

# SYLLABUS

## MATH 10675- Algebra for Calculus Boost

An extensive and rich immersion into the structure of functions. Routine analysis includes discussion of domain, range, zeros general function behavior (increasing, decreasing, extrema, etc.). Operations with functions include addition, subtraction, multiplication, division, composition, and inversion. Functions are studied as a tool to analyze rates of change in real-world scenarios. The emphasis is on linear, polynomial, exponential, and rational functions, with an extensive problem-solving component. A two-week review of intermediate algebra skills is included in the course, as is extra time studying quadratic functions, absolute value functions, systems of equations, and extended time on logarithms. No credit earned for this course if a student already earned credit for MATH 12001 or MATH 10775 or MATH 11010.

Text: Carlson, M., Oerhrtman, M., & Kevin Moore. (2018). *PreCalculus: Pathways to Calculus, A Problem-Solving Approach*. Plymouth, MI: Hayden-McNeil, Macmillan Learning.

75 days

### **Review of Intermediate Algebra Skills – 9 days**

- Integer and rational exponents
- Polynomial operations
- Factoring
- Rational expressions
- Complex rational expressions

### **Reasoning about and representing quantitative relationships - 11 days**

- Quantities and co-variation of quantities
- Change in quantities, constant rate of change
- Linear relationships
- Proportionality
- Average rate of change
- Distance formula and circles
- Absolute Value

### **Formalizing relationships between quantities: Functions – 9 days**

- Modeling relationships with functions
- Domains of functions
- Function notation – use and interpretation using tabular, symbolic, and graphical approaches
- Composition of functions
- Inverses of functions
- Difference quotients

### **Exponential and logarithmic functions – 12 days**

- Percent change
- Comparing linear and exponential behavior
- One-unit growth and decay factors, initial values
- Partial and n-unit growth and decay factors
- Compound interest
- The number  $e$  and continuous growth and decay
- Logarithmic functions – the inverse of exponentials
- Graphing exponential functions
- Solving exponential and logarithmic equations

### **Systems of Equations – 2 days**

- Modeling with systems of linear equations
- Solving systems of 2 linear equations: graphical, substitution, and elimination methods

### **Polynomial and Power Functions – 11 days**

- Changing rates of change and concavity
- Transformations of polynomial functions
- Quadratic functions – finding roots and max/mins, both in context and skill/drill practice
- Roots and end behavior of polynomial functions
  - Review of division of polynomials
  - Hand graph polynomial functions
- Solving polynomial inequalities

### **Rational Functions and an introduction to limit - 8 days**

- Domains of rational functions
- Vertical asymptotes
- End behavior of rational function and horizontal asymptotes
- Graphing rational functions and introducing limits

62 class lessons

Pre and Post (Pre-Calculus Concept) Assessment – 2 days

Gateway exam – 1 day

Unit exams – 4 days

Review for final exam – 1 day

Holidays – 5 days

**TOTAL: 75 days**