

Common Course Outline

Math 165

Precalculus

4 Semester Hours

The Community College of Baltimore County

Description

Math 165 – 4 credits

Precalculus

Prepares students for calculus; covers exponential and logarithmic functions with graphing, equations, applications, and modeling; conic sections and parametric equations; trigonometric functions; vectors; partial fractions; polar coordinates and graphing; mathematical induction; sequences and series.

Prerequisite: (Rdng 052 or LVR2) and (Engl 052 or LVE 2) or (ESOL 052 or LVE 2) and Math 163.

Overall Course Objectives

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Upon successfully completing the course students will be able to:

1. Determine the inverse of a given function; (I, 2, 3, 4, 5)
2. Evaluate logarithmic, exponential, and trigonometric functions; (I, 2, 3)
3. Analyze and interpret graphs of logarithmic, exponential, and trigonometric functions; (I, 2, 3, 4, 5)
4. Solve exponential, logarithmic, and trigonometric equations; (I, IV, 1, 3, 4, 5, 7)
5. Solve application problems using exponential, logarithmic, or trigonometric functions; (I, II, III, IV, 1, 2, 3, 4, 5, 6, 7)
6. Recognize and simplify the equations of the conic sections and then graph any of the conic sections; (I, 2, 3, 4, 5)
7. Find the partial decomposition of a rational function; (I, IV, 1, 3, 4, 5, 7)
8. Simplify trigonometric expressions and verify trigonometric identities using trigonometric identities; (I, III, 1, 2)
9. Solve oblique triangles; (I,IV, 1,3,4,6,7)
10. Perform vector operations; (I, II, II, IV, 1, 3, 4, 6, 7)
11. Understand and apply the algebra of complex numbers in vector or polar form and work with complex numbers in conjunction with polynomials and vectors; (I, II, III, IV, 1, 2, 4, 5, 6)
12. Solve application questions using analytical, numerical, or graphical approaches as appropriate; (I, III, IV, VI, 1, 2, 4,6, 7)
13. Identify the appropriate analytical model to solve application problems (models include polynomial functions, rational functions, exponential functions, logarithmic functions, trigonometric functions and vectors); (I, III, IV, VI, 1, 2, 4, 6, 7)
14. Model numerical data and use the model to further analyze data and predict values. Models include polynomials, logarithmic functions, exponential functions, and power functions; (1, III, IV, VI, 1, 2, 4, 6, 7)
15. Identify and work with arithmetic and geometric sequences and series; (I, III, IV, 1, 2, 3, 4, 5, 6, 7)
16. Prove a statement using mathematical induction; (II, 2)
17. Examine the mathematical contributions made by people from diverse cultures throughout history; (V, 5)
18. Articulate a solution to mathematical problems. (II, 2)
19. Apply appropriate technology to the solution of mathematical problems. (IV, 4,5)

Math 165 Major Topics:

- I. Exponential and Logarithmic Functions
 - a. Definition 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

- II. Analytic Geometry
 - f. Circles and Parabolas
 - g. Ellipses and Hyperbolas
 - h. Identifying Conic Sections; eccentricity
 - i. Parametric equations

- III. Partial Fractions
 - j. Distinct and repeated linear factors
 - k. Distinct and repeated quadratic factors

- IV. Trigonometric Functions
 - l. Angles and triangles
 - m. Right triangle definition
 - n. Special angles
 - o. Co function identities
 - p. Fundamental identities
 - q. Trigonometric functions of general angles
 - r. Evaluating trigonometric functions and inverse functions
 - s. Applications of right triangles
 - t. The unit circle and radian measure
 - u. Trigonometric functions of arc lengths
 - v. Graphs of Sine and Cosine functions
 - w. Graphs of Tangent, Cotangent, Secant, Cosecant functions
 - x. Harmonic motion

- V. Analytical Trigonometry
 - y. Trigonometric identities
 - z. Sum and difference identities
 - aa. Further identities
 - bb. Inverse circular functions
 - cc. Trigonometric equations and inequalities

- VI. Vectors
 - dd. Law of Sines
 - ee. Law of Cosines
 - ff. Vectors and their applications
 - gg. Trigonometric form of complex numbers
 - hh. Power and roots of complex numbers
 - ii. Polar equations and graphs
 - jj. Parametric equations with trigonometric functions

VII. Sequences and Series

kk. Definition and notation

ll. Arithmetic sequences and series

mm. Geometric sequences and series

nn. Mathematical induction

Course Requirements (General Education Goal #VII)

Students will be given opportunity to collaborate via group work and/or oral presentation of problem solutions. There will be multiple opportunities for the instructor to assess student progress in the course through classwork and/or homework.

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

Tests (at least two) and Quizzes: Individual faculty will notify students of the testing procedures to be used.

Other components, such as Projects or Group Work, may be part of the grade.

Comprehensive Final Exam: The course will include a comprehensive final exam.

Final Grades: Grades will be determined by individual faculty members.

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