Boonton School District

Course Title:	Algebra II / Trigonometry CP Algebra II / Trigonometry Honors	**Grade Level(s):**	**10, 11, 12**
Curriculum Area / Level:	Mathematics	**Credits:**	**5**
Course prerequisites and/or co-requisites:	Prerequisite - Algebra I / Algebra I Honors Corequisite - Geometry / Geometry Honors		
Course Description:	This course is designed for those students who have demonstrated exceptional ability and interest in mathematics. It is a rigorous, fast-paced course that covers the Algebra 2 topics recommended by the Common Core Standards. It expands upon concepts learned in Algebra 1 regarding linear and quadratic functions and introduces complex numbers and rational exponents. It includes an intensive study of several families of functions including polynomial, radical, rational, exponential, logarithmic, and trigonometric. Also included is an introduction to Statistics and higher level probability.		

		Date:		**BOE Approval:**	
Created by:	Stephen Young		08/12/16		09/26/16

Division of Umbrella & Mini Units
Umbrella Unit 1: Polynomial Functions **Mini Units:** **1A.** Quadratic Equations **1B.** Higher Degree Equations **1C.** Radical Equations
Umbrella Unit 2: Exponential Functions / Statistics **Mini Units:** **2A.** Exponential and Logarithmic Equations **2B.** Graphing Exponential and Logarithmic Functions **2C.** Statistics
Umbrella Unit 3: Rational Functions / Probability **Mini Units:** **3A.** Graphing Rational Functions **3B.** Solving Rational Equations **3C.** Probability
Umbrella Unit 4: Trigonometry **Mini Units:** **4A.** Right Triangle Trigonometry **4B.** Unit Circle Trigonometry **4C.** Trigonometric Graphs

UMBRELLA UNIT 1	
Title:	Polynomial Functions
Duration:	9 weeks
Essential Questions:	- What are the different ways you can find the zeroes (roots) of any polynomial? - Why is factoring so important in mathematics? - How can we determine the number of real and imaginary roots of a polynomial? - What is the relationship between a radical and a rational exponent? - When might using rational exponent be more useful than a radical?
Summative Assessments: (Assessment at the end the learning period)	Section Quizzes Chapter Tests Cumulative Assessments Unit Projects
Formative Assessments: (Ongoing assessments during the learning period)	Teacher Observation Homework Exit Tickets Communicator Boards Do Nows
Differentiation:	**Visual** Highlight in different colors the values of a, b, and c in a quadratic Write partial solutions and fill in the blanks Show numerical examples to go with rules Point out patterns when simplifying expressions **Auditory** Verbalize expressions explicitly **Kinesthetic** Have students create tables of values **ELL** Explain that mathematics terms often have different definitions from normal usage **Inclusion**

	Show all simplification steps explicitly
	Work through one example in multiple forms
	Creating tables to organize information
	Write out information that is taken "for granted" (i.e. that x + 5 means 1x + 5)
	Advanced
	Challenge students to prove properties and formulas
	Have students explore what it means to have extraneous solutions
	Below Level
	Break processes down to simple parts

TECHNOLOGY STANDARD (STANDARD 8)	
CPI #	**CUMULATIVE PROGRESS INDICATOR (CPI)**
8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.

21ST CENTURY LIFE AND CAREER (STANDARD 9)	
CPI #	**CUMULATIVE PROGRESS INDICATOR (CPI)**
CRP2	Apply appropriate academic and technical skills
CRP6	Demonstrate creativity and innovation
CRP8	Utilize critical thinking to make sense of problems and persevere in solving them

MINI UNIT 1A	
Title:	**Quadratic Functions**
Duration:	**3 weeks**
Overview:	Students will learn Completing the Square and be able to determine the best method to find the roots of a quadratic equation. Students will use the Quadratic Equation and the Discriminant to determine the types of roots a Quadratic has, and use that information to graph a quadratic function.

Essential Outcomes - Upon completion of this course students will know (declarative):	Alignment to Standards
What the Zero Product Property is and how to use it to solve a quadratic	A-REI.4
How Completing the Square and the Quadratic Formula are related	A-REI.4a
How Imaginary and Complex Numbers extend the Real Number System	N-CN.7
Essential Outcomes - Upon completion of this course students will be able to (procedural):	**Alignment to Standards**
Solve a quadratic equation in one variable	A-REI.4
Use FOIL and the quadratic formula to solve equations with variables in parentheses: "(x-4)(x+k)=0 where b term is +3x" (H aspects)	A-REI.4
Find the vertex, axis of symmetry, and intercepts of a quadratic function	F.IF.7c
Determine the equation of a quadratic given the vertex and a point on the quadratic (H aspects)	F.IF.7c

Determine the Domain and Range of quadratic functions (H aspects)	F.IF.7c
Use the Difference of Squares to factor quadratic expressions	A.SSE.2
Perform operations with complex numbers	N-CN.2
Use the discriminant to identify the number of real and imaginary roots	A-REI.4
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 (both positive and negative); find the value of k given the graphs	F-BF.3-2
Essential Outcomes - Upon completion of this course students will understand (conceptual):	**Alignment to Standards**
What the roots or zeroes of a quadratic mean (H aspects)	A-SSE.1
How quadratics are used to model problems in Physics	A-CED.3
How the Complex Number System extends the Real Number System	N-CN.2
Resources Mini Unit 1A:	www. bigideasmath.com Big Ideas Learning, Big Ideas Math Algebra 2, 2015 Kuta Software www.classzone.com

MINI UNIT 1B	
Title:	**Higher Degree Functions**
Duration:	**3 weeks**

Overview:	Students will learn the Fundamental Theorem of Algebra and how to apply it to determine characteristics of higher degree polynomials. Also, students will use polynomial division to find the factors of polynomials.

Essential Outcomes - Upon completion of this course students will know (declarative):	Alignment to Standards
The Factor and Remainder Theorems	A-APR.2
Odd and Even Functions	F-BF.3-2
End Behavior of a Polynomial	F-IF.7c
Fundamental Theorem of Algebra	N-CN.9
Polynomial and Synthetic Division	A-APR.2
Essential Outcomes - Upon completion of this course students will be able to (procedural):	**Alignment to Standards**
Apply the Factor and Remainder Theorems to find the roots of a polynomial using polynomial or synthetic division	A-APR.2
Recognize Odd and Even Functions based on their graph and algebraic expressions	F-BF.3-2
Graph polynomial functions, identifying zeros and showing end behavior	F-IF.7c
Add, Subtract, and Multiply Polynomials	A-APR.1
Essential Outcomes - Upon completion of this course students will understand (conceptual):	**Alignment to Standards**
The importance of the Fundamental Theorem of Algebra to the study of Algebra	N-CN.9

How the Fundamental Theorem of Algebra relates to finding the complex roots of a polynomial functions (H aspects)	N-CN.9 N-CN.2
The relationship between zeros and factors of polynomials	A-APR.3
What the end behavior tells us about the polynomial	F-IF.7c
Resources Mini Unit 1B:	www. bigideasmath.com Big Ideas Learning, Big Ideas Math Algebra 2, 2015 Kuta Software www.classzone.com

MINI UNIT 1C	
Title:	**Radical Functions**
Duration:	**3 weeks**
Overview:	The student will demonstrate the ability to solve radical equations, as well as describe, interpret, analyze, and graph radical functions to model real-world data.
Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
The meaning of rational exponents	N-RN.1
The properties of rational exponents	N-RN.2
N^{th} roots and N^{th} powers	N-RN.1
Essential Outcomes - Upon completion of this course students will be able to (procedural):	**Alignment to Standards**

Solve radical equations in one variable, and give examples showing how extraneous solutions may arise.	A-REI.2
Rewrite expressions involving radicals and rational exponents using the properties of exponents.	N-RN.2
Graph functions with radical or rational exponents	A-REI
Evaluate radical expressions and expressions with rational exponents	N-RN.2
Essential Outcomes - Upon completion of this course students will understand (conceptual):	**Alignment to Standards**
How radicals and rational exponents are connected and when is the best situation to use each one	N-RN.2 A-REI.4
Why it is necessary to check the solutions of radical equations	A-REI.2
Why domain problems exist for even indices but not for odd indices	A-REI
Resources Mini Unit 1C:	www. bigideasmath.com Big Ideas Learning, Big Ideas Math Algebra 2, 2015 Kuta Software www.classzone.com

UMBRELLA UNIT 2	
Title:	Exponential Functions / Statistics
Duration:	9 weeks
Essential Questions:	• How does exponential growth work with the principle of compound interest? • How do you convert between exponential and logarithmic form? • How can you use the inverse relationship between exponential and logarithmic functions to solve equations? • What are the different ways in which data can be organized and analyzed? • What are the ways to sample a population to get the most accurate statistics?
Summative Assessments: (Assessment at the end the learning period)	Section Quizzes Chapter Tests Cumulative Assessments Unit Projects
Formative Assessments: (Ongoing assessments during the learning period)	Teacher Observation Homework Exit Tickets Communicator Boards Do Nows
Differentiation:	**Visual** Show numerical examples to go with rules Point out patterns **Auditory** Verbalize expressions explicitly Have students create their own formulas and discuss them with classmates **Kinesthetic** Have students verify results after learning the formula Have students create tables of values **ELL** Explain that mathematics terms often have different definitions from normal usage **Inclusion**

	Show all conversion steps explicitly Creating tables to organize information Write out information that is taken "for granted" (i.e. that x + 5 means 1x + 5) **Advanced** Challenge students to study connections and concepts between topics Have students research historical context of formulas **Below Level** Break processes down to simple parts Create diagrams and flowcharts of conversions

TECHNOLOGY STANDARD (STANDARD 8)	
CPI #	**CUMULATIVE PROGRESS INDICATOR (CPI)**
8.1.12.F.1	Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
21ST CENTURY LIFE AND CAREER (STANDARD 9)	
CPI #	**CUMULATIVE PROGRESS INDICATOR (CPI)**
CRP2	Apply appropriate academic and technical skills
CRP6	Demonstrate creativity and innovation
CRP8	Utilize critical thinking to make sense of problems and persevere in solving them

MINI UNIT 2A	
Title:	**Exponential and Logarithmic Equations**
Duration:	**3 weeks**
Overview:	The student will demonstrate the ability to solve exponential and logarithmic equations, as well as describe, interpret, and analyze logarithmic functions to model real-world data.

Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
What exponential and logarithmic equations are, and how to solve them	F-LE
What the exponential growth and decay formulas are used for	F-LE
The natural base e, its origin and uses	F-LE
What a logarithm is and where it is used	F-LE.4
Properties of Logarithms (Change of Base formula, Product, Power, Quotient Property)	F-LE.4
Essential Outcomes - Upon completion of this course students will be able to (procedural):	**Alignment to Standards**
Solve Exponential Growth and Decay Problems	F-LE
Simplify expressions with the natural base e	F-LE
Evaluate logarithms and analyze characteristics of logs	F-LE
Solve general exponential and logarithmic functions	F-LE
Essential Outcomes - Upon completion of this course students will understand (conceptual):	**Alignment to Standards**

How growth and decay formulas are used in business and financial situations	F-LE.3
How logarithms and exponential functions are related	F-LE
Why logarithms can have extraneous solutions	F-LE.4

Resources Mini Unit 2A:	www. bigideasmath.com
	Big Ideas Learning, Big Ideas Math Algebra 2, 2015
	Kuta Software
	www.classzone.com

MINI UNIT 2B	
Title:	Graphing Exponential and Logarithmic Functions
Duration:	**2 weeks**
Overview:	The student will demonstrate the ability to solve exponential and logarithmic equations, as well as describe, interpret, and analyze logarithmic functions to model real-world data.

Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
Exponential graphs	F.BF.4a
Logarithmic graphs	F.BF.4a
End behavior	F-IF.7e
Vertical and Horizontal Asymptote	F-IF.7d
Essential Outcomes - Upon completion of this course students will be able to (procedural):	**Alignment to Standards**

Graph exponential functions, showing intercepts and end behavior.	F-IF.7e
Graph logarithmic functions on a Cartesian grid, showing intercepts and end behavior	F-IF.7e
Graph logarithmic functions on a Logarithmic grid, showing intercepts and end behavior (H aspects)	F-IF.7e
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 (both positive and negative); find the value of k given the graphs	F-BF.3 F-IF.7e
Essential Outcomes - Upon completion of this course students will understand (conceptual):	**Alignment to Standards**
How exponential and logarithmic graphs compare to linear and quadratic graphs	F-IF.7e
That exponential graphs and logarithmic graphs are inverses	F.BF.4a
Resources Mini Unit 2B:	www. bigideasmath.com Big Ideas Learning, Big Ideas Math Algebra 2, 2015 Kuta Software www.classzone.com

MINI UNIT 2C	
Title:	**Statistics**
Duration:	**4 weeks**
Overview:	Students will begin to learn about measures of dispersion as a way to analyze a group instead of relying

	on the measures of central tendency. Focus will be on normal distribution and standard deviation to create normal curves. Students will also learn about populations and how to tell the difference between biased and unbiased samples.
Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
Measures of Dispersion	S-ID.4
Standard Deviation	S-ID.4
Normal Distribution	S-ID.4
Normal Curve	S-ID.4
Population	S-IC.3
Unbiased Sample	S-IC.3
Biased Sample	S-IC.3
Margin of Error	S-IC.3
Essential Outcomes - Upon completion of this course students will be able to (procedural):	**Alignment to Standards**
Recognize the purposes of and differences among sample surveys, experiments, and observational studies.	S-IC.3
Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages.	S-ID.4
Identify between biased and unbiased samples	S-IC.3
Essential Outcomes - Upon completion of this course students will understand (conceptual):	**Alignment to Standards**

How the measure of dispersion differs from the measure of central tendency	S-ID.4
How the bell curve can find the normal probability	S-ID.4
How z-scores and t-scores can be used to provide a better understanding specific scores (H aspects)	S-ID.4
The differences between biased and unbiased samples of a population	S-IC.3
How to understand the information given to them through polls (i.e. presidential polls on TV)	S-IC.3
Resources Mini Unit 2C:	www. bigideasmath.com Big Ideas Learning, Big Ideas Math Algebra 2, 2015 Kuta Software www.classzone.com

UMBRELLA UNIT 3	
Title:	Rational Functions / Probability
Duration:	9 weeks
Essential Questions:	● Why is it important to state the restricted values before simplifying a rational expression? ● How do you know when a rational expression can be simplified? ● What causes rational graphs to be discontinuous? ● How does probability help to develop informed decisions? ● Why don't experimental probabilities match theoretical probabilities?
Summative Assessments: **(Assessment at the end the learning period)**	Section Quizzes Chapter Tests Cumulative Assessments Unit Projects
Formative Assessments: **(Ongoing assessments during the learning period)**	Teacher Observation Homework Exit Tickets Communicator Boards Do Nows
Differentiation:	**Visual** Use different colors to highlight different aspects Create a flowchart Circle individual areas to be simplified to reduce confusion **Auditory** Verbalize expressions explicitly Have students create their own formulas and discuss them with classmates Use small groups to allow presentations of solutions **Kinesthetic** Have students verify results after learning the formula Modify graph paper with scissors to show asymptotes Use index cards to create manipulatives

	ELL
	Explain that mathematics terms often have different definitions from normal usage
	Inclusion
	Show all conversion steps explicitly
	Creating tables to organize information
	Have students practice translating equations into sentences
	Advanced
	Challenge students to study connections and concepts between topics
	Have students explore multi-disciplinary aspects of mathematics
	Below Level
	Break processes down to simple parts
	Make a table of values
	Review fraction concepts

TECHNOLOGY STANDARD (STANDARD 8)	
CPI #	**CUMULATIVE PROGRESS INDICATOR (CPI)**
8.2.12.C.2	Analyze a product and how it has changed or might change over time to meet human needs and wants.
21ST CENTURY LIFE AND CAREER (STANDARD 9)	
CPI #	**CUMULATIVE PROGRESS INDICATOR (CPI)**
CRP2	Apply appropriate academic and technical skills
CRP6	Demonstrate creativity and innovation
CRP8	Utilize critical thinking to make sense of problems and persevere in solving them

MINI UNIT 3A	
Title:	**Graphing Rational Functions**
Duration:	**3 weeks**
Overview:	Students will develop the ability to graph rational functions, understand the situations that cause asymptotes and holes, as well as describe, interpret, and analyze rational functions to model real-world data.

Essential Outcomes - Upon completion of this course students will know (declarative):	Alignment to Standards
Rational Function	F-IF.7d
Vertical and Horizontal Asymptotes	F-IF.7d
Slant Asymptotes (H aspects)	F-IF.7d
Holes (H aspects)	F-IF.7d
Hyperbola	F-IF.7d
Essential Outcomes - Upon completion of this course students will be able to (procedural):	**Alignment to Standards**
Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.	F-IF.7d
Identify holes in rational functions, where f(x)/g(x) equals 0/0 [Honors Aspects]	F-IF.7d
Calculate the locations of asymptotes algebraically	F-IF.7d
Essential Outcomes - Upon completion of this course students will understand (conceptual):	**Alignment to Standards**
What causes asymptotes and holes [H] to be created	F-IF.7d

when working with rational functions	
How rational functions behave differently from other functions with asymptotes or discontinuities	F-IF.7d

Resources Mini Unit 3A:	www. bigideasmath.com
	Big Ideas Learning, Big Ideas Math Algebra 2, 2015
	Kuta Software
	www.classzone.com

MINI UNIT 3B	
Title:	**Solving Rational Equations**
Duration:	**3 weeks**
Overview:	Students will develop the ability to solve rational equations, simplify rational expressions, the understanding as to why we cannot have a radical in the denominator, and use rational equations to model problems in STEM fields.
Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
What is a rational expression	A.REI.2
Cross multiplication	A.REI.2
Extraneous solutions of a rational equation	A.REI.2
Rationalize the denominator	A.APR.7
Complex Fractions [Honors Aspects]	A.APR.7
Essential Outcomes - Upon completion of this course	**Alignment to Standards**

students will be able to (procedural):	
Rationalize the Denominator with one term	A.APR.7
Solve rational equations in one variable, and give examples showing how extraneous solutions may arise.	A.REI.2
Add, subtract, multiply, and divide rational expressions	A.APR.7
Rationalize the Denominator using conjugates [Honors Aspects]	A.APR.7
Simplify Complex Fractions [Honors Aspects]	A.APR.7
Essential Outcomes - Upon completion of this course students will understand (conceptual):	**Alignment to Standards**
Why can we not have a radical in the denominator of a fraction	A.APR.7
How to take the concepts of cross-multiplication learned in middle school and apply it to more complex examples	A.REI.2
Resources Mini Unit 3B:	www. bigideasmath.com Big Ideas Learning, Big Ideas Math Algebra 2, 2015 Kuta Software www.classzone.com

MINI UNIT 3C	
Title:	**Probability**
Duration:	**3 weeks**

Overview:	Students will begin to move away from solving probablities of a single event and begin calculating the probabilities of compound events that may or may not be related to each other. Students will also demonstrate the ability to use a problem-solving approach in applying concepts of probability to various situations.
Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
Dependent Events	S-CP.2
Independent Events	S-CP.2
Compound Events	S-CP.7
Union and Intersection of Sets (H aspects)	S-CP.7
Joint and Disjoint Probability	S-CP.7
Conditional Probability	S-CP.3
Additive Probability	S-CP.3
Essential Outcomes - Upon completion of this course students will be able to (procedural):	**Alignment to Standards**
Find the likelihood that an event will occur	S-CP.2
Calculate probabilities of independent and dependent events	S-CP.2
Calculate probabilities of compound events	S-CP.7
Calculate probabilities using conditional probability	S-CP.3
Essential Outcomes - Upon completion of this course students will understand (conceptual):	**Alignment to Standards**

How to use joint and disjoint events to calculate the probability of real-world events	S-CP.7
Why the lottery is not a good way to earn money	S-CP.2
Resources Mini Unit 3C:	www. bigideasmath.com Big Ideas Learning, Big Ideas Math Algebra 2, 2015 Kuta Software www.classzone.com

UMBRELLA UNIT 4	
Title:	Trigonometry
Duration:	9 weeks
Essential Questions:	- Why is the Pythagorean Theorem so important? - How can sine, cosine, and tangent functions be defined using the unit circle? - What are periodic functions? Why is modeling them so important? - How do you use right triangle trigonometric ratios to find missing sides and angles of right triangles? - How do you convert angle measures between degrees and radians and why would this conversion be necessary? - How are special right triangles used to find the values of trigonometric functions on the unit circle?
Summative Assessments: (Assessment at the end the learning period)	Section Quizzes Chapter Tests Cumulative Assessments Unit Projects
Formative Assessments: (Ongoing assessments during the learning period)	Teacher Observation Homework Exit Tickets Communicator Boards Do Nows
Differentiation:	**Visual** Use different colors to highlight different aspects Sketch out angles to identify reference and standard angles Circle individual areas to be simplified to reduce confusion **Auditory** Verbalize SOHCAHTOA Have students use a think aloud strategy Use small groups to allow presentations of solutions **Kinesthetic** Create paper plate manipulatives for the unit circle

	Use toothpicks to create triangles to show different ratios Use index cards to create manipulatives **ELL** Explain that mathematics terms often have different definitions from normal usage **Inclusion** Show all conversion steps explicitly Creating tables to organize information **Advanced** Challenge students to study connections and concepts between topics Have students explore multi-disciplinary aspects of mathematics **Below Level** Break processes down to simple parts Make a table of values Use mnemonic devices to help memory
TECHNOLOGY STANDARD (STANDARD 8)	
CPI #	**CUMULATIVE PROGRESS INDICATOR (CPI)**
8.2.12.E.1	**Demonstrate an understanding of the problem-solving capacity of computers in our world.**
21ST CENTURY LIFE AND CAREER (STANDARD 9)	
CPI #	**CUMULATIVE PROGRESS INDICATOR (CPI)**
CRP2	**Apply appropriate academic and technical skills**
CRP6	**Demonstrate creativity and innovation**
CRP8	**Utilize critical thinking to make sense of problems and persevere in solving them**

MINI UNIT 4A	
Title:	**Right Triangle Trigonometry**
Duration:	**2 weeks**
Overview:	The student will demonstrate the ability to use a problem-solving approach in working with trigonometric functions and applying them to situations involving right triangles.
Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
Angles of Elevation and Depression	G-SRT.8
The Six Trigonometric Functions	G-SRT.8
The Six Inverse Trigonometric Functions	G-SRT.8
Essential Outcomes - Upon completion of this course students will be able to (procedural):	**Alignment to Standards**
Calculate the lengths of sides on a right triangle by using trigonometric functions	G-SRT.8
Calculate the angles of a right triangle by using inverse trigonometric functions	G-SRT.8
Use trigonometric identities to solve triangles (H aspects)	G-SRT.8
Calculate angles of elevation and depression	G-SRT.8
Essential Outcomes - Upon completion of this course students will understand (conceptual):	**Alignment to Standards**
How physics and astronomy are dependent on understanding trigonometry	G-SRT.8
That the six trignometric functions are ratios of the	G-SRT.8

lengths of the sides of the triangle	
Resources Mini Unit 4A:	www. bigideasmath.com Big Ideas Learning, Big Ideas Math Algebra 2, 2015 Kuta Software www.classzone.com

MINI UNIT 4B	
Title:	**Unit Circle Trigonometry**
Duration:	**3 weeks**
Overview:	The student will demonstrate the ability to use a problem-solving approach in working with trigonometric functions and applying them to situations involving the unit circle.
Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
Radians and Degrees	F-TF.1
The Unit Circle	F-TF.2
Quadrangles	F-TF.2
Special Right Triangles (45-45-90, 30-60-90)	F-TF.3
Essential Outcomes - Upon completion of this course students will be able to (procedural):	**Alignment to Standards**
Convert angle measures between degrees and radians	F-TF.1
Evaluate trigonometric functions of any angle	F-TF.2

Find angles given values of trigonometric functions	F-TF.2
Find lengths using trigonometric functions and angles	F-TF.2
Use special right triangles to find sine, cosine, and tangent	F-TF.3
Essential Outcomes - Upon completion of this course students will understand (conceptual):	**Alignment to Standards**
The importance and use of the Unit Circle for trigonometric functions and properties	F-TF.2
How Radians, Degrees, Circumference, and Pi are all related and connected to each other	F-TF.1
Resources Mini Unit 4B:	www. bigideasmath.com Big Ideas Learning, Big Ideas Math Algebra 2, 2015 Kuta Software www.classzone.com

MINI UNIT 4C	
Title:	**Trigonometric Graphs**
Duration:	**4 weeks**
Overview:	Students will develop the ability to graph trigonometric functions, understand the situations that cause periodic functions, as well as describe, interpret, and analyze trigonometric functions to model real-world data**.**
Essential Outcomes - Upon completion of this course students will know (declarative):	**Alignment to Standards**
Period	F-IF.7e-2

Midline	F-IF.7e-2
Amplitude	F-IF.7e-2
Phase and Vertical Shifts	F-BF.3-2
Sine, Cosine, and Tangent Graphs	F-IF.7e-2
Essential Outcomes - Upon completion of this course students will be able to (procedural):	**Alignment to Standards**
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 (both positive and negative); find the value of k given the graphs	F-BF.3-2
Graph sine and cosine waves, showing period, midline, and amplitude	F-IF.7e-2
Graph tangent graphs, showing x-intercepts and vertical asymptotes	F-IF.7e-2
Graph secant, cosecant, and cotangent waves, showing asymptotes and critical points (H aspects)	F-IF.7e-2
Essential Outcomes - Upon completion of this course students will understand (conceptual):	**Alignment to Standards**
How trigonometric graphs are used to model natural phenomena	F-IF.7e-2
Why asymptotes are created in a tangent function, but not in a sine or cosine wave	F-IF.7e-2
Resources Mini Unit 4C:	www. bigideasmath.com Big Ideas Learning, Big Ideas Math Algebra 2, 2015 Kuta Software

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Board of Education Adoption Date: 09/26/2016