

# Math 1330 Course Objectives

## Learning Objectives for Math 1330 Precalculus

1. Recognize various kinds of functions (including polynomial, rational, radical, exponential, and logarithmic functions), analyze their behavior, and use the properties of these functions to solve equations and application problems. Recognize that exponential and logarithmic functions are inverses, recall the characteristics of these functions, and solve equations and application problems involving exponential and logarithmic functions. Apply the concepts learned about limits at infinity to afore mentioned functions.

2. Recognize and use the vocabulary of angles (including standard position, initial and terminal sides, quadrantal angles, coterminal angles, acute, right, and obtuse angles). Use degrees and radians to measure angles. Convert angles from degrees to radians and vice versa. Compute the length of a circular arc given the radius and the interior angle. Apply the concepts of linear and angular speed to solve problems concerning motion on a circular path.

3. Use right triangles to evaluate the six trigonometric functions. State the trigonometric function values for  $30^\circ$ ,  $45^\circ$ ,  $60^\circ$ . Use right triangle trigonometry to solve application problems that can be visualized using right triangles.

4. Compute the six trigonometric functions of any angle and use the unit circle to define the six trigonometric functions for all real numbers. Define the trigonometric functions for any angle. Identify the signs of the trigonometric functions. Find reference angles and use them to evaluate trigonometric functions. Identify even and odd trigonometric functions.

5. Know and draw the graphs of the six trigonometric functions and their variations. Compute the amplitude, period, phase shift, vertical shift, domain, and range of a sinusoidal functions. Compute the period, domain, range, vertical asymptotes, and x-intercepts of the tangent and cotangent functions. Draw the graphs of  $y = \csc x$  and  $y = \sec x$ ; recognize the relationship between the graph of a cosecant function (respectively, secant) and the graph of a sine (respectively, cosine) function.

6. Understand the definitions of the inverse trigonometric functions. Compute the domain and range of the inverse trigonometric functions. Evaluate inverse trigonometric functions using a calculator (\*optional). Find exact values of composite functions with inverse trigonometric functions

7. Know and apply identities involving the trigonometric functions. Use trigonometric identities to simplify expressions and to evaluate the trigonometric functions. Use the trigonometric functions to solve triangles. Use fundamental trigonometric identities to verify other identities. Apply the sum and difference formulas for sine, cosine, and tangent.

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Apply the double-angle and half-angle formulas for sine, cosine, and tangent.  
Apply the Law of Sines and/or the Law of Cosines either to solve triangles.

8. Find all solutions of a trigonometric equation.  
Solve trigonometric equations quadratic in form.  
Use identities to solve trigonometric equations.

9. Recognize conic sections and their geometric properties.  
Differentiate between four conic sections (circle, ellipse, hyperbola, parabola) using the standard and the general form of the equations.  
Describe the terms center, foci, vertices, and directrix.  
Graph the conic sections.  
Solve non-linear systems with two variables using algebra and/or graphing.

10. Recognize and use the vocabulary of vectors (vector, scalar, magnitude, direction) to perform arithmetic on vectors and to solve application problems.  
Draw the components of a vector.  
Construct a visual representation of scalar multiplication, vector addition, and vector subtraction.  
Find the dot product of two vectors; find the angle between two vectors.  
Use the dot product to determine if two vectors are orthogonal, parallel, or neither.

## **Math 1330 Precalculus Topic List**

Algebra Review: Functions

- Methods of Combining Functions
- Inverse Functions
- Polynomial and Rational Functions
- Exponential Functions
- Logarithmic Functions

Chapter 4: Trigonometric Functions

- Special Right Triangles and Trigonometric Ratios
- Radians, Arc Length and the area of a Sector
- Unit Circle Trigonometry
- Trigonometric Expressions and Identities

Chapter 5: Graphing Trigonometric Functions

- Trigonometric Functions of Real numbers
- Graphs of the Sine and Cosine Functions
- Graphs of the other Trigonometric Functions
- Inverse Trigonometric Functions

# Math 1330 Course Objectives

## Chapter 6: Trigonometric Formulas and Equations

Sum and Difference Formulas

The Double-Angle and Half-Angle Formulas

Solving Trigonometric Equations

## Chapter 7: Trigonometric Applications

Solving Right Triangles

Area of a Triangle

The Law of Sines and The Law of Cosines

Vectors in the Plane

## Chapter 8: Analytic Geometry

Circles

Ellipses

Parabolas

Hyperbolas