SYLLABUS

MATH 10775- Algebra for Calculus Plus

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. Extra time is spent studying quadratic functions, absolute value functions, systems of equations, and extended time is spent on logarithms. No credit earned for this course if a student already earned credit for MATH 12001 or MATH 10775 or MATH 11010.

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

60 days

Skill Review - 4 days

- Simplifying expressions
- Writing equations for line
- Factoring polynomials
- Operations with polynomials

Reasoning about and representing quantitative relationships - 8 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 equations and inequalities

Formalizing relationships between quantities: Functions – 8 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 – 11 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 – 10 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 - 6 days

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

49 class lessons
Pre and Post (Pre-Calculus Concept) Assessment – 2 days
Unit exams – 4 days
Review for final exam – 1 day
Holidays – 4 days
TOTAL: 60 days