

BROOME COMMUNITY COLLEGE
Binghamton, New York

COURSE TITLE ELEMENTARY ALGEBRA AND TRIGONOMETRY MAT 096

CLASS LECTURE HOURS 5 **LAB HOURS** 0 **CREDIT HOURS** 5

DIVISION DEAN Julia Peacock

DEPT. CHAIRPERSON Paul O'Heron **DATE** Spring 2005

PREREQUISITE: MAT 092 Foundations for College Mathematics I or equivalent.

MAT 096 Objectives

After taking MAT 096 the student should be able to:

Perform skills in four categories: Algebra, Geometry/Trigonometry, Graphing and Problem Solving /Estimation.

Note: Throughout the course the students are expected to solve applied problems related to the topics of the course.

Algebra:

After taking MAT 096 the student should be able to:

1. Solve linear equations. (a complete development)
2. Perform operations on polynomials.
3. Use exponent rules with rational exponents. (a complete development)
4. Simplify rational expressions and perform operations on rational expressions including complex fractions.
5. Solve elementary rational equations.
6. Simplify radical expressions.
7. Solve radical equations.
8. Solve and evaluate literal equations.
9. Solve equations with absolute values.
10. Define and evaluate functions using function notation.
11. After a brief review, factor a monomial from a polynomial, factor trinomials, and factor special cases (difference of squares).
12. Factor expressions in quadratic form, expressions that are sum and difference of cubes, and expressions that can be factored by grouping.
13. After a brief review, solve quadratic equations by factoring and by using the quadratic formula.
14. Solve quadratic equations by completing the square.
15. Solve higher degree equations by factoring.
16. Identify parallel lines from their equations.
17. After a brief review, solve 2 by 2 systems of linear equations by substitution and elimination.

Geometry/Trigonometry:

After taking MAT 096 the student should be able to:

18. Classify angles and triangles using appropriate terminology.
19. Relate the sides and angles of similar triangles.
20. Find the area and perimeter of polygons.
21. Convert between radians and degrees.
22. Find reference angles for angles measured in degrees.
23. Evaluate the six trigonometric functions of general angles measured in degrees.
24. Understand and use right triangle trigonometry.

Graphing:

After taking MAT 096 the student should be able to:

25. Identify and graph the following basic relations:
 - a. $ax + by = c$
 - b. $y = ax^2 + bx + c$
 - c. $(x - h)^2 + (y - k)^2 = r^2$
26. Find equations of lines using point-slope form, slope-intercept form and general form.
27. After a brief review, solve 2 by 2 systems of linear equations by graphing.
28. Graph a parabola by finding the vertex, intercepts, and additional points.

Problem Solving / Estimation:

After taking MAT 096 the student should be able to:

29. Solve applications problems involving 2 by 2 systems of linear equations.
30. Solve application problems with linear and quadratic equations.
31. Solve applications problems involving unit conversions.
32. Solve applications using right triangle trigonometry.
33. Solve application problems with rational equations.

Calculator:

After taking MAT 096 the student should be able to:

34. Use TI 30X II to evaluate higher order roots, find trigonometric and inverse trigonometric values and find equivalent angle measures in degrees and radians.
35. Use TI 30X II to calculate using scientific notation.

Computer:

After taking MAT 096 the student should be able to:

36. Complete at least 6 assignments in CourseCompass.
37. Log in to WebCT for access to an assignment sheet, syllabi, lecture notes, assignments, or grades.
38. Receive email from the instructor and access their class calendar through BCCToday or WebCT.
39. Access their own grades for this class online.

Final Exam:

40. A department final will be given for MAT 096. If a faculty member chooses no to give the department final, he/she must submit the final for review to the course coordinator for approval.
41. Graphing calculators are not permitted for any portion of the final exam. It must be explicitly stated on the final and announced prior to the exam and at the beginning of the semester.
42. No notecards, formula sheets, or any other aids are permitted for at least 50% of the final exam. That is, at least 50% of the final must be completed without any assistance.

CATALOG COURSE DESCRIPTION:

Rational exponents; polynomials; factoring; functions; rational expressions; linear, quadratic and rational equations; graphs of basic functions; linear systems; topics in geometry; right triangle trigonometry.

5 Class Hours; Prerequisite: MAT 092 Foundations for College Mathematics II or equivalent.

MAT 096

Elementary Algebra and Trigonometry

Course outline

- I. Algebra and Problem Solving
 - Some Basics of Algebra
 - Operations and Properties of Real Numbers
 - Solving Equations
 - Introduction to Problem Solving
 - Formulas, Models, and Geometry
 - Properties of Exponents
 - Scientific Notation

- II. Graphs, Functions, and Linear Equations
 - Graphs
 - Functions
 - Linear Functions: Graphs and Models
 - Another Look of Linear Graphs
 - Other Equations of lines
 - The Algebra of Functions

- III. Systems of Equations and Problem Solving
 - Systems of Equations in Two Variables
 - Solving by Substitution or Elimination
 - Solving Applications: Systems of Two Equations
 - Business and Economic Applications

- IV. Inequalities and Problem Solving
 - Absolute-value Equations and Inequalities

- V. Polynomials and Polynomial Functions
 - Introduction to Polynomials and Polynomial Functions
 - Multiplication of Polynomials
 - Common Factors and Factoring by Grouping
 - Factoring Trinomials
 - Factoring Perfect-Square Trinomials and Differences of Squares
 - Factoring Sums of Differences of Cubes
 - Factoring: A General Strategy
 - Applications of Polynomial Equations

- VI. Rational Expressions, Equations, and Functions
 - Rational Expressions and Functions: Multiplying and Dividing
 - Rational Expressions and Functions: Adding and Subtracting
 - Complex Rational Expressions
 - Rational Equations
 - Solving Applications Using Rational Equations
 - Division of Polynomials
 - Formulas and Applications

- VII. Exponents and Radicals
 - Radical Expressions and Functions
 - Rational Numbers as Exponents
 - Multiplying, Adding, and Subtracting Radical Expressions
 - Multiplying, Dividing, and Simplifying Radical Expressions
 - More with Multiplication and Division
 - Solving Radical Equations

- VIII. Quadratic Functions and Equations
 - Quadratic Equations
 - The Quadratic Formula
 - Applications Involving Quadratic Equations
 - Quadratic Functions and Their Graphs
 - Problem Solving and Quadratic Functions

- IX. The Trigonometric Functions
 - Angles
 - Angles Relationships and Similar Triangles
 - Definitions of the Trigonometric Functions
 - Using the Definitions of the Trigonometric Functions

- X. Acute Angles and Right Angles
 - Trigonometric Functions of Acute Angles
 - Trigonometric Functions of Non-Acute Angles
 - Finding Trigonometric Function Values Using a Calculator
 - Solving Right Triangles

- XI. Radian Measure and the Circular Functions
 - Radian Measure
 - Applications of Radian Measure