

Syllabus

Developmental Math 2—Beginning Algebra

Course Overview

Beginning Algebra is a comprehensive collection of mathematical concepts. It includes concepts such as fractions, real numbers, linear and nonlinear equations, and inequalities.

In this course, you will be introduced to graphs where you will learn to graph linear equations and inequalities. You will also learn to solve linear systems and will be exposed to exponents and polynomials. The course includes offline learning activities that focus on improving your understanding of the concepts taught in the course.

Course Goals

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

- Add and subtract fractions with like and unlike denominators.
- Find reciprocals and multiply and divide fractions.
- Solve real-life problems using addition, subtraction, multiplication, and division.
- Find the least common denominator and learn to rename fractions using it.
- Determine whether elements belong to a set and identify the subsets of a set.
- Classify a set as finite or infinite.
- Identify the intersection and union of two sets.
- Graph sets of numbers on a number line.
- Investigate the differences between rational and irrational numbers and get acquainted with some common irrational numbers.
- Study the simplest form of fractions and study how to find the common multiples and the least common multiple (LCM) of two whole numbers.
- Find the factors and the prime factors of whole numbers and the greatest common factor of two whole numbers and study how to multiply fractions.
- Add and subtract monomials and binomials.
- Study how to evaluate expressions with more than one variable using the order of operations.
- Classify polynomials and use linear math sentences in one variable to solve practical problems.
- Solve problems with linear equations in one variable and linear functions.
- Solve linear inequalities in one variable with multiple operations.

- Solve more difficult linear inequalities by isolating the variable and graph the solution sets to inequalities in one variable.
- Find the coordinates of a given point on a coordinate plane.
- Use the slope and intercept of linear functions to write an equation from a graph, and draw a graph from an equation.
- Determine the slope and intercept of a linear relationship from its graph and graph an ordered pair of real numbers on a coordinate plane.
- Find the lengths of the sides of a right triangle using the Pythagorean Theorem.
- Find the distance between two points using the distance formula.
- Find the equation of a circle in the coordinate plane in terms of its center and radius.
- Use a variety of problem-solving strategies, such as drawing a diagram, making a chart, guess-and-check, solving a simpler problem, writing an equation, and working backwards.
- Find the intercepts of a linear equation and determine if a point is on the graph of a linear equation.
- Graph inequalities in two variables on a coordinate plane and determine whether an ordered pair is a solution of a linear equation.
- Learn and apply the point-slope form and the slope-intercept form of the equation of a line.
- Learn the relationship between parallel lines and perpendicular lines and their slopes.
- Identify when equations will graph as parallel lines, perpendicular lines, or neither.
- Calculate the slope of a line from a graph or from two points and solve problems based on linear graphs that represent real-world situations.
- Solve a system of equations by adding or subtracting or by using the substitution method.
- Use the graphing method to solve systems of two linear equations.
- Solve word problems using a system of two linear equations or inequalities and solve a system of inequalities by graphing.
- Use the power rule for exponents to simplify an expression with exponents raised to a power.
- Simplify a product using the product rule for exponents and divide exponential forms with the same base using the quotient rule for exponents.
- Study positive and negative exponents and find the sum and difference of two polynomials.
- Find the product of monomials and polynomials and divide a polynomial by a monomial.
- Evaluate polynomials.
- Factor a polynomial that has monomial factors.
- Use the distributive property to write an expression as the product of two sums or differences.
- Factor trinomials of the form x^2+bx+c and factor a perfect square trinomial.
- Identify non-permissible values for the variables in a rational expression.
- Find the product and quotient of two rational expressions.
- Find the sum and difference of rational expressions with like denominators.
- Represent values using scientific notation.

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

Beginning 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- Preparing for Algebra

Summary

This unit starts with teaching you to add and subtract fractions with like and unlike denominators. You will then study reciprocals and then learn to multiply and divide fractions. You will also solve real-life problems involving fractions using addition, subtraction, multiplication, and division. In the concluding part of the unit, you will find the least common denominator and rename fractions using it.

Unit 2 – Real Numbers

Summary

In this unit, you will determine whether certain elements belong to a set, then identify the subsets of a set. Next, you will classify a set as finite or infinite and identify the intersection and union of two sets. You will then graph sets of numbers on a number line. Further in the unit, you will investigate the differences between rational and irrational numbers and get acquainted with some common irrational numbers. You will also study the simplest form of fractions, the

common multiples, and the least common multiple (LCM) of two whole numbers. You will also find the factors and the prime factors of whole numbers. In the later part of the unit you will find the greatest common factor of two whole numbers and learn to multiply fractions.

Unit 3 – Solving Linear Equations and Inequalities

Summary

Unit 3 begins with teaching you to add and subtract monomials and binomials. Using the order of operations, you will evaluate expressions with more than one variable. You will also learn to classify polynomials. Further in the unit, you will work with linear equations. You will first use linear math sentences in one variable to solve practical problems, then solve word problems that can be represented by linear equations in one variable. You will describe real-world situations as linear functions and then solve linear inequalities involving multiplication and division. You will study how to solve linear inequalities in one variable that involve multiple operations and solve more difficult linear inequalities by isolating the variable. In the end, you will learn to graph the solution sets to inequalities in one variable.

Unit 4 – Introduction to Graphing

Summary

In unit 4, you will find the coordinates of a given point on a coordinate plane. You will use the slope and intercept of linear functions to write an equation from a graph as well as draw a graph from an equation. You will determine the slope and intercept of a linear relationship from its graph, and graph an ordered pair of real numbers on a coordinate plane. You will find the lengths of the sides of a right triangle using the Pythagorean Theorem. You will also learn to find the distance between two points using the distance formula. In the concluding part of the unit, you will find the equation of a circle in the coordinate plane in terms of its center and radius and use a variety of problem-solving strategies, such as drawing a diagram, making a chart, guess-and-check, solving a simpler problem, writing an equation, and working backwards.

Unit 5 – Graphing Linear Equations and Inequalities

Summary

Unit 5 will help you to find the intercepts of a linear equation and determine if a point is on the graph of a linear equation. You will graph inequalities in two variables on a coordinate plane and determine whether an ordered pair is a solution of a linear equation. You will learn and apply the point-slope form and the slope-intercept form of the equation of a line. Further in the unit, you will learn the relationship between parallel lines and perpendicular lines and their slopes. You will then identify when equations will graph as parallel lines, perpendicular lines, or neither. In the end, you will calculate the slope of a line from a graph or from two points. You will also solve problems or answer questions based on linear graphs that represent real-world situations.

Unit 6 – Solving Linear Systems

Summary

Unit 6 starts by teaching you how to solve a system of equations by adding, subtracting or by using the substitution method. Next, by using the graphing method, you will solve systems of two linear equations and solve word problems using a system of two linear equations or inequalities. In the latter part of the unit, you will solve a system of inequalities by graphing.

Unit 7 – Exponents and Polynomials

Summary

In unit 7, you will learn to use the power rule for exponents to simplify an expression with exponents raised to a power. You will simplify a product using the product rule for exponents and divide exponential forms with the same base using the quotient rule for exponents. You will also learn about positive and negative exponents. In the latter part of the unit, you will work with polynomials. You will first find the sum and difference of polynomials. Next, you will find the product of monomials and polynomials. Then you will divide a polynomial by a monomial. In the end, you will also evaluate polynomials.

Unit 8 – Factoring

Summary

In unit 8, you will factor a polynomial that has monomial factors and use the distributive property to write an expression as the product of two sums or differences. You will also factor trinomials of the form x^2+bx+c . In the latter part, you will factor a perfect square trinomial.

Unit 9 – Rational Expressions

Summary

Unit 9 begins with identifying non-permissible values for the variables in a rational expression. You will first find the product and quotient of two rational expressions. Then the unit goes on to teach you how to add and subtract rational expressions with the same denominator. In the end, you will study how to represent values using scientific notation.