

Common Course Outline

MATH 165

Pre-Calculus II

4 Credits

Community College of Baltimore County

Description

MATH 165 – Pre-Calculus II prepares students for calculus. It covers topics including exponential and logarithmic functions, graphing logarithmic and exponential functions; conic sections and parametric equations; trigonometric functions; partial fractions; vectors; laws of sine and cosine; polar coordinates; mathematical induction; and sequences and series.

4 Credits

Prerequisites: ACLT 052 or ACLT 053 and MATH 163 with a grade of “C” or better

Overall Course Objectives

Upon successfully completing this course students will be able to:

1. determine the inverse of a given function;
2. evaluate logarithmic, exponential, and trigonometric functions;
3. analyze and interpret graphs of logarithmic, exponential, and trigonometric functions, both accurately and ethically;
4. solve exponential, logarithmic, and trigonometric equations;
5. solve application problems using exponential, logarithmic, or trigonometric functions;
6. recognize and simplify the equations of the conic sections and then graph any of the conic sections;
7. find partial decomposition of a rational function;
8. simplify trigonometric expressions and verify trigonometric identities using other trigonometric identities;
9. solve oblique triangles;
10. perform vector operations;
11. apply the algebra of complex numbers in vector or polar form and work with complex numbers in conjunction with polynomials and vectors;
12. solve application questions using appropriate analytical, numerical, or graphical approaches;
13. identify the appropriate analytical model to solve application problems (such as polynomial, rational, exponentials, logarithmic, trigonometric, and vectors);
14. model numerical data and use the model to further analyze data and predict values;

15. identify and work with arithmetic and geometric sequences and series;
16. prove a statement using mathematical induction;
17. examine the mathematical contributions made by people from diverse cultures throughout history, and their cultural, and social significance;
18. articulate a solution to mathematical problems; and
19. use appropriate technology to solve mathematical problems.

Major Topics

- I. Exponential and Logarithmic Functions
 - A. Definitions and graph of exponential and logarithmic functions
 - B. Properties of logarithms and solutions of exponential and logarithmic equations
 - C. Exponential equations and logarithmic equations
 - D. Applications of exponential and logarithmic functions
 - E. Modeling with exponential or logarithmic functions
 - F. Global and social topics evaluated through exponential functions
- II. Analytic Geometry
 - A. Circles and Parabolas
 - B. Ellipses and Hyperbolas
 - C. Identifying Conic sections; eccentricity
 - D. Parametric equations
- III. Partial Fractions
 - A. Distinct and repeated linear factors
 - B. Distinct and repeated quadratic factors
- IV. Trigonometric Functions
 - A. Angles and triangles
 - B. Right triangle definition
 - C. Special angles
 - D. Co-function identities
 - E. Fundamental identities
 - F. Trigonometric functions of general angles
 - G. Evaluating trigonometric functions and inverse functions
 - H. Applications of right triangles
 - I. The unit circle and radian measure
 - J. Trigonometric functions of arc lengths
 - K. Graphs of Sine, Cosine, Tangent, Cotangent, Secant, and Cosecant functions
 - L. Harmonic motion
- V. Analytic Trigonometry
 - A. Trigonometric identities
 - B. Sum and difference identities
 - C. Further identities
 - D. Inverse circular functions
 - E. Trigonometric equations and inequalities
- VI. Vectors

- A. Law of Sines
 - B. Law of Cosines
 - C. Vectors and their applications
 - D. Trigonometric form of complex numbers
 - E. Power and roots of complex numbers
 - F. Polar equations and graphs
 - G. Parametric equations with trigonometric functions
- VII. Sequences and Series
- A. Definitions and notations
 - B. Arithmetic sequences and series
 - C. Geometric sequences and series
 - D. Mathematical induction

Course Requirements

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

Grading/exams

- A minimum of two tests
- A comprehensive final exam
- At least one written project (such as a research paper or application)
- An oral presentation (such as a short presentation) and group work

Written Assignments: Students are required to use appropriate academic resources. Multiple assignments will infuse CCBC General Education Program objectives; at least one assignment worth a minimum 10% of the total course grade will allow students to demonstrate at least 5 of the 7 General Education Program outcomes.

Other Course Information

This course is an approved 4-credit General Education course in the Mathematics category. Please refer to the current CCBC Catalog for General Education course criteria and outcomes.