

PreCalculus and Honors PreCalculus Overview

Course Description: Students enrolled in PreCalculus extensively study operations on functions including solving equations, graphing, and finding domain and range. Specific functions to be studied include polynomials, rational, exponential, logarithmic, and trigonometric functions. Students will also apply their knowledge and skills to the study of analytic geometry.

Grade Level: 10-12th

Curricular Work Thus Far:

1. Solicited feedback from district and community stakeholders to guide course development.
2. Examined state standards ([Missouri Learning Standards](#)) and national standards ([Common Core State Standards](#)) to inform course development.
3. Drafted a curricular scope and sequence of nine units within the yearlong course.

Unit 1: Trigonometric Functions of Angles

Unit 2: Unit Circles and Radians

Unit 3: Analytic Trigonometry - Simplifying Expressions and Verifying Identities

Unit 4: Inverse Trig and Solving Trigonometric Equations

Unit 5: Intro to Functions

Unit 6: Quadratic and Square Root Functions

Unit 7: Exponential and Logarithmic Functions

Unit 8: Polynomial Functions

Unit 9: Rational Functions

4. Developed unit essential questions and student learning goals in alignment with state standards. Examples include, but are not limited to:

Essential Questions:

- How do we use trigonometry and special right triangles to find missing pieces of triangles and evaluate expressions?
- How do we evaluate trigonometric expressions using the unit circle to find exact values?
- How do we graph sine, cosine, and tangent functions?
- How do we analyze and identify key characteristics of different function types?
- Which method is most efficient when solving a quadratic equation?
- How do the restrictions on a square root function influence inverses for both quadratic and square root functions?
- How do we use the properties of logarithms to simplify or solve exponential and logarithmic situations?

- How does the fundamental theorem of algebra relate to x-intercepts?
- How does the degree of a polynomial function impact end behavior, x-intercepts, and relative extrema?
- How do we identify the domain of any function?
- How do we know if a domain restriction is an asymptote versus a point of discontinuity?

Student Learning Goals:

- Students will learn to solve a triangle using SOH-CAH-TOA, Pythagorean Theorem, and Special Right Triangles.
- Students will understand the difference between degrees and radians and convert between them.
- Students will perform operations and factor trigonometric expressions.
- Students will solve trigonometric equations with identities, factoring, and multiple rotations.
- Students will evaluate the difference quotient for constant, linear, quadratic, and rational functions.
- Students will graph and analyze quadratic, square root functions, and piecewise functions.
- Students will use properties of exponents and logarithms to simplify, evaluate or solve.
- Students will graph and analyze polynomial functions.
- Students will solve rational equations and check for extraneous solutions.