

I. COURSE DESCRIPTION:

- A. Division: Science and Math
Department: Math
Course ID: MATH 102
Course Title: Introduction to College Algebra
Units: 4
Lecture: 4 Hours
Prerequisite: MATH 095 or eligibility for MATH 102 as determined through the SBVC assessment process.
- B. Catalog Description: Designed for students with a strong foundation in algebra. This course includes the study of absolute value equations and inequalities, quadratic and rational inequalities, in depth work with rational exponents, radicals, and quadratic equations, introduction to functions and their inverses, exponential functions and their inverses, exponential functions and their graphs, logarithmic functions and their graphs and their algebraic properties, and introduction to sequences, series and the binomial expansion.
- C. Schedule Description: Designed for students with a strong foundation in algebra, this course includes the study of inequalities and absolute value, radicals, functions, quadratic equations, sequences, series, binomial expansion, and logarithms.

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

III. EXPECTED OUTCOMES FOR STUDENTS:

Upon completion of the course, the student should be able to:

- A. Recognize and identify functions
- B. Compare and contrast linear and quadratic equations
- C. Construct graphs of quadratic functions
- D. Distinguish and use the most efficient methods of solving a quadratic equation
- E. Analyze an application problem and to formulate and express their findings in an appropriate mathematical equation
- F. Apply the principles of fractions to the concept of exponents and to explore on how they relate to radicals
- G. Compare and contrast exponential and logarithmic functions

IV. CONTENT:

- A. Unit I. Inequalities
 - 1. Absolute Value Equations
 - 2. Absolute Value Inequalities
 - 3. Nonlinear Inequalities
- B. Unit II. Exponents and Radicals
 - 1. Review Rational Exponents
 - 2. Operations with Radicals
 - 3. Equations with Radicals
 - 4. Complex Numbers
- C. Unit III. Quadratic Equations
 - 1. Review Completing the Square
 - 2. Review Quadratic Formula
 - 3. Complex Solutions
 - 4. Applications

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- D. Unit IV. Functions
 - 1. Definition and Notation
 - 2. Graphs
 - 3. Inverse Functions
- E. Unit V. Quadratic Functions; Parabolas
 - 1. Graphs
 - 2. Shifts and Reflections
- F. Unit VI. Exponential and Logarithmic Functions
 - 1. Exponential Functions
 - 2. Logarithmic Functions
 - 3. Properties of Logarithms
- G. Unit VII. Sequences and Series
 - 1. Sequences
 - 2. Series
 - 3. Binomial Expansion

V. METHODS OF INSTRUCTION:

Methods of instruction will vary from instructor to instructor, but may include

- A. Lecture
- B. Class and study group discussions
- C. Computer demonstrations
- D. Audio-visual aids, filmstrips, and cassettes.

VI. TYPICAL ASSIGNMENTS:

At the end of each section there is a set of problems. These start with problems that require the student to recognize and apply the principles covered in the section. The problems then graduate into those requiring the application of two or more principles and the student must recognize the principles to apply and the correct order in which to apply them. Typical problem sets end with application problems in which the student must translate the words in the problems into appropriate mathematical symbols and analyze which principles must be applied. The student must then formulate and apply a solution strategy.

VII. EVALUATION(S):

A. There is a minimum of four regular scheduled objective exams.

1. Typical exam problems:

a) Find the domain and range of the function $f(x) = \frac{2}{x-5}$

b) Write $\log_3\left(\frac{1}{9}\right) = -2$ in exponential form.

B. There may be weekly or daily quizzes and/or homework assignments.

1. Typical homework or quiz problems:

a) Solve $\sqrt[3]{12m+4} - 4 = 0$

b) Find the amount that results when \$100 is invested at 8% compounded continuously after a period of 25 years.

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- C. There is a comprehensive final.
1. Typical final exam problems:

a) $f(x) = 2x + 1$ $g(x) = x^2 - 1$ find $(f \circ g)(x)$

b) Find the inverse of the one-to-one function $3x - y = 5$

VIII. TYPICAL TEXT(S):

R. David Gustafson and Peter Frisk, Algebra for College Students, 6th edition. Brooks-Cole, 2002
Margaret Lial and John Hornsby, Algebra for College Students, 4th edition. Addison-Wesley
Publishing Company, 2000.

IX. OTHER SUPPLIES REQUIRED OF STUDENTS: None