	Key Standards Covered	Possible Resources
Quarter 1 September 6- November 2	• Perform arithmetic operation with complex numbers: HSN-CN.A.1, 2, • Use complex numbers in polynomial identities and equations: HSN-CN.C.7, 8 • Interpret functions that arise in applications in terms of the context: HSF-IF.B.4, 5, 6 • Build new functions from existing functions: HSF-IF.B.1, 3 • Interpret the structure of expressions: HSA-SSE.A.1a, 1b, 2, • Write expressions in equivalent forms to solve problems: HSA-SSE.B.3a • Understand the relationship between zeros and factors of polynomials: HSA-APR.B.3 • Create equations that describe numbers or relationships: HSA-CED.A.1, 2, 3 • Represent and solve equations and inequalities graphically: HSA-REI.D.11	• Homework given after each class • Practice questions showing. understanding of concept (both individually and in groups). ○ Using ideas like think-pair-share • Quizzes administered after each lesson is completed to show knowledge gained. • Scavenger hunt review to show if students are prepared for unit test. • Test administered at the end of the unit to show knowledge gained within the unit.
	Key Standards Covered	**Possible Resources**

Quarter 2 November 12- January 28	● Using complex numbers in polynomial identities and equations: HSN-CN.C.7, 8, 9 ● Interpret the structure of expressions: HSA-SSE.A.1a, 1b, 2 ● Understand the relationship between zeros and factors of polynomials: HSA-APR.B.2, 3 ● Use polynomial identities to solve problems: HSA-APR.C.4, 5, 6 ● Represent and solve equations and inequalities graphically: HSA-REI.D.11 ● Interpret functions that arise in applications in terms of the context: HSF-IF.B.4, 5, 6, C.7, 8 ● Build new functions from existing functions: HSF-BF.B.3	● Homework given after each class ● Practice questions showing. understanding of concept (both individually and in groups). ○ Using ideas like think-pair-share ● Quizzes administered after each lesson is completed to show knowledge gained. ● Activity for test review (independent or small group) ● Test administered at the end of the unit to show knowledge gained within the unit.
	Key Standards Covered	**Possible Resources**
Quarter 3 February 4- April 5	● Interpret the structure of expressions: HSA-SSE.A.2 ● Create equations that describe the number of relationships: HSA-CED.A.4 ● Understand solving equations as a process of reasoning and explain the reasoning: HSA-REI.A.2 ● Analyze functions using different representations: HSF-IF.C.7b, 8 ● Build a function that models a relationship between two quantities: HSF-BF.A.1b ● Build new functions from existing functions: HSF-BF.B.4a	● Homework given after each class ● Practice questions showing. understanding of concept (both individually and in groups). ○ Using ideas like think-pair-share ● Quizzes administered after each lesson is completed to show knowledge gained. ● Activity for test review (independent or small group) ● Test administered at the end of the unit to show knowledge gained within the unit.
	Key Standards Covered	**Possible Resources**

Quarter 4 April 8- June 17	• Interpret the structure of expressions: HSA-SSE.A.1a, 1b • Write expressions in equivalent forms to solve problems: HSA-SSE.B.3c • Create equations that describe numbers: HSA-CED.A. 1, 2, 3 • Represent and solve equations and inequalities graphically: HSA-REI.D.11 • Analyze functions using different representation: HSF-IF.C.7e, 8, 9 • Build a function that models a relationship between quantities: HSF-BF.A.1b • Build new functions for existing functions: HSF-BF.B. 4a • Construct and compare linear and exponential models and solve problems: HSF-LE.4 • Extend the domain of trigonometric functions using the unit circle: HSF-TF.A.1, 2 • Model periodic phenomena with trigonometric functions: HSF-TF.B.6 • Define trigonometric ratios and solve problems involving right triangles: HSG-SRT.C.6 • Apply trigonometry to general triangles: HSG-SRT.D. 11	• Homework given after each class • Practice questions showing. understanding of concept (both individually and in groups). ○ Using ideas like think-pair-share • Quizzes administered after each lesson is completed to show knowledge gained. • Activity for test review (independent or small group) • Test administered at the end of the unit to show knowledge gained within the unit.

AUL Curriculum - Mathematics - Algebra II

Title of Unit	Quadratic Equations and Functions	**Grade Level**	10, 11, 12

Curriculum Area	Algebra II	**Time Frame**	5-7 Weeks
Developed By	Douglas Frost		

Identify Desired Results (Stage 1)

Content Standards

- Perform arithmetic operation with complex numbers: HSN-CN.A.1, 2,
- Use complex numbers in polynomial identities and equations: HSN-CN.C.7, 8
- Interpret functions that arise in applications in terms of the context: HSF-IF.B.4, 5, 6
- Build new functions from existing functions: HSF-IF.B.1, 3
- Interpret the structure of expressions: HSA-SSE.A.1a, 1b, 2,
- Write expressions in equivalent forms to solve problems: HSA-SSE.B.3a
- Understand the relationship between zeros and factors of polynomials: HSA-APR.B.3
- Create equations that describe numbers or relationships: HSA-CED.A.1, 2, 3
- Represent and solve equations and inequalities graphically: HSA-REI.D.11

Understandings

Overarching Understanding

- Identify the vertex, line of symmetry, maximum or minimum, domain, range, and translations of a quadratic function.
- Graph quadratic functions with and without graphing calculators.
- Use quadratic functions as models.
- Graph transformations of the parent quadratic function $y = x^2$.
- Compare translations to the parent quadratic function.
- Identify the x-intercepts of the graph of related quadratic functions.
- Solve quadratic equations.

Related Misconceptions

Essential Questions

Overarching

- What are the advantages of a quadratic function in vertex form? in standard form?
- How is any quadratic function related to the parent quadratic function $y = x^2$?
- How are real solutions of a quadratic equation related to the graph of the

Topical

- What is the vertex and axis of symmetry of the quadratic function?
- What factors of the constant term will add up to the coefficient of the middle term?
- How many and what type of solutions are there in the

• Stating the opposite location of the vertex based on the given function. • Plugging in the wrong numbers when finding the vertex algebraically and using the Quadratic Formula. • Finding factors of the coefficients of the middle term that add up to the constant term.		given equation? • What factor of the given number is a perfect square?
Knowledge Students will know…	**Skills** Students will be able to…	
• The vertex is the turning point of a parabola and can determine where the axis of symmetry is located. • The discriminant of the Quadratic Formula can determine the types of solutions that exist with a given equation. • The imaginary number i is defined as $\sqrt{-1}$.	• Graph quadratic functions with and without a calculator. • Determine the transformation of any quadratic function based on the parent quadratic function $y = x^2$. • Find the vertex, axis of symmetry, and x-intercepts of the graph of a quadratic function both graphically and algebraically. • Solve quadratic equations.	
Assessment Evidence (Stage 2)		
Performance Task Description		

- Graph quadratic functions. (HSF-IF.B.1, 3, 4, 5, 6)
    - Visual representation of quadratic functions.
    - Use the graph to find key information in a real-world situation
        - Examples include the vertex to find the highest point an object will hit and how long will it take for the same object to hit the ground.
- Determine the transformation of the graph of a quadratic function based on the parent quadratic function $y = x^2$. (HSF-IF.B.1, 3, 4, 5, 6)
    - Using the different forms of quadratic functions (standard, vertex, and intercept), determine the different transformations that occur based on the parent quadratic function.
- With the general form of a quadratic equation $ax^2 + bx + c = 0$, use Completing the Square to derive the Quadratic Formula. (HSA-REI.B.4b)
    - Algebraically, solve the general form of a quadratic equation for x using Completing the Square.

Other Evidence

- Homework given after each class
- Practice questions showing. understanding of concept (both individually and in groups).
    - Using ideas like think-pair-share
- Quizzes administered after each lesson is completed to show knowledge gained.
- Scavenger hunt review to show if students are prepared for unit test.
- Test administered at the end of the unit to show knowledge gained within the unit.

Learning Plan (Stage 3)

General Information

- All warm-up questions, provided by the publisher, will lead into the new section of the unit by having students think outside-the-box.
    - Example: When starting to solve quadratic equations, determine the graph of a quadratic function that will produce a smile on a given face given the parabola will have two, one, and no *x*-intercepts.
- This unit is part of both Algebra I and Algebra II. However, in Algebra II, we introduce quadratic systems and imaginary numbers.
- Throughout the unit, students will have access to online assessments and practice problems provided by the publisher for self-assessment.
- The activities below can be delivered in individual or small groups.

Sequence

- Graphing quadratic functions based on the given form (standard, vertex, intercept) with and without a graphing calculator.
    - Identify the vertex, axis of symmetry, and intercepts, if possible
    - In small groups, determine the transformation(s) performed on a given graph based on the parent quadratic function.
    - Find the vertex and axis of symmetry without graphing based on the form of the function given
- Modeling quadratic functions.
    - Illustrating how quadratic functions are utilized in the real world.
    - Using the knowledge gained from graphing quadratic functions, students will create their own quadratic functions and real-world examples for their classmates to solve.
- Factor quadratic expressions.
    - Review of finding factors of composite numbers.
    - Choosing the correct factors to properly factor a quadratic expression
- Solve quadratic equations by factoring, Completing the Square, and the Quadratic Formula.
    - Utilize factoring to solve equations.
    - Introduce Completing the Square to solve any type of quadratic equation.
    - In small groups, use Completing the Square to derive the Quadratic Formula.
- Introduce complex numbers.
    - Review simplifying radical expressions.
    - Illustrate how the square root of a negative number can now be simplified using *i*.
- Unit assessment on Quadratic Equations and Functions.
    - Utilize the problems created by students either as review or test questions.

Title of Unit	Polynomial and Polynomial Functions	**Grade Level**	10, 11, 12
Curriculum Area	Algebra II	**Time Frame**	5-7 Weeks
Developed By	Douglas Frost		

Identify Desired Results (Stage 1)

Content Standards

- Using complex numbers in polynomial identities and equations: HSN-CN.C.7, 8, 9
- Interpret the structure of expressions: HSA-SSE.A.1a, 1b, 2
- Understand the relationship between zeros and factors of polynomials: HSA-APR.B.2, 3
- Use polynomial identities to solve problems: HSA-APR.C.4, 5, 6
- Represent and solve equations and inequalities graphically: HSA-REI.D.11
- Interpret functions that arise in applications in terms of the context: HSF-IF.B.4, 5, 6, C.7, 8
- Build new functions from existing functions: HSF-BF.B.3

Understandings	Essential Questions	
Overarching Understanding	**Overarching**	**Topical**
• Write a polynomial function given a polynomial equation. • Identify the degree of a polynomial equation. • Identify the highest power of a polynomial function. • Write a polynomial given its factors or zeros. • Identify the zeros of a polynomial function by finding the *x*-intercepts of its graph. • Factor a polynomial equation. • Apply the Zero-Product Property	• What does the degree of a polynomial tell you about its related polynomial function? • For a polynomial function, how are factors, zeros, and *x*-intercepts related? • For a polynomial	• What factor(s) of the constant term are solutions to the given polynomial equation? • What degree is the given polynomial? • How many *x*-intercepts are there in the
Related Misconceptions		

• Finding numbers that add up to the constant instead of multiply to. • The number of turning points is equal to the degree of the polynomial. • Remembering the rules of factoring quadratic expressions.	equation, how are factors and roots related?	given polynomial?

Knowledge Students will know…	**Skills** Students will be able to…
• Polynomials functions are polynomials of degree 3 or higher. • Degree of a given polynomial is also the number of solutions in the polynomial equation. • When graphing polynomials, the number of turning points possible is one less than the degree of the polynomial function. • When solving polynomial equations, you will need to utilize synthetic division to simplify the polynomial to a quadratic expression.	• Graph polynomial functions. • Solve polynomial equations when you are given a factor of the polynomial. • Divide polynomials using long and synthetic division. • Utilize synthetic division to solve polynomial equations.

Assessment Evidence (Stage 2)

Performance Task Description

- Creating a diorama (HSF-IF.B.4, 5, 6, C.7, 8, 9; HSF-BF.B.3)
    - Based on a given sheet of cardboard, determine the dimensions of a diorama that needs to be a certain volume.
- Graphing polynomial functions (HSA-APR. B.3)
    - Given the factored form of a polynomial function, graph the function.
        - Use the zeros to determine the location of the turning points.

Other Evidence

- Homework given after each class
- Practice questions showing. understanding of concept (both individually and in groups).
    - Using ideas like think-pair-share
- Quizzes administered after each lesson is completed to show knowledge gained.
- Activity for test review (independent or small group)
- Test administered at the end of the unit to show knowledge gained within the unit.

Learning Plan (Stage 3)

General Information

- All warm-up questions, provided by the publisher, will lead into the new section of the unit by having students think outside-the-box.
    - Example: Determine the fraction based on given properties (Numerator is a factor of 6, Denominator is a factor of 4, etc.).
- Throughout the unit, students will have access to online assessments and practice problems provided by the publisher for self-assessment.
- The activities below can be delivered in individual or small groups.

Sequence

- Polynomial functions
  - Introduce the classification of polynomials and key terms.
  - In small groups and student-centered, determine the properties of polynomials when graphed.
    - Based on this, the students will determine the generalizations of end behavior and turning points.
  - Determine the end behavior of a polynomial without graphing.
- Polynomial factors and zeros
  - Graph polynomials with a calculator
    - Using the calculator, identify the relative minimum and maximum of the function.
  - Determine the zeros of a polynomial graphically
  - Given either the zeros or factors of a polynomial, write the polynomial function
- Solving polynomial equations, part 1
  - In small groups, solve simple polynomial equations
    - Utilizes the principles of solving quadratic equations
    - Some equations need to be simplified to quadratic form
- Dividing polynomials
  - Illustrate the similarities to numerical and polynomial division
  - Utilize small groups to divide polynomials using synthetic division
- Solving polynomial equations, part II
  - Deals with utilizing the Rational Root Theorem and Fundamental Theorem of Algebra
  - Determine which rational root will simplify the polynomial
  - In small groups, find all the zeros of a polynomial function

Title of Unit	Function Operations and Square Root Functions	**Grade Level**	10, 11, 12
Curriculum Area	Algebra II	**Time Frame**	4-6 Weeks
Developed By	Douglas Frost		

Identify Desired Results (Stage 1)

Content Standards

- Interpret the structure of expressions: HSA-SSE.A.2
- Create equations that describe the number of relationships: HSA-CED.A.4
- Understand solving equations as a process of reasoning and explain the reasoning: HSA-REI.A.2
- Analyze functions using different representations: HSF-IF.C.7b, 8
- Build a function that models a relationship between two quantities: HSF-BF.A.1b
- Build new functions from existing functions: HSF-BF.B.4a

Understandings

Overarching Understanding

- Simplify radical expressions.
- Solve radical equations.
- Determine the domain of radical functions.
- Check for extraneous solutions.
- Find inverse functions.
- Graph functions and their inverses.

Related Misconceptions

Essential Questions

Overarching

- To simplify the *n*th root of an expression, what must be true about the expression?
- When you square each side of an equation, is the

Topical

- What factor of the given number or expression is a perfect square?
- What is the domain of the given function?

• An expression where the exponent is not 2 and even (Ex: y^4) is not a perfect square. • After squaring both sides of an equation, there are two answers. • When doing the composition of two functions, you plug the first function in the list into the second function.	resulting equation equivalent to the original? • How are a function and its inverse related?	• Does the given function have an inverse?

Knowledge Students will know…	**Skills** Students will be able to…
• How similar solving radical equations are to other types of equations taught so far. • The different operations that can be performed on functions. • The graph of the inverse of a function is a reflection of the original graph over the line $y = x$.	• Simplify radical expressions. • Solve radical equations. • Perform function operations. • Find the inverse of a function. • Graph radical functions.

Assessment Evidence (Stage 2)

Performance Task Description

- Analyzing the Dimensions of a Yacht (HSA-CED.A.4, HSA-REI.A.2, HSF-IF.C.7b, 8)
  - Using the given inequality, determine by the dimensions given of a boat would be allowed to sail in the America's Cup.
  - If not, determine what dimensions to change in order for the boat to be allowed to sail.
- Properties of Exponents (HSN-RN.A.1)
  - Reviewing the properties of exponents taught in Algebra I
- Graphing Inverses (HSF-BF.B.4a)
  - Using a graphing calculator, graph the inverse of a given function.
  - Utilize the graph to determine if a function has a true inverse.

Other Evidence

- Homework given after each class
- Practice questions showing. understanding of concept (both individually and in groups).
    - Using ideas like think-pair-share
- Quizzes administered after each lesson is completed to show knowledge gained.
- Activity for test review (independent or small group)
- Test administered at the end of the unit to show knowledge gained within the unit.

Learning Plan (Stage 3)

General Information

- All warm-up questions, provided by the publisher, will lead into the new section of the unit by having students think outside-the-box.
    - Example: Given the distance from a cell phone tower and its range, determine how many miles do you have to finish your call.
- Throughout the unit, students will have access to online assessments and practice problems provided by the publisher for self-assessment.
- The activities below can be delivered in individual or small groups.

Sequence

- Roots and Radical Expressions
  - Simplifying radical expressions
- Multiplying and Dividing Radical Expressions
  - In small groups, multiply and divide given radical expressions
- Graphing Radical Functions
  - Graph radical functions
  - Determine the domain and range of a radical function without graphing.
- Solving Square Roots and Other Radical Equations
  - Solving radical equations
  - Students will work on their own to solve radical equations based on solving by solving linear and quadratic equations (by taking the square root) to show its similarity.
- Function Operations
  - In small groups, students will perform the four basic operations on functions.
  - Find the composition of two functions.
- Inverse Relations and Functions
  - Determine if a function has an inverse.
  - Find the inverse of a function.
  - Graph the inverse of a function,

Title of Unit	Exponential and Logarithmic Functions	**Grade Level**	10, 11, 12
Curriculum Area	Algebra II	**Time Frame**	5-7 Weeks
Developed By	Douglas Frost		

Identify Desired Results (Stage 1)

Content Standards

- Interpret the structure of expressions: HSA-SSE.A.1a, 1b
- Write expressions in equivalent forms to solve problems: HSA-SSE.B.3c
- Create equations that describe numbers: HSA-CED.A.1, 2, 3
- Represent and solve equations and inequalities graphically: HSA-REI.D.11
- Analyze functions using different representation: HSF-IF.C.7e, 8, 9
- Build a function that models a relationship between quantities: HSF-BF.A.1b
- Build new functions for existing functions: HSF-BF.B.4a
- Construct and compare linear and exponential models and solve problems: HSF-LE.4

Understandings

Overarching Understanding

- Model situations with exponential functions.
- Use exponents to solve logarithmic equations and logarithms to solve exponential equations.
- Show that exponents and logarithms are inverse functions.
- Graph exponential and logarithmic functions.

Related Misconceptions

Essential Questions

Overarching

- How do you model a quantity that changes regularly over time by the same percentage?
- How are exponents and

Topical

- What logarithmic base is used when solving exponential equations?
- Based on the given

• Exponent is now a variable instead of a number. • Graph of exponential functions looks like a parabola. • Growth rate of exponential functions is constant. • When writing logarithms, the numbers are in the wrong position. • Not utilizing natural logarithms when the base of the given exponential function is *e*.	logarithms related? • How are exponential functions and logarithmic functions related?	exponential model, are you experiencing exponential growth or decay? • What property or properties of logarithms would you need to utilize to expand or condense the given expression?
Knowledge Students will know…	**Skills** Students will be able to…	
• Exponential functions have a faster growth or decay rate than linear functions. • Logarithms are used to find the exponent you need to raise the base to achieve the given number. • The properties of logarithms are used to either condense or expand a given expression. • The natural number *e* was derived by Leonhard Euler and it is based on a pattern.	• Graph and evaluate exponential and logarithmic functions. • Utilize the properties of logarithms to expand or condense a given expression. • Solve exponential and logarithmic equations.	
Assessment Evidence (Stage 2)		
Performance Task Description		

- .Apparent Magnitudes of Stars (HSF-IF.7e, 8, 9, HSA-REI.D.11)
    - Determine the magnitude of different stars in the night sky.
- Graphing Exponential and Logarithmic Functions (HSF-IF.7e, HSA-SSE.A.1b, HSA-CED.A.2, HSF-IF.C.8)
    - Graph exponential and logarithmic functions.
    - Differentiate the differences between exponential and linear functions.
- Fitting Curve to Date (HSF-IF.B.4)
    - Based on the given data, determine the type of regression model is best used (linear, logarithmic, exponential)

Other Evidence

- Homework given after each class
- Practice questions showing. understanding of concept (both individually and in groups).
    - Using ideas like think-pair-share
- Quizzes administered after each lesson is completed to show knowledge gained.
- Activity for test review (independent or small group)
- Test administered at the end of the unit to show knowledge gained within the unit.

Learning Plan (Stage 3)

General Information

- All warm-up questions, provided by the publisher, will lead into the new section of the unit by having students think outside-the-box.
    - Example: You won the grand prize on a gameshow. Do you take $10,000 a week for a year or 1¢ today, 2¢ tomorrow, 4¢ the next day, and continue the pattern for a year?
- Throughout the unit, students will have access to online assessments and practice problems provided by the publisher for self-assessment.
- The activities below can be delivered in individual or small groups.

Sequence

- Exponential Models and Functions.
  - Illustrate the differences between linear and exponential functions.
  - Graph exponential functions.
  - In small groups, create an exponential model based on a given real-world situation and compute.
- Logarithmic Functions
  - Graph logarithmic functions.
  - Using graphing, illustrate how exponential and logarithmic functions are inverses of each other.
    - In small groups, determine the rules of transformations of the graphs logarithmic functions.
  - Evaluate logarithmic expressions
- Properties of Logarithms
  - Introduce the properties of logarithms by using the inverse relationship between exponential and logarithmic functions.
  - Expand and condense logarithmic expressions
- Solving Exponential and Logarithmic Equations
  - Without assistance, solve exponential and logarithmic equations based on the similarities of solving linear, radical, and simple exponential equations (when the base is the exponent).
  - Write and solve exponential and logarithmic equations based on a given real-world situation.
    - Some models will need the students to create the model (Ex: Exponential growth and decay, compound interest)

Title of Unit	Trigonometric Ratios and Functions	**Grade Level**	10, 11, 12
Curriculum Area	Algebra II	**Time Frame**	6-8 Weeks
Developed By	Douglas Frost		

Identify Desired Results (Stage 1)

Content Standards

- Extend the domain of trigonometric functions using the unit circle: HSF-TF.A.1, 2
- Model periodic phenomena with trigonometric functions: HSF-TF.B.6
- Define trigonometric ratios and solve problems involving right triangles: HSG-SRT.C.6
- Apply trigonometry to general triangles: HSG-SRT.D.11

Understandings	Essential Questions	
Overarching Understanding	**Overarching**	**Topical**
• Use trigonometric functions, • Find the value of the reciprocal trigonometric functions based on the corresponding trigonometric functions. • Introduce radian measure and show how the circumference of the unit circle relates to it. • Utilize inverse trigonometric functions to find the measure of an angle formed by two sides. • Apply the Law of Sines and Law of Cosines to find missing parts of non-right triangles.	• If you know the value of sin θ, how can you find cos θ, tan θ, csc θ, sec θ, and cot θ? • What is the purpose of the inverse trigonometric function? • How can you find missing	• What is the value of a given trigonometric function for a given angle? • What is the measure of the angle formed by these two sides? • What angle has the value for a specific
Related Misconceptions		

• Using the improper trigonometric function to find the missing part of a triangle. • Secant and Sine functions are reciprocals of each other. Same with cosine and cosecant. • The period is the number of number of times the curve is repeated within 2π radians. • Computing the exact value of a trigonometric function at angles that are multiples of 30° or 45°.	information on a triangle that does not contain a right angle?	trigonometric function?

Knowledge Students will know…	**Skills** Students will be able to…
• There are six trigonometric functions, where the new three functions are reciprocals of the original three trigonometric functions. • The unit circle is utilized to find the value of any trigonometric function and is the basis to the the graphs of the sine and cosine functions. • Radian measure deals with length in terms of π. • The inverse trigonometric functions are used to find the measure of an angle. • When to use the Law of Sines and Law of Cosines.	• Find the value of any trigonometric function based on the unit circle. • Convert degree measure to radians and vice versa. • Find the measure of an angle given two sides of a triangle. • Use the Law of Sines and Law of Cosines to find the missing part of a non-right triangle.

Assessment Evidence (Stage 2)

Performance Task Description

- Measuring Radians (HSF-TF.A.1)
    - Develop a tactile understanding of radian measure.
- Determining the Length of a Zipline (HSF-TF.C.9, HSG-SRT.C.6, 8, D.9, 10, 11)
    - Use trigonometric identities to find certain lengths within the diagram.
    - Use the laws and the Half Angle Identity to find the angle of depression of the zipline.
- The Ambiguous Case (HSG-SRT.D.11)
    - Even though two triangles have one pair of congruent angles and two pairs of congruent sides, the angle you are looking for using the Law of Sines may be incorrect.
        - Students will need to remember the sine function is also positive in Quadrant II.

Other Evidence

- Homework given after each class
- Practice questions showing. understanding of concept (both individually and in groups).
    - Using ideas like think-pair-share
- Quizzes administered after each lesson is completed to show knowledge gained.
- Activity for test review (independent or small group)
- Test administered at the end of the unit to show knowledge gained within the unit.

Learning Plan (Stage 3)

General Information

- All warm-up questions, provided by the publisher, will lead into the new section of the unit by having students think outside-the-box.
    - Example: A ferris wheel takes 20 minutes to go around once. How far off the ground are you after 5 and 10 minutes? At what time(s) will you be 474 feet above the platform?
- Throughout the unit, students will have access to online assessments and practice problems provided by the publisher for self-assessment.
- The activities below can be delivered in individual or small groups.

Sequence

- Trigonometric Functions with Right Triangles
  - Review sine, cosine, and tangent functions
  - Introduce cosecant, secant, and cotangent functions.
  - In small groups, evaluate the trigonometric values for special angles/
    - Utilize the 30-60-90 and 45-45-90 triangles.
  - Solve right triangles
- Angles and the Unit Circle and Radian Measure
  - Illustrate how the unit circle is used to determine the measure of an angle in a circle on the coordinate plane.
  - In small groups, determine the sine and cosine of an angle when given a point on the terminal side of the angle.
  - Without any assistance, in small groups, students will do the Measuring Radian assessment.
  - Convert degree measure to radians and vice versa.
  - Find the coordinate of the general angles of the unit circle utilizing the special triangles.
- Evaluating Trigonometric Functions of Any Angle
  - Utilizing the given point on the terminal side and the Pythagorean Theorem, find the value of each trigonometric function.
  - Utilize a reference angle when the terminal side is located in Quadrants II, III, or IV.
- Inverse Trigonometric Functions
  - Introduce trigonometric inverse functions
    - Students need to remember there are two solutions unless the inverse they are doing is -1, 0, or 1.
  - Students will create trigonometric word problems based on everything taught up to this point.
- Area and Law of Sines
  - Find the area of a non-right triangle using trigonometry.
    - Formula will be derived from the warm-up exercise.
  - Use the area formula to derive the Law of Sines,
  - Utilize the Law of Sines to find missing side/angle.
- Law of Cosines
  - On their own, based on the warm-up, derive the Law of Cosines
    - Warm-up illustrates how the cosine of an angle can be computed if the lengths of all three sides are given.
  - In small groups, work on questions where the students must decide to use either the Law of Sines or the Law of Cosines.