direction of a scalar multiple knowing that lcl v ≠ 0, the direction

							of cv is either along v (for c>0) or against v (for c<0).
Review Unit 9 Vectors 1 Day							
Test Unit 9 Vectors 1 Day							
Unit 10 Solving Systems of Equations with Matrices							
Estimated Time Frame for Unit	**Big Ideas**	**Essential Question**	**Concepts**	**Competencies**	**Lesson Plans and Suggested Resources**	**Vocabulary**	**Standards/Eligible Content**
9 Days	Degree and direction of linear association between two variables is measurable	How do you differentiate between two independent events and two dependent events and how do you calculate the probabilities for each situation?	Algebraic properties, processes and representations	Students should be able to organize data into matrices. Students should be able to matrix row and column operations to analyze data.	**Introduction to Matrices** Suggested Text Glencoe Algebra 2 (2010)- Chapter 4- Section 4-1 (pgs 185 – 191) 1 Days	Matrix Element Dimensions Row matrix Column matrix Square matrix Zero matrix Equal matrices	Domain: A-REI Reasoning with Equations and Inequalities Standard: Solve systems of equation 8. Represent a system of linear equations as a single matrix equation in a vector variable. 9. Find the inverse of a matrix if it exist and use it to solve systems of linear equations. (using technology for matrices of dimensions of 3 x 3 or higher)
	Degree and direction of linear association between two variables is measurable	How do you differentiate between two independent events and two dependent events and how do you calculate the probabilities for each situation?	Algebraic properties, processes and representations.	Students should be able to add and subtract matrices. Students should be able to multiply a matrix by a scalar	**Operations with Matrices-** Suggested Text-Glencoe Algebra 2 (2010)-Section 4-2 (pgs 191 – 199) Section 4-3	Scaler Scalar multiplication	Domain: A-REI Reasoning with Equations and Inequalities Standard: Solve systems of equation

				Students should be able to multiply matrices. Students should be able to use the properties of matrix multiplication.	(pgs 200 – 207) 1 Day		8. Represent a system of linear equations as a single matrix equation in a vector variable. 9. Find the inverse of a matrix if it exist and use it to solve systems of linear equations. (using technology for matrices of dimensions of 3 x 3 or higher)
	Degree and direction of linear association between two variables is measurable	How do you differentiate between two independent events and two dependent events and how do you calculate the probabilities for each situation?	Algebraic properties, processes and representations.	Students should be able to find the inverse of a 2 x 2 matrix. Students should be able to write and solve matrix equations for a system of equations	Inverse Matrices and Systems of Equations Suggested Text- Glencoe Algebra 2 (2010) Section 4-6 (pgs 229 – 235) Glencoe Precalculus -2011 Section 6-3 Pgs.388-394 Algebra and Trigonometry with Analytic Geometry (Swokowski Pg 687 - 709) 5-days		Domain: A-REI Reasoning with Equations and Inequalities Standard: Solve systems of equation 8. Represent a system of linear equations as a single matrix equation in a vector variable. 9. Find the inverse of a matrix if it exist and use it to solve systems of linear equations. (using technology for matrices of dimensions of 3 x 3 or higher)
	Review Unit 10 Solving Systems of Equations with Matrices 1 Day						
	Test Unit 10 Solving Systems of Equations with Matrices 1 Day						