Advanced Level PreCalculus Syllabus

Course Description

This is a full year PreCalculus course exploring all high school PreCalculus topics as well as Algebra and Geometry concepts. This class teaches and requires students to demonstrate fluent understanding of concepts and procedures, reason abstractly and quantitatively, communicate reasoning, model with mathematics, solve problems, and analyze data. Throughout the course, students will learn how math topics are related to daily life and solve real-world problems. Students who successfully complete this course will be ready to continue to a Calculus course. In alignment with the skills detailed in the ***Portrait of the Crusader,*** students practice solving problems with innovation and imagination, and they are taught to think critically about the synthesis of data and respond with defendable, original work.

Assessment Practices

Throughout the course, teachers strive to include varied assessments, including traditional quizzes and tests to measure discrete skills; problem/solution/explanation opportunities where students solve a complex problem and communicate their reasoning; and real-world scenarios where students define the problem, develop a plan, and solve the problem, adjusting as necessary and communicating their reasoning when required.

Essential Questions

1. How do we use previous math topics from Algebra and Geometry to discover PreCalculus rules ?
2. How do we interpret and analyze real life situations using PreCalculus?
3. How do we integrate technology to support PreCalculus topics ?

Curriculum Framework

First Quarter:

Summer Work to Review and Reinforce Skills

- Evaluate and simplify exponents
- Simplify radicals and rational exponents
- Perform operations on polynomials
- Factor polynomials
- Solve equations: Quadratic and Linear
- Identify Intercepts
- Review slopes and linear functions

Functions and Graphs

- Identify odd and even functions, symmetry (technology utilized)
- Find average rate of change
- Perform transformation of functions
- Evaluate combinations of functions, composite functions
- Identify, create and graph inverse functions (technology utilized)
- Apply knowledge of functions in real world applications

Second Quarter:
Polynomial Functions

- Simplify complex numbers
- Identify critical points of quadratic functions and graph (technology utilized)
- Define polynomial functions and their graphs (technology utilized)
- Divide polynomials and then use remainder and factor theorems
- Find the zeros of polynomial functions (technology utilized)
- Apply knowledge of quadratic and higher Order Polynomials in real world applications

Third Quarter:
Rational Functions

- Identify critical points of rational functions and graph (technology utilized)
- Solve applied problems involving rational functions
- Identify critical points polynomial inequalities and graph
- Solve polynomial inequalities

Introduction to Exponential and Logarithms

- Review exponent laws, negative exponents, rational exponents

Fourth Quarter:
Exponential and Logarithmic Functions

- Evaluate and graph exponential functions
- Evaluate and graph logarithmic functions
- Use properties of logarithms to simplify logarithms
- Explore exponential growth and decay in real world applications

Trigonometric Functions

- Define trigonometry concepts (sine, cosine, tangent) (technology utilized)
- Define radian measure
- Explore trigonometric functions and use the unit circle to solve problems
- Evaluate trigonometric functions of any angle
- Apply trigonometric principles in real world applications

If time permits

- Explore sine and cosine graphs

Resources

- PreCalculus (6th Edition) Blitzer
- MyMathLab. (mymathlabforschool.com)
- Graphing Calculator
- Desmos application (ISO/Android or web)

Grading

- 15 % MyMathLab,
- 30% Quizzes
- 20% Student Work
- 35% Tests