

# **MTH 163 Pre-Calculus**

## **COURSE OUTLINE**

### **Prerequisites:**

**Completion of MTE 1-9 or placement into MTH 163 on the Virginia Placement Test (VPT).**

### **Course Description:**

**Presents college algebra, matrices, and algebraic, exponential, and logarithmic functions. (Credit will not be awarded for both MTH 163 and MTH 166.)**

**MTH 163 cover basic concepts and methods necessary for the study of calculus. Topics include functions and their properties, college algebra, systems of equations, matrices, exponential and logarithmic functions and basic analytical geometry.**

**Semester Credits: 3 Lecture Hours: 3 Lab/Recitation Hours: 0**

**VIRGINIA WESTERN COMMUNITY COLLEGE  
PO Box 14007  
Roanoke, VA 24038  
(540)-857-7273**



# MTH 163 PreCalculus

## Course Outcomes

MTH 163 serves two purposes. It prepares students for the study of an applied calculus course with a limited amount of trigonometry. It also provides students with the mathematical skills needed by students in the business, social and biological sciences. In this course the student will study the properties and graphs of the elementary functions and will be introduced to basic principles of matrices. MTH 166 covers the material of MTH 163 plus the study of the trigonometric (circular) functions.

At the completion of this course, the student should be able to:

1. Give and apply the definition of a function.
2. Use the algebra of functions to combine elementary functions.
3. Draw graphs of algebraic, exponential and logarithmic functions.
4. Find zeros of appropriate functions.
5. Solve systems of linear equations by graphic, algebraic and matrix methods.
6. Solve appropriate application problems.

VIRGINIA WESTERN COMMUNITY COLLEGE  
PO Box 14007  
Roanoke, VA 24038  
(540)-857-7273



# MTH 163

Required Materials:

Textbook:

**Precalculus—Graphing Approach, 10th Edition, Sullivan, Pearson Publishers.  
ISBN: 9780321979070**

The following supplementary materials are available:

1. Student Solution Manual is optional: Student Solutions Manual, 10<sup>th</sup> edition, ISBN 9780321717634

VIRGINIA WESTERN COMMUNITY COLLEGE  
PO Box 14007  
Roanoke, VA 24038  
(540)-857-7273



# MTH 163 PreCalculus

Topical Description:

## Chapter 1: Graphs

- 1.1 Distance and Midpoint Formulas
- 1.2 Equations in two variables
- 1.3 Lines
- 1.4 Circles

## Chapter 2: Functions and Their Graphs

- 2.1 Functions
- 2.2 The Graph of a Function
- 2.3 Properties of Functions
- 2.4 Library of Functions; Piecewise-defined Functions
- 2.5 Graphing Techniques: Transformations
- 2.6 Mathematical Models: Constructing Functions

## Chapter 3: Polynomial and Rational Functions

- 3.1 Linear Models and Properties
- 3.2 Building Linear Functions from Data (optional)
- 3.3 Quadratic Functions and Their Properties
- 3.4 Quadratic Models
- 3.5 Rational Inequalities

## Chapter 4: Polynomial and Rational Functions

- 4.1 Polynomial Functions
- 4.2 Properties of Rational Functions
- 4.3 Graphs of Rational Functions
- 4.4 Polynomial and Rational Inequalities
- 4.5 The Real Zeros of a Polynomial Function
- 4.6 Complex Zeros; Fundamental Theorem of Algebra

## Chapter 5: Exponential and Logarithmic Functions

- 5.1 Composite Functions
- 5.2 Inverse Functions

VIRGINIA WESTERN COMMUNITY COLLEGE  
PO Box 14007  
Roanoke, VA 24038  
(540)-857-7273



- 5.3 Exponential Functions
- 5.4 Logarithmic Functions
- 5.5 Properties of Logarithms
- 5.6 Logarithmic and Exponential Equations
- 5.7 Compound Interest
- 5.8 Exponential Growth and Decay; Newton's Law; Logistic Models
- 5.9 Fitting Data to Exponential, Logarithmic, and Logistic Functions (optional)

**Chapter 11: Systems of Equations**

- 11.2 Systems of Linear Equations; Matrices
- 11.3 Determinants
- 11.4 Matrix Algebra

VIRGINIA WESTERN COMMUNITY COLLEGE  
PO Box 14007  
Roanoke, VA 24038  
(540)-857-7273



# MTH 163 PreCalculus

Notes to Instructors

(List information about optional topics, departmental exams, etc)

1. The final exam must be comprehensive

VIRGINIA WESTERN COMMUNITY COLLEGE  
PO Box 14007  
Roanoke, VA 24038  
(540)-857-7273

