Virginia Community College Course Content Summary

Course Title: __MTH 161:_ PreCalculus I_____

Course Description

Presents topics in power, polynomial, rational, exponential, and logarithmic functions and systems of equations and inequalities. Lecture 3 hours per week. 3 credits.

General Course Purpose

The general purpose of this one-semester course is to prepare students for a course in statistics or applied calculus sequence by providing them with the necessary competencies in algebra and functions. Precalculus I can also be applied in conjunction with Precalculus II in preparation for a course in calculus with analytic geometry.

Course Prerequisites/Corequisites

Prerequisite: Satisfaction or completion of units MTE 1-9 or Corequisite: MCR 6, which requires the satisfaction of any 7 of the 9 MTE units.

Course Objectives

Upon completing the course, the student will be able to:

Relations and Functions

- Distinguish between relations and functions.
- Evaluate functions both numerically and algebraically.
- Determine the domain and range of functions in general, including root and rational functions.
- Perform arithmetic operations on functions, including the composition of functions and the difference quotient.
- Identify and graph linear, absolute value, quadratic, cubic, and square root functions and their transformations.
- Determine and verify inverses of one-to-one functions.

Polynomial and Rational Functions

- Determine the general and standard forms of quadratic functions.
- Use formula and completing the square methods to determine the standard form of a quadratic function.
- Identify intercepts, vertex, and orientation of the parabola and use these to graph quadratic functions.
- Identify zeros (real-valued roots) and complex roots, and determine end behavior of higher order polynomials and graph the polynomial, and graph.
- Determine if a function demonstrates even or odd symmetry.
- Use the Fundamental Theorem of Algebra, Rational Root test, and Linear Factorization Theorem to factor polynomials and determine the zeros over the complex numbers.
- Identify intercepts, end behavior, and asymptotes of rational functions, and graph.
- Solve polynomial and rational inequalities.
- Interpret the algebraic and graphical meaning of equality of functions ($f(x) = g(x)$) and inequality of functions ($f(x) > g(x)$)

Exponential and Logarithmic Functions

- Identify and graph exponential and logarithmic functions and their transformations.
- Use properties of logarithms to simplify and expand logarithmic expressions.
- Convert between exponential and logarithmic forms and demonstrate an understanding of the relationship between the two forms.
- Solve exponential and logarithmic equations using one-to-one and inverse properties.
- Solve application problems involving exponential and logarithmic functions.

Systems of Equations and Inequalities

- Solve three variable linear systems of equations using the Gaussian elimination method.

Major Topics to be Included

Course Prefix and Number __ ___
(*To be assigned by the VCCS*)

Relations and Functions
Polynomial and Rational Functions
Exponential and Logarithmic Functions
Systems of Equations and Inequalities

(To be completed by VCCS) Course Approved: Month _____ Year _____