

Course Objectives/Course Outline
Spokane Community College

Course Title: Precalculus I

Prefix and Course Number: MATH& 141

Course Learning Outcomes:

By the end of this course, a student should be able to:

- Identify functions, piece-wise functions, and their graphs.
- Identify characteristics of a function (even/odd, max/min, intervals of increase/decrease, end behavior, etc.).
- Calculate average rates of change for a given function.
- Demonstrate understanding of transformations of a function.
- Demonstrate understanding of roots/zeros and a function and what they represent.
- Determine roots/zeros of a function utilizing methods beyond factoring.
- Demonstrate an understanding of what it means for a function to be one-to-one, have an inverse and find the inverse function.
- Demonstrate an understanding of mathematical functions and properties (domain, range, evaluation, operations, composition, etc.).
- Analyze functions (polynomial, rational, exponential, logarithmic, etc.) mathematically.
- Solve systems of equations and inequalities using algebra and technology, including matrix algebra.
- Understand sequences, series, and summation notation.
- Prove mathematical statements by mathematical induction.
- Apply properties of exponential and logarithmic expressions/functions.
- Solve a variety of application problems involving mathematical modeling while developing a clear, logical problem solving process and interpretation of solution in context to the original problem.

Course Outline:

- I. Graphs and Functions
 - A. Linear Functions (Slope/Equations/Applications)
 - B. Graphical Symmetry
 - C. Transformations of Functions
 - D. Distance, Midpoints, and Circles
 - E. The Complex Numbers
 - F. Detailed Graphs of Quadratic Functions
 - G. Linear and Quadratic Models
- II. Polynomial and Rational Functions
 - A. Polynomial Division
 - i. Long Division
 - ii. Synthetic Division
 - iii. The Division Algorithm
 - B. Characteristics of Polynomial Functions
 - i. Zeros and Multiplicity
 - ii. End Behavior
 - iii. Graphs
 - iv. Completely Factor Polynomials
 - C. Characteristics of Rational Functions
 - i. Domain
 - ii. Graphs

- iii. Zeros and Intercepts
 - iv. Asymptotes and Holes
 - D. Polynomial and Rational Inequalities
 - E. Polynomial Regression
- III. Exponential and Logarithmic Functions
 - A. Composite and Inverse Functions
 - B. Exponential Functions and Graphs
 - C. Logarithmic Functions and Graphs
 - D. Properties of Logarithmic Functions
 - E. Solving Exponential and Logarithmic Equations
 - F. Applications and Models
- IV. Other Topics:
 - A. Matrix models of systems of equations
 - i. Find reduced row echelon form
 - a. Without a calculator (up to 3 variables)
 - b. With a calculator
 - ii. Represent infinitely many solutions
 - B. Sequences and Series/Summation Notation
 - C. Mathematical Induction