MATH 165
Pre-Calculus II
4 Credits

Community College of Baltimore County
Common Course Outline

Description

MATH 165 – Pre-Calculus II: is a course that prepares students for calculus. It covers topics which include exponential and logarithmic functions, graphing logarithmic and exponential functions, conic sections, trigonometric functions, partial fractions, laws of sine and cosine, polar coordinates, complex numbers in polar form, and sequences and series.

Pre-requisites: ACLT 053 or (ESOL 052 and ESOL 054); MATH 163 with a C or better, or a sufficient score on the placement exam.

Overall Course Objectives

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

1. produce graphs of functions using transformations;
2. evaluate functions using the algebra of functions;
3. determine the inverse of functions;
4. evaluate logarithmic, exponential, and trigonometric functions;
5. analyze graphs of logarithmic, exponential, and trigonometric functions;
6. solve exponential, logarithmic, trigonometric equations and application problems;
7. articulate solutions to mathematical problems using clear written and/ or oral communication;
8. analyze equations of the circles, ellipses, hyperbolas, and their graphs;
9. perform partial decomposition of rational functions;
10. verify trigonometric identities;
11. solve right and oblique triangles;
12. perform operations on complex numbers in polar form;
13. solve applications using appropriate analytical, numerical, graphical approaches, or technological tools;
14. describe the appropriate analytical model to solve application problems (such as polynomial, rational, exponentials, logarithmic, and trigonometric);
15. model numerical data using functions to analyze and predict values;
16. analyze arithmetic and geometric sequences and series;
17. construct solutions to real-world problems using ethical problem-solving methods and critical thinking;
18. apply appropriate technology to solve mathematical problems;
19. find, evaluate, use, and cite appropriate academic sources about mathematics topics; and
20. examine the mathematical contributions made by people from diverse cultures throughout history, and their cultural, ethical, and social significance through project, research, applications, and/or group activities.

Major Topics

I. Review of functions
   a. Functions and Relations
   b. Transformation of graphs
   c. Analyzing graphs of functions including piece-wise defined functions
   d. Algebra of functions
   e. Inverse functions

II. Exponential and Logarithmic Functions
   a. Graphs of exponential and logarithmic functions
   b. Properties of logarithms
   c. Exponential and logarithmic equations
   d. Applications of exponential and logarithmic functions
   e. Global and social topics evaluated through exponential functions

III. Analytic Geometry
   a. Circles
   b. Ellipses centered at the origin
   c. Hyperbolas centered at the origin

IV. Partial Fractions
   a. Distinct and repeated linear factors
   b. Distinct and repeated quadratic factors

V. Trigonometric Functions
   a. Angles
   b. Triangles
   c. Fundamental identities
   d. Trigonometric functions
   e. Inverse trigonometric functions
   f. Applications of right triangles
   g. Unit circle
   h. Arc lengths
   i. Area of a sector
   j. Graphs of trigonometric functions

VI. Analytic Trigonometry
   a. Trigonometric identities
   b. Trigonometric equations
   c. Law of Sines
   d. Law of Cosines

VII. Polar coordinates
   a. Representation of a complex number in polar form
   b. Multiplication and division of complex numbers in polar form
   c. Polar equations

VIII. Sequences and Series
   a. Definitions and notations
   b. Arithmetic sequences and series
   c. Geometric sequences and series

Course Requirements

Grading will be determined by the individual faculty member, but shall include the following, at minimum:

- two exams
- one comprehensive final exam
- one project (such as a research paper or application) which will address 5 of the 7 General Education Outcomes

Written assignments and research projects: Students are required to use appropriate academic resources in their research and cite sources according to the style selected by their professor.

Other Course Information

This course is an approved 4–credit General Education course in Mathematics.
One or more assignments will infuse CCBC General Education Program outcomes and will account for a minimum of 10% of the total course grade. The assignment(s) will allow students to demonstrate at least 5 of the 7 General Education program outcomes.

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