

## Syllabus

# Developmental Math 3—Intermediate Algebra

## Course Overview

Intermediate Algebra is a comprehensive collection of mathematical concepts designed to give you a deeper understanding of the world around you. This course teaches you algebraic concepts such as polynomials, radical expressions, quadratic equations, and functions.

In this course, you will learn how to simplify polynomials and radical expressions. You will study the relationship between equations and functions. You will also learn how to graph functions and use them to solve a variety of real-world problems. In addition to online components, this course includes offline learning activities that focus on improving your understanding about the concepts taught in the course.

## Course Goals

By the end of this course, you will be able to do the following:

- Group terms to write an expression as the product of two sums or differences.
- Review polynomials and factoring.
- Solve problems with linear and quadratic equations.
- Graph a linear equation in two variables.
- Describe solutions of linear equations as ordered pairs.
- Graph the solution sets of quadratic inequalities in one variable and other unions of solution sets.
- Perform basic operations on rational expressions.
- Solve equations having absolute values.
- Perform operations on radical expressions and apply the rules for positive and negative exponents.
- Use the slope and intercept of linear functions to write an equation from a graph and draw a graph from an equation.
- Find points on a line given the slope and the y-intercept.
- Solve quadratic equations using a variety of methods.
- Plot complex numbers in the complex number plane.
- Describe functions with equations, tables, and graphs.
- Determine whether a relation is a function.
- Find the domain and range of a function.
- Determine if a point is on the graph of a linear equation.

- Graph absolute value functions.
- Find the product of two polynomials.
- Divide a polynomial by a binomial.
- Find output values using a rule of a function.
- Find composite functions.
- Determine if a function has an inverse by inspecting its graph.
- Identify the inverse of a function.
- Recognize graphs of different types of functions.
- Solve problems that involve exponential decay and exponential growth.
- Use the properties of exponential and logarithmic functions to solve problems.

## General Skills

To participate in this course, you should be able to do the following:

- Complete basic operations with word processing software, such as Microsoft Word or Google Docs.
- Complete basic operations with presentation software, such as Microsoft PowerPoint or Google Docs presentation.
- Perform online research using various search engines and library databases.
- Communicate through email and participate in discussion boards.

## Credit Value

Intermediate Algebra is a 0.5-credit course.

## Course Materials

- notebook
- computer with Internet connection and speakers or headphones
- Microsoft Word or equivalent
- Microsoft PowerPoint or equivalent

## Course Pacing Guide

This course description and pacing guide is intended to help you keep on schedule with your work. Note that your course instructor may modify the schedule to meet the specific needs of your class.

## Unit 1: Essentials of Algebra

### Summary

In this unit, you will group terms to write an expression as the product of two sums or differences. You will then learn to factor trinomials, including a perfect square trinomial and a difference of squares. Further, the unit will teach you to multiply algebraic expressions. You will solve problems with linear equations in one variable. By testing ordered pairs, you will learn to identify the graph of a linear equation. You will also learn to describe solutions of linear equations as ordered pairs. You will work with difficult linear inequalities and learn to graph the solution sets of associated inequalities. Next, you will learn to apply the rules for exponents and radicals. You will simplify rational expressions and identify non-permissible values for the variables in the rational expression. The unit will also teach you how to find the least common denominator, product, and quotient of two rational expressions. Additionally, you will find the sum and difference of two rational expressions with unlike denominators. Near the end of the unit, you will learn to simplify rational expressions by adding, subtracting, multiplying, and dividing, and you will solve equations having absolute values.

## Unit 2: Rational Exponents and Radicals

### Summary

To begin this unit, you will study square roots of perfect squares. You will then learn how to estimate square roots of imperfect squares and find positive and negative square roots of integers. You will also learn about the multiplication and division rules for radicals. You will simplify rational expressions for exponents and radicals and rationalize the denominator in rational expressions using the rules for exponents. Near the end of the unit, you will learn to solve equations containing radical expressions.

## Unit 3: Quadratic Equations

### Summary

In this unit, you will study how to use the slope and intercept of linear functions to write an equation from a graph and draw a graph from an equation. You will also learn how to find points on a given line using the slope and y-intercept. You will solve quadratic equations in which both sides are perfect squares and learn to solve problems using quadratic equations. You will factor a quadratic equation as a difference of two squares or as a perfect square of a binomial. Further in the unit, you will solve problems with quadratic equations and quadratic functions and use the quadratic formula to find a solution set for a quadratic equation. You will also learn to add, subtract, multiply, and divide complex numbers. As the unit concludes, you will learn to plot complex numbers in the complex number plane.

## Unit 4: Functions

### Summary

In this unit, you will study how to represent a function with the help of equations, tables, and graphs. You will determine if a relation is a function and find the domain and range of a function. You will use the rule of a function to determine its output values. Further in the unit, you will determine if a point is on the graph of a linear equation. Next, you will find the product of two polynomials and divide a polynomial by a binomial. You will also learn to graph functions including absolute value functions. You will find composite functions with their values. As the unit concludes, you will find the inverse of a function and determine if a function has an inverse by looking at a mapping diagram or by inspecting its graph.

## Unit 5: Exponential & Logarithmic Functions

### Summary

In this unit, you will learn to recognize graphs of types of functions. You will solve problems that involve exponential growth and exponential decay. You will also study the properties of exponential and logarithmic functions and solve related problems.