

Precalculus Syllabus

Course Overview

In Precalculus, students build on K–8, Algebra I, Geometry, and Algebra II foundations to expand their understanding through new mathematical experiences. Students use symbolic reasoning and analytical methods to study mathematical concepts, represent mathematical situations, express generalizations, and connect the central ideas of algebra, geometry, trigonometry, and calculus. Students use a variety of representations (concrete, numerical, algorithmic, graphical, symbolical, and verbal) to model functions and solve real-life problems in problem-solving contexts with and without technology (TI-84 Plus calculators).

Prerequisite

Algebra 2

Materials

Textbook: Larson, Ron. *Precalculus with Limits*. 3rd ed. Boston: Brooks Cole, 2014.

Standards

This course covers standards outlined in the [Pennsylvania Department of Education Academic Standards for Mathematics](#)

Course Outline

The following is a course outline with a suggested timeline.

Chapter 1 - Functions and Their Graphs (8 weeks)

Standards: CC.2.1.HS.F.1-5, CC.2.2.HS.C.1-6, CC.2.2.HS.D.7-10, CC.2.4.HS.B.3

- Rectangular Coordinates
- Graphs of Equations
- Linear Equations in Two Variables
- Functions
- Analyzing Graphs of Functions
- Parent Functions
- Transformations of Functions
- Composition of Functions
- Inverse Functions
- Variation and Modeling

Chapter 2 - Polynomial and Rational Functions (6 weeks)

Standards: CC.2.1.HS.F.1-7, CC.2.2.HS.C.1-6, CC.2.2.HS.D.2-7, 10

- Quadratic Functions
- Polynomial Functions of Higher Degree

- Polynomial and Synthetic Division
- Complex Numbers
- Zeros of Polynomial Functions
- Rational Functions

Chapter 3 - Exponential and Logarithmic Functions (4 weeks)

Standards: CC.2.1.HS.F.1-5, CC.2.2.HS.C.1-6, CC.2.2.HS.D.6-10

- Exponential Functions and Graphs
- Logarithmic Functions and Graphs
- Properties of Logarithms
- Exponential and Logarithmic Equations
- Exponential and Logarithmic Models

Chapter 4 – Trigonometry (8 weeks)

Standards: CC.2.1.HS.F.1-5, CC.2.2.HS.C.1-9, CC.2.2.HS.D.2, 6-8, 10, CC.2.3.HS.A.7

- Radian and Degree Measure
- The Unit Circle
- Right Triangle Trigonometry
- Trigonometric Functions of Any Angle
- Graphs of Sine and Cosine Functions
- Graphs of Other Trigonometric Functions
- Inverse Trigonometric Functions
- Applications and Models

Chapter 5 - Analytic Trigonometry (6 weeks)

Standards: CC.2.1.HS.F.1-5, CC.2.2.HS.C.1-9, CC.2.2.HS.D.2, 6-8, 10, C.C.2.3.HS.A.7

- Using Trigonometric Identities
- Verifying Trigonometric Identities
- Solving Trigonometric Equations
- Sum and Difference Formulas
- Multiple-Angle and Product-to-Sum Formulas

Chapter 6 - Additional Topics in Trigonometry (2 weeks)

Standards: CC.2.2.HS.C.7, CC.2.2.HS.D.2, 8

- Law of Sines
- Law of Cosines

(Time permitting)

Chapter 12 - Limits and an Introduction to Calculus (2 week)

Standards: CC.2.1.HS.F.2, CC.2.2.HS.C.2, CC.2.2.HS.D.2

- Introduction to Limits

- Techniques for Evaluating Limits
- Limits at Infinity