MATH 1414 : Basic Algebra

4 credit hours (4 lecture/0 lab)

The course presents the basic principles of algebra and its application. Topics include the study of properties of real numbers, equations and inequalities of one variable, introduction to graphing, systems of equations in two variables, and operations and factoring of polynomials. Skills for success in more advanced courses are emphasized; consequently, the student must have a strong working knowledge of arithmetic before entering this course.

Prerequisite(s)

MATH 0974 with a grade of C or better or appropriate assessment score

Topical Outline

1. The Set of Real Numbers
    a. Fractions
    b. Intro to Algebra and the set of real numbers
    c. Exponents, square roots, and order of operations
    d. Operations of real numbers
    e. Properties of real numbers and simplifying expressions
2. Linear Equations and Inequalities
    a. Properties of equality
    b. Solving linear equations
    c. Clearing fractions and decimals in linear equations
    d. Applications of linear equations: intro to problem solving
    e. Applications involving percents
    f. Formulas and applications of Geometry
    g. Mixture applications and uniform motion
3. Graphing linear equations in two variables
    a. Rectangular coordinate system
    b. Linear equations in two variables
    c. Slope of a line and rate of change
    d. Slope-intercept form of a linear equation
    e. Point-slope formula
    f. Applications of linear equations and modeling
4. Systems of Linear Equations in Two Variables
    a. Graphing method
    b. Substitution method
    c. Addition method
    d. Applications of systems of linear equations
5. Polynomials and Properties of Exponents
    a. Multiplying and dividing expressions with common bases
    b. More properties of exponents
    c. Definitions of zero and negative exponents
    d. Scientific notation
    e. Addition and subtraction of polynomials
    f. Multiplication of polynomials and special products
    g. Division of polynomials
6. Factoring Polynomials
    a. Greatest common factors and factoring by grouping
    b. Factoring trinomials of the form x2 + bx + c
    c. Factoring trinomials: AC-method
    d. Difference of squares and perfect square trinomials
    e. Sum and difference of cubes
    f. Solving equations using the zero product rule

g. Applications of quadratic equations
h. Supplementary factoring topics

Course Outcomes

At the end of this course, students will be able to:

1. Apply properties of real numbers to simplify expressions.
2. Solve quadratic equations by factoring.
3. Solve linear equations and inequalities.
4. Solve a word problem using an equation.
5. Graph linear equations and interpret slope as a rate of change.
6. Write a linear equation to describe a given situation.
7. Solve system of linear equations in two variables.
8. Apply laws of integer exponents to simplify expressions.
9. Perform the four basic arithmetic operations on polynomials.
10. Factor polynomials.