Common Course Outline
Math 163
Pre-Calculus I
3 Credits

Community College of Baltimore County

Description

MATH 163 – Pre-Calculus I explores the nature and scope of college mathematics through the study of functions. Topics include the study of polynomial, rational, radical, piece-wise defined, and absolute value functions and their graphs and applications as well as modeling with these functions. Additional topics include complex numbers, inverse functions, operations with functions, exponential and logarithmic functions and their graphs and applications.

3 Credits

Prerequisites: ACLT 052 or ACLT 053; and (Algebra I and II in high school and a satisfactory score on the placement exam) or Math 083

Overall Course Objectives

Upon completion of this course, the students will be able to:

1. produce and compare graphs of absolute value and piecewise-defined functions;
2. solve inequalities in one and two variables;
3. solve absolute value inequalities in one variable;
4. identify domain and range of functions;
5. produce and compare graphs of functions, using translations, symmetry, end behavior, and asymptotes;
6. combine two or more functions using addition, subtraction, multiplication, division, or functional composition;
7. identify the inverse of a given function;
8. identify the function, given information about the function;
9. model numerical data using quadratic functions to further analyze data and predict values;
10. perform operations with functions;
11. produce and compare graphs of exponential and logarithmic functions;
12. solve problems using exponential and logarithmic functions;
13. produce and compare graphs of polynomial functions;
14. identify the zeros of polynomial functions; apply the Fundamental Theorem of Algebra;
15. identify the equation of a polynomial using the Theory of Equations and given sufficient information about its zeroes;
16. solve rational equations;

17. produce graphs of rational functions;
18. construct a solution to real world problems using problem solving methods individually and in groups;
19. examine the mathematical contributions made by people from diverse cultures throughout history;
20. articulate a solution to mathematical problems; and
21. apply appropriate technology to the solution of mathematical problems.

Major Topics

I. Absolute value equations and inequalities
   A. Absolute value equations
   B. Absolute value inequalities
II. Functions
   A. Review domain, range, functional notation
   B. Modeling data with linear regression function
   C. Review parallel and perpendicular functions
   D. Review quadratic functions and their graphs
   E. Graphing techniques using shifting/stretching techniques
   F. Absolute value and piecewise defined functions and their graphs
III. Polynomial Functions
   A. Graphs of polynomial functions
   B. Zeros of polynomial functions
   C. Complex numbers and theory of equations
   D. Fundamental Theorem of Algebra
   E. Modeling with polynomial functions
IV. Rational Functions and Radical Functions
   A. Graphs of rational functions
   B. Graphs of radical functions
   C. Equations and inequalities of rational and radical functions
V. Combinations of Functions
   A. Arithmetic operations on functions
   B. Composition of functions
   C. One-to-one functions
   D. Inverse functions
VI. Exponential and Logarithmic Functions
   A. Definition and graphs of exponential functions
   B. Definition and graphs of logarithmic functions
   C. Properties of logarithms
   D. Solving exponential and logarithmic equations
   E. Applications of exponential and logarithmic functions

Course Requirements

Grading procedures will be determined by the individual faculty member but will include the following:

Grading/exams

- At least two exams in addition to the final exam
- At least one written project will be a requirement for the semester, which will include the GREAT project when administered.

- A comprehensive final exam that will count between 20% and 30% of the total weighted course grade.
- Other components, such as group work, may be part of the grade.

Written Assignments: Students are required to use appropriate academic resources.

Other Course Information

This course is an approved 3-credit General Education course in the Mathematics category. Please refer to the current CCBC Catalog for General Education course criteria and outcomes.

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