Syllabus

Accuplacer Math

Course Overview

Each unit in the Accuplacer Math course aligns to one or more topics in the 2016 Accuplacer Math Test. This course consists of three units that will help polish your math skills. The first unit focuses on basic arithmetic concepts such as operations with whole numbers and decimals. The second unit introduces you to topics such as use of variables to solve equations, inequalities, and algebraic expressions. The third unit will help improve your knowledge of advanced concepts such as linear systems of equations, coordinate geometry, complex numbers, sequences and series, matrices, functions, probability, and trigonometry. Sections in each lesson explain concepts in an easy-to-understand manner. Activities and tests will help you practice what you have learned.

Course Goals

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

- Solve story problems involving addition, subtraction, multiplication, division, and fractions.
- Recognize proportional relationships, perform operations with decimal numbers, and express rational numbers as decimal numbers.
- Use proportional relationships to solve ratio and percentage problems, and use ratio reasoning to convert measurement units.
- Apply the concept of unit rates, and give precise definitions of basic geometric concepts.
- Apply formulas to solve problems based on the area and volume of different geometrical shapes.
- Order values in the real world, and use positive and negative numbers to represent quantities.
- Use the four mathematical operations to solve real-world and mathematical problems that contain rational numbers, and find the absolute value of a rational number.
- Use the four operations to solve problems that contain monomials and polynomials.
- Factor a polynomial that has monomial factors and common algebraic expressions, and simplify polynomial expressions.
- Solve linear equations by isolating the variable, and write inequalities and literal equations to solve math problems.
- Find the solution for a quadratic equation of the form $x^2 + bx + c = 0$.
- Find the solution set for a quadratic equation that factors as the difference of two squares and is the perfect square of a binomial.
- Use factorization to find the solution set of the given quadratic equation.

- Determine whether a point is on the graph of a linear equation, and graph the solution sets to inequalities in one variable.
- Simplify rational expressions, and explore the ways to factorize a difference of squares, a perfect square trinomial, and trinomials of the form $x^2 + bx + c$.
- Use the product, quotient, and power rules to solve integer exponents, and apply properties of exponents to rational exponents.
- Prove and use polynomial identities and the Binomial Theorem, and determine whether an ordered pair is a solution of a linear equation.
- Use the slope and intercept of linear functions, and apply the slope-intercept and point-slope forms of the equation of a line.
- Solve other types of equations, including those involving radicals and power functions, and use the graphing method to solve systems of two linear equations, inequalities, and equations.
- Find and position pairs of integers and other rational numbers on a coordinate plane, and identify when equations will graph as parallel lines, perpendicular lines, or neither.
- Apply knowledge of conic sections to explore parabolas, hyperbolas, ellipses, circles, and their respective graphs.
- Use coordinates to prove geometric theorems and to compute perimeters and areas.
- Use the four operations to solve problems that involve complex numbers, and plot complex numbers in the complex number plane.
- Study different types of patterns and predict future items in these patterns, write rules for arithmetic and geometric sequences, and find sums of their respective series.
- Identify when matrix addition and subtraction may occur, perform matrix addition and subtraction, and compute the determinant of a matrix.
- Describe events as subsets of a sample space, and apply the addition rule and the general multiplication rule in a uniform probability model.
- Determine whether events are independent, and use counting techniques to determine probabilities.
- Explore functions and their properties, and describe functions with equations, tables, and graphs.
- Study the properties of exponential and logarithmic functions, and examine trigonometric graphs and trigonometric functions using a unit circle.

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.

For a complete list of general skills that are required for participation in online courses, refer to the Prerequisites section of the Plato Student Orientation document, found at the beginning of this course.

Course Materials

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

Course Structure

Unit 1: Arithmetic

Summary

In this unit, you will solve real-life problems using addition and subtraction, multiplication and division, and fractions. You will work with rates, ratios, percentages, and decimal numbers. You will learn the precise geometric definitions of angles, circles, perpendicular lines, parallel lines, and line segments. Then you will find the areas of triangles, special quadrilaterals, and polygons; find the area and circumference of circles; and find the volume of right rectangular prisms.

Activity/*Objective*
Solving Addition and Subtraction Story Problems *Solve real-life problems using addition and subtraction.*
Solving Multiplication Story Problems *Solve real-life problems using addition and subtraction and multiplication and division.*
Solving Division Story Problems *Solve real-life problems using addition and subtraction and multiplication and division.*
Solving Fraction Story Problems *Solve real-life problems using addition and subtraction, multiplication and division, and fractions.*
Recognizing Proportional Relationships *Decide whether two quantities are in a proportional relationship.*
Operations with Decimals *Add, subtract, multiply, and divide multidigit decimals using the standard algorithm for each operation.*
Expressing Rational Numbers as Decimal Numbers *Convert a rational number to a decimal number using long division.*
Applications of Ratio and Percent *Use proportional relationships to solve ratio and percent problems.*

Activity/*Objective*
Rates *Explore the concept of a unit rate and use rates to describe ratio relationships.*
Measurement Units and Ratio Conversions *Use ratio reasoning to convert measurement units.*
Ratios and Rates as Percentages *Find a percentage of a quantity as a rate per 100 and solve problems that involve finding the whole, given a part and the percentage.*
Basic Geometric Concepts *Know precise definitions for the concepts of angle, circle, perpendicular line, parallel line, and line segment.*
Area *Find the areas of triangles, special quadrilaterals, and polygons by composing or decomposing them into other shapes.*
Area and Circumference of a Circle *Study the formulas for the area and circumference of a circle and use them to solve problems.*
Volume *Apply volume formulas to find the volumes of right rectangular prisms.*

Unit 2: Elementary Algebra

Summary

In this unit, you will perform operations with integers and rational numbers, including ordering values, using positive and negative numbers to represent quantities in real-world situations, and solving real-world and mathematical problems that contain rational numbers. You will perform operations on monomials and polynomials. You will work with linear equations, inequalities, literal equations, and quadratic equations. Finally, you will work with graphs of linear equations in two variables and inequalities in one variable.

Activity/*Objective*
Ordering Values in the Real World *Write and explain statements of order for rational numbers in real-world situations.*
Positive and Negative Rational Numbers *Use positive and negative numbers to represent quantities in real-world situations.*
Add, Subtract, Multiply, and Divide Rational Numbers to Solve Real-World Problems *Use the four operations to solve real-world and mathematical problems that contain rational numbers.*
Absolute Values *Study the absolute value of a rational number as its distance from zero on the number line.*
Adding Monomials *Add monomials.*

Activity/*Objective*
Subtracting Monomials *Subtract monomials.*
Multiplying Monomials *Multiply monomials.*
Dividing Monomials *Divide monomials.*
Polynomial Sum *Find the sum of two polynomials.*
Polynomial Difference *Find the difference of two polynomials.*
Product of Polynomials *Find the product of polynomials.*
Monomial Factors of Polynomials *Factor a polynomial that has monomial factors.*
Simplifying Polynomial Expressions *Simplify polynomial expressions.*
Factoring Algebraic Expressions *Factor common algebraic expressions.*
Linear Equations in 1 Variable: Isolating the Variable *Solve more difficult linear equations by isolating the variable.*
Building Equations to Solve Real-World Problems *Write an inequality to represent a real-world mathematical problem.*
Literal Equations *Write literal equations to solve math problems.*
Solving Simple Quadratic Equations *Find the solution for quadratic equations of the form $x^2 + bx + c = 0$.*
Solving Quadratic Equations by Factoring, Part 1 *Find the solution set of quadratic equations that factor as the difference of two squares.*
Solving Quadratic Equations by Factoring, Part 2 *Find the solution set of a quadratic equation that is the perfect square of a binomial.*
Solving Quadratic Equations by Factoring, Part 3 *Find the solution set of quadratic equations by factoring.*
Graphing Linear Equations in 2 Variables *Determine if a point is on the graph of a linear equation.*
Graphing Linear Inequalities in 1 Variable *Graph the solution sets to inequalities in one variable.*

Unit 3: College Level Math

Summary
This is a wide-ranging unit in which you will explore algebraic operations, solutions of equations and inequalities, coordinate geometry, complex numbers, geometric and arithmetic sequences and series, matrices, probability and statistics, and functions, including trigonometric functions.

Activity/*Objective*
Simplifying Rational Expressions *Simplify rational expressions.*
Factoring the Difference of 2 Squares *Factor a difference of squares.*
Factoring Perfect Square Trinomials *Factor a perfect square trinomial.*
Factoring Trinomials, Part 1 *Factor trinomials of the form $x^2 + bx + c$.*
Factoring Trinomials, Part 2 *Factor trinomials of the form $x^2 + bx + c$.*
Integer Exponents and the Product Rule *Simplify a product using the product rule for exponents.*
Integer Exponents and the Quotient Rule *Divide exponential forms with the same base using the quotient rule for exponents.*
Integer Exponents and the Power Rule, Part 1 *Use the power rule for exponents to simplify an expression with exponents raised to a power.*
Integer Exponents and the Power Rule, Part 2 *Use the power rule for exponents to simplify an expression with exponents raised to a power.*
Rational Exponents *Study and apply properties of exponents to rational exponents.*
Polynomial Identities and the Binomial Theorem *Prove and use polynomial identities and the Binomial Theorem.*
Ordered Pairs as Solutions of Linear Equations *Determine whether an ordered pair is a solution of a linear equation.*
Equations, Graphs, Slopes, and *y*-Intercepts *Use the slope and intercept of linear functions to write an equation from a graph, and draw a graph from an equation.*
Slope-Intercept Form *Apply the slope-intercept form of the equation of a line.*
Point-Slope Form *Apply the point-slope form of the equation of a line.*

Activity/*Objective*
Other Types of Equations *Solve other types of equations, including those involving radicals and power functions.*
Solving Linear Systems of Equations: Graphs *Use the graphing method to solve systems of two linear equations.*
Solving Linear Systems of Inequalities: Graphs *Solve a system of inequalities by graphing.*
Solving Linear Systems of Equations: Substitution *Solve a system of equations by substitution.*
Solving Linear-Quadratic Systems of Equations *Solve practical problems with two variables.*
The Coordinate Plane *Find and position pairs of integers and other rational numbers on a coordinate plane.*
Equations of Parallel or Perpendicular Lines *Identify when equations will graph as parallel lines, perpendicular lines, or neither.*
Conic Sections and Parabolas *Understand the conic section while exploring parabolas and their graphs.*
Ellipses and Circles and Their Graphs *Explore ellipses and circles and their graphs.*
Defining Hyperbolas *Define hyperbolas and identify their key features.*
Hyperbolas and Their Graphs *Use key features of hyperbolas to graph them.*
Using Coordinates to Prove Geometric Theorems *Use coordinates to prove simple geometric theorems algebraically, including proofs involving circles.*
Using Coordinates to Compute Perimeters and Areas *Use coordinates to compute perimeters of polygons and areas of triangles and rectangles.*
Plotting Complex Numbers in the Plane *Plot complex numbers in the complex number plane.*
Adding and Subtracting Complex Numbers *Add and subtract complex numbers.*
Multiplying and Dividing Complex Numbers *Multiply and divide complex numbers.*
Patterns and Sequences *Study different types of patterns and predict future items in these patterns.*
Arithmetic Sequences and Series *Write rules for arithmetic sequences and find sums of arithmetic series.*
Geometric Sequences and Series *Write rules for geometric sequences and find sums of geometric series.*

Activity/*Objective*
Matrices and Matrix Operations *Identify when matrix addition and subtraction may occur and perform matrix addition and subtraction.*
The Determinant of a Matrix *Compute the determinant of a matrix.*
Sample Space *Describe events as subsets of a sample space (the set of outcomes).*
Applying the Addition Rule for Probability *Apply the Addition Rule, P(A or B) = P(A) + P(B) − P(A and B), and interpret the answer in terms of the model.*
Applying the Multiplication Rule for Probability *Apply the general Multiplication Rule in a uniform probability model and interpret the answer in terms of the model.*
Independent Events *Understand how to determine whether two events are independent of each other.*
Using Counting Techniques to Determine Probabilities *Use permutations and combinations to compute probabilities of compound events and to solve problems.*
Introduction to Functions *Understand that a function assigns one output to each input and that the graph of a function is the set of ordered pairs of inputs and corresponding outputs.*
Properties of Functions *Describe properties of linear and nonlinear functions.*
Describing Functions with Equations, Tables, and Graphs *Study how equations, tables and graphs can represent the same function.*
Properties of Exponential Functions *Study the properties of exponential functions.*
Properties of Logarithmic Functions *Study the properties of logarithmic functions.*
Trigonometric Functions and the Unit Circle *Examine trigonometric functions using a unit circle.*
Trigonometric Functions *Examine trigonometric functions.*
Trigonometric Graphs *Examine trigonometric graphs.*