

Math 0101: Foundations of College Algebra

Course Title: Foundations of College Algebra

Credit hours: 4 (in-house) credits

Prerequisites: Placement in ACCUPLACER Grid 2 or completion of MATH 0099 or MATH 0100 with a grade of C or better

Note: *This class is only available online. Students who need this course and do not wish to take an online class must sign up for Math 0095 and complete the course in the emporium.*

Course Description

This course in elementary algebra covers the real number system, properties for solving linear equations and inequalities, formula rearrangement, properties of and operations with polynomials, basic factoring, quadratic equations, operations with rational expressions, exponents, roots and radicals, graphs of linear equations and the Pythagorean Theorem. This course serves as a remedial prerequisite for Math 1179 and Math 1200.

Course Objectives

1. Become proficient with operations involving real numbers
2. Become proficient in the techniques used to solve problems requiring elementary level algebra
3. Form the computational expertise necessary for success in a gateway college mathematics course
4. Develop the critical thinking and study skills necessary for success in a gateway college mathematics course
5. Make the transition from developmental mathematics to college level mathematics
6. Acquire the skills necessary to utilize mathematics in the other disciplines

Learning Outcomes

1. Utilize skills acquired from earlier math courses including use of the order of operations, working with fractions, finding areas and perimeters, solving proportions and solving percentage problems
2. Perform arithmetic operations on all types of real numbers, including integers
3. Understand the concept of a variable and evaluate algebraic expressions given values for the variables
4. Solve linear equations involving whole numbers, integers, decimals and fractions, in one variable
5. Sketch the graph of the solution set of a linear equation in two variables, including vertical and horizontal lines
6. Calculate the slope of a line
7. Write the equation of a line in slope-intercept form and standard form
8. Solve a right triangle using the Pythagorean Theorem
9. Solve problems involving the perimeter, circumference, and area of circles, rectangles, and triangles
10. Solve problems involving the volume of rectangular solids and cylinders
11. Use a number line to show the solution set to a linear inequality in one variable
12. Solve linear inequalities, involving whole numbers, integers and fractions, in one variable
13. Solve systems of linear equations in two variables using graphing, substitution, and elimination
14. Simplify expressions using properties of integer exponents and utilize scientific notation
15. Perform arithmetic operations on polynomials
16. Factor a given polynomial using the GCF, difference of two squares, and trinomials
17. Solve quadratic equations by factoring
18. Solve application problems involving quadratic equations
19. Find values for which a rational expression is undefined
20. Reduce rational expressions to lowest terms
21. Perform operations on rational expressions
22. Solve equations and application problems involving rational expressions

Course Topics

I. ADDITION, SUBTRACTION, MULTIPLICATION, AND DIVISION OF REAL NUMBERS

- A. Introduction to sets, including definition of an integer, rational number, irrational number and real number
- B. Concept of absolute value
- C. Order of operations including Basic Radicals
- D. Algebraic expressions
 - 1. Variables
 - 2. Terms
 - 3. Factors
 - 4. Coefficients
- E. Translating English expressions into algebraic expressions
- F. Distributive property
- G. Evaluating algebraic expressions
- H. Combining elementary like terms

II. SOLVING LINEAR EQUATIONS AND LINEAR INEQUALITIES

- A. Techniques of solving
- B. Word problems

III. GRAPHING LINEAR EQUATIONS IN TWO VARIABLES AND OTHER EQUATIONS

- A. Coordinates
- B. Plotting points
- C. Slope
- D. Methods of graphing linear equations
 - 1. Using a table
 - 2. Using intercepts
 - 3. Horizontal and vertical lines
 - 4. Introduction to graphing a nonlinear equation using a table
- E. Slope-Intercept, point-slope, and standard forms
- F. Interpreting graphs
- G. Rearrange formulas in terms of another variable or other variables

IV. EXPONENTS, POLYNOMIALS, AND QUADRATIC EQUATIONS

- A. Apply the rules of integer exponents
- B. Scientific Notation
- C. Polynomials
 - 1. Definition
 - 2. Add and subtract polynomials by combining like terms
- D. Factoring
 - 1. Greatest Common Factor
 - 2. Factoring by grouping
 - 3. Difference of two squares
 - 4. Trinomials
- E. Solve quadratic equations by factoring
- F. Applications of quadratic equations

V. RADICALS AND THE PYTHAGOREAN THEOREM

- A. Evaluate square roots
- B. Right triangles
- C. Solve a right triangle using the Pythagorean Theorem

VI. RATIONAL EXPRESSIONS

- A. Determine the values for which a rational expression is undefined
- B. Rewrite rational expressions in lowest terms
- C. Add and subtract rational expressions
- D. Solve rational equations
- E. Applications of rational expressions

