



DREYFOUS & ASSOCIATES

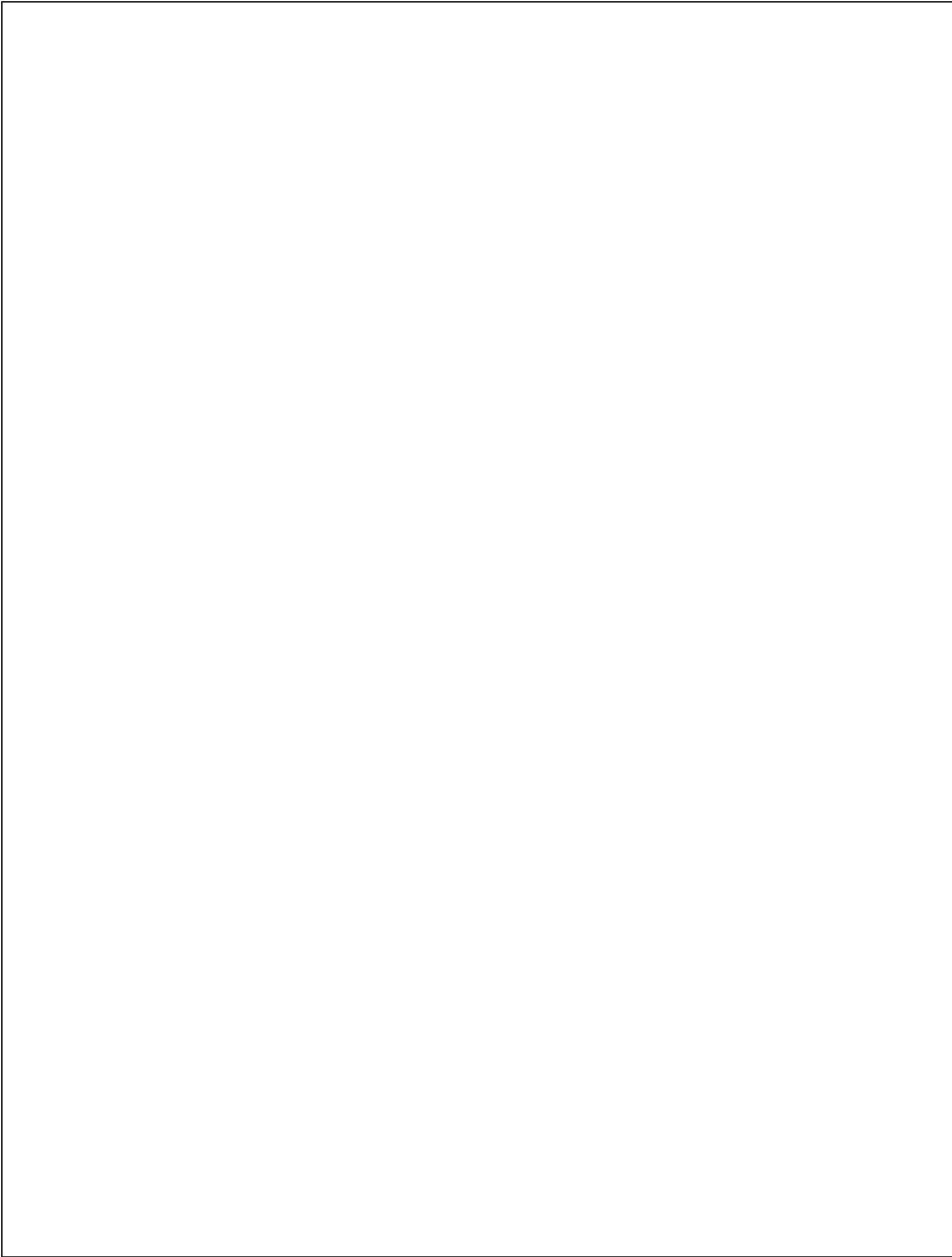
Course Overview

Intermediate Algebra



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Breakdown of Units

Below is an itemization of the division of each unit in lessons, including a detailed description of the general objectives and the name of each lesson with its corresponding objectives, concepts, and skills.

Unit 0. Cumulative review

Lesson 0. Cumulative review

Code: C302G0SU00L00

Content.

- Cumulative Review U01-U04
- Cumulative Review U01-U05
- Cumulative Review U01-U06
- Cumulative Review U01-U09

Unit 1. The Real Numbers

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 1. Numbers and Their Properties

Code: C302G0SU01L01

Objectives

- Write a set of numbers using roster or set-builder notation.
- Write a rational number as a decimal.
- Classify a number as natural, whole, integer, rational, irrational, or real.
- Find the additive inverse of a number.
- Find the absolute value of a number.
- Given two numbers, use the correct notation to indicate equality or which is larger.
- Applications involving real numbers.

Concepts

- absolute value of a number
- additive inverse of a number
- integer number
- irrational number
- natural number
- rational number
- real number
- roster
- set-builder notation
- whole number

Lesson 2. Operations and Properties of Real Numbers

Code: C302G0SU01L02

Objectives

- Add, subtract, multiply, and divide signed numbers.
- Identify uses of the properties of the real numbers.
- Solve applications involving operations of real numbers.

Concepts

- add
- divide signed numbers
- multiply
- real numbers
- subtract

Lesson 3. Properties of Exponents

Code: C302G0SU01L03

Objectives

- Evaluate expressions containing natural numbers as exponents.

- Write an expression containing negative exponents as a fraction.
- Multiply and divide expressions containing exponents.
- Raise a power to a power and a quotient to a power.
- Convert between ordinary decimal notation and scientific notation, and use scientific notation in computations.

Concepts

- negative exponents
- ordinary decimal notation
- quotient to a power
- scientific notation

Lesson 4. Algebraic Expressions and the Order of Operations

Code: C302G0SU01L04

Objectives

- Evaluate numerical expressions with grouping symbols.
- Evaluate expressions using the correct order of operations.
- Evaluate algebraic expressions.
- Use the distributive property to simplify expressions.
- Simplify expressions by combining like terms.
- Simplify expressions by removing grouping symbols and combining like terms.

Concepts

- evaluate
- grouping symbols
- like terms
- numerical and algebra expression

Unit 2. Linear Equations and Inequalities

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 0. Linear Equations and Inequalities

Code: C302G0SU02L00

Unit Documents: Collaborative Learning, Cumulative Review, Practice Test, PreTest, Research Questions, Review Exercises and Summary.

Lesson 1. Linear Equations in One Variable

Code: C302G0SU02L01

Objectives

- Determine whether a number is a solution of a given equation.
- Solve linear equations using the properties of equality.
- Solve linear equations in one variable involving fractions or decimals.
- Solve linear equations with one solution, no solutions, or infinitely many solutions.

Concepts

- algebraic expression
- conditional equations
- constants
- equation
- terms
- variables

Lesson 2. Formulas, Geometry, Problem Solving

Code: C302G0SU02L02

Objectives

- Solve a formula or literal equation for a specified variable and then evaluate the answer for given values of the variables.
- Translate from word expressions into mathematical expressions.
- Write a formula for a given situation that has been described in words.
- Solve problems about angle measures.

Concepts

- angles
- area
- formula
- linear equation in one variable
- perimeter

Lesson 3. Problem Solving Integers Geometry

Code: C302G0SU02L03

Objectives

- Translate a word statement into a mathematical equation.
- Solve word problems of a general nature.
- Solve word problems about integers.
- Solve word problems about geometric formulas and angles.

Concepts

- consecutive integer
- even and odd numbers
- word problem

Lesson 4. Problem Solving: Percent, Investment, Motion And Mixture Problems

Code: C302G0SU02L04

Objectives

- Solve percent problems.
- Solve investment problems.
- Solve uniform motion problems.
- Solve mixture problems.

Concepts

- annual interest
- mixture
- percent
- uniform motion

Lesson 5. Linear Compound Inequalities

Code: C302G0SU02L05

Objectives

- Graph linear inequalities.
- Solve and graph linear inequalities.
- Solve and graph compound inequalities.
- Translate sentences and solve applications involving inequalities.

Concepts

- bounded and un bounded intervals
- compound inequalities
- intersection
- linear inequalities
- open and close intervals
- union

Lesson 6. Absolute-Value Equations Inequalities

Code: C302G0SU02L06

Objectives

- Solve absolute-value equations.
- Solve absolute-value inequalities of the form $|ax + b| < c$ or $|ax + b| > c$, where $c > 0$.
- Solve applications involving absolute-value inequalities.

Concepts

- absolute value
- distance

Unit 3. Graphs and Functions

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 0. Graphs and Functions

Code: C302G0SU03L00

UnitDocuments: Collaborative Learning, Cumulative Review, Practice Test, PreTest, Research Questions, Review Exercises and Summary.

Lesson 1. Graphs

Code: C302G0SU03L01

Objectives

- Given an ordered pair of numbers, find its graph, and vice versa.
- Graph linear equations by finding solutions satisfying the equation.
- Graph lines by finding the x and y intercepts.
- Graph horizontal and vertical lines.
- Graph nonlinear equations by finding the solutions satisfying the equation.

Concepts

- x intercept
- y intercept
- coordinate system
- equation
- graphs
- horizontal
- nonlinear
- ordered pair
- quadrants
- vertical

Lesson 2. Using Slopes to Graph Lines

Code: C302G0SU03L02

Objectives

- Find the slope of a line passing through two given points.
- Use the definition of slope to decide whether two lines are perpendicular, parallel, or neither.
- Graph a line given its slope and a point on the line.
- Find the slope and y intercept given the equation of a line.

Concepts

- graphs
- intercept
- parallel
- perpendicular

- rate of change
- slopes
- two points

Lesson 3. Equations of Lines

Code: C302G0SU03L03

Objectives

- Find the equation and the graph on a line given
- Two points.
- One point and the slope.
- The slope and the y -intercept.
- One point and the fact that the line is parallel or perpendicular to a given line.
- The slope is that of a horizontal or vertical line.

Concepts

- horizontal line
- Intercept
- parallel
- perpendicular
- point – slope form
- slope
- slope intercept form
- vertical line

Lesson 4. Linear Inequalities in Two Variables

Code: C302G0SU03L04

Objectives

- Graph linear inequalities.
- Graph inequalities involving absolute values.
- Solve applications involving linear inequalities.

Concepts

- boundary line
- graphs
- inequalities
- linear inequalities
- shading
- solve applications

Lesson 5. Introduction to Functions

Code: C302G0SU03L05

Objectives

- Find the domain and range of a relation and determine whether the relation is a function.
- Use the vertical line test to determine if a relation is a function.
- Find the domain of a function defined by an equation.
- Find the value of a function.

Concepts

- dependent variable
- domain
- equation
- function
- graphs
- independent variable
- mapping diagram
- range
- relation
- vertical line test

Lesson 6. Linear Functions

Code: C302G0SU03L06

Objectives

- Identify linear and nonlinear functions from graphs or equations.
- Find the equation of a linear function from a graph.
- Use mathematical modeling with linearly related data.

Concepts

- constant function
- increasing and decreasing function
- line of best fit
- linear function

Unit 4. Solving Systems of Linear Equations and Inequalities

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 0. Solving Systems of Linear Equations and Inequalities

Code: C302G0SU04L00

Unit Documents: Collaborative Learning, Cumulative Review, Practice Test, PreTest, Research Questions, Review Exercises and Summary.

Lesson 1. Systems with Two Variables

Code: C302G0SU04L01

Objectives

- Find the solution of a system of two linear equations using.
 - The graphical method
 - The substitution method
 - The elimination method
 - Solve applications involving systems of equations

Concepts

- consistent
- inconsistent
- system of equation

Lesson 2. Systems with Three Variables

Code: C302G0SU04L02

Objectives

- Solve a system of three equations and three unknowns by the elimination method.
- Determine whether a system of three equations in three unknowns is consistent, inconsistent, or dependent.
- Solve applications involving systems of three equations.

Concepts

- consistent
- dependent
- inconsistent
- three equations

Lesson 3. Coin, Distance-Rate-Time, Investment, and Geometry Problems

Code: C302G0SU04L03

Objectives

- Solve coin problems with two or more unknowns.
- Solve general problems with two or more unknowns.
- Solve rate, time, and distance (motion) problems with two or more unknowns.
- Solve investment problems with two or more unknowns.

- Solve geometry problems with two or more unknowns.
- Solve problems that can be modeled with a system.

Concepts

- elimination method
- geometry
- substitution method
- systems
- unknowns

Lesson 4. Systems of Linear Inequalities

Code: C302G0SU04L04

Objectives

- Graph systems of two linear inequalities.
- Graph systems of inequalities.

Concepts

- graph
- inequalities
- solution set

Unit 5. Polynomials

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 0. Polynomials

Code: C302G0SU05L00

Unit Documents: Collaborative Learning, Cumulative Review, Practice Test, PreTest, Research Questions, Review Exercises and Summary.

Lesson 1. Polynomials. Addition and Subtraction

Code: C302G0SU05L01

Objectives

- Classify polynomials.
- Find the degree of a polynomial and write in descending order.
- Evaluate a polynomial function.
- Add and subtract polynomials.
- Solve applications involving sums or differences of polynomials.

Concept

- coefficient
- polynomials
- terms

Lesson 2. Multiplication of Polynomials

Code: C302G0SU05L02

Objectives

- Multiply a monomial by a polynomial.
- Multiply two polynomials.
- Use the FOIL method to multiply two binomials.
- Square a binomial sum or difference.
- Find the product of the sum and the difference of two terms.
- Use the ideas discussed to solve applications.

Concepts

- FOIL
- monomial
- polynomials

Lesson 3. The Greatest Common Factor and Factoring by Grouping

Code: C302G0SU05L03

Objectives

- Factor out the greatest common factor of a polynomial.
- Factor a polynomial with four terms by grouping.

Concepts

- factor
- polynomials

Lesson 4. Factoring Trinomials

Code: C302G0SU05L04

Objectives

- Factor a trinomial of the form $x^2 + bx + c$ (b and c are integers).
- Factor a trinomial of the form $ax^2 + bx + c$ using trial and error.
- Factor a trinomial of the form $ax^2 + bx + c$ using the ac test.

Concept

- factor tree
- factorization
- trinomial

Lesson 5. Special Factoring

Code: C302G0SU05L05

Objectives

- Factor a perfect square trinomial.
- Factor the difference of two squares.
- Factor the sum or difference of two cubes.

Concepts

- cubes
- perfect square trinomial
- squares
- trinomial

Lesson 6. General Methods of Factoring

Code: C302G0SU05L06

Objectives

- Factor a polynomial using the procedures given in the text.

Concepts

- perfect square
- squares
- trinomial

Lesson 7. Solving Equations by Factoring. Applications

Code: C302G0SU05L07

Objectives

- Solve equations by factoring.
- Use the Pythagorean Theorem to find the length of one side of a right triangle.
- Solve applications involving quadratic equations.

Concepts

- Pythagorean Theorem
- quadratic equations
- standard form
- zero product property

Unit 6. Rational Expressions

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 0. Rational Expressions

Code: C302G0SU06L00

Unit Documents: Collaborative Learning, Cumulative Review, Practice Test, PreTest, Research Questions, Review Exercises and Summary.

Lesson 1. Rational Expressions

Code: C302G0SU06L01

Objectives

- Find the values that make a rational expression undefined.
- Write an equivalent rational expression with the indicated denominator.
- Write a rational expression in one of the standard forms.
- Reduce a rational expression to lowest terms.

Concepts

- denominator
- rational equation
- rational expression
- standard form
- undefined

Lesson 2. Multiplication and Division of Rational Expressions

Code: C302G0SU06L02

Objectives

- Multiply rational expressions.
- Divide rational expressions.
- Use multiplication and division together to simplify rational expressions.

Concepts

- factor
- invert
- rational expression

Lesson 3. Addition and Subtraction of Rational Expressions

Code: C302G0SU06L03

Objectives

- Add and subtract rational expressions with the same denominator.
- Add and subtract rational expressions with different denominators.

Concepts

- expression
- last common denominator
- rational

Lesson 4. Complex Fractions**Code:** C302G0SU06L04**Objective**

- Write a complex fraction as a simple fraction in reduced form.

Concepts

- complex fraction
- denominator
- expression
- rational
- reciprocal

Lesson 5. Division of Polynomials and Synthetic Division**Code:** C302G0SU06L05**Objectives**

- Divide a polynomial by a monomial.
- Use long division to divide one polynomial by another.
- Completely factor a polynomial when one of the factors is known.
- Use synthetic division to divide a polynomial by a binomial.
- Use the remainder theorem to verify that a number is a solution of a given equation.

Concepts

- monomial
- polynomial
- remainder
- synthetic division
- theorem

Lesson 6. Equations Involving Rational Expressions**Code:** C302G0SU06L06**Objectives**

- Solve equations involving rational expressions.
- Solve proportions.
- Solve applications involving proportions.

Concepts

- expressions
- proportions
- rate/ratio
- rational

Lesson 7. Applications. Problem Solving**Code:** C302G0SU06L07**Objectives**

- Solve integer problems.
- Solve work problems.
- Solve distance problems.
- Solve for a specified variable.

Concepts

- distance
- integer
- variable

Lesson 8. Variation**Code:** C302G0SU06L08**Objectives**

- Write an equation expressing.
- Direct variation.
- Inverse variation.
- Joint variation.
- Solve applications involving direct, inverse, and joint variation.

Concepts

- direct variation
- inverse variation
- joint variation

Unit 7. Rational Exponents and Radicals

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 0. Rational Exponents and Radicals

Code: C302G0SU07L00

Unit Documents: Collaborative Learning, Cumulative Review, Practice Test, PreTest, Research Questions, Review Exercises and Summary.

Lesson 1. Rational Exponents and Radicals

Code: C302G0SU07L01

Objectives

- Find the n th root of a number, if it exists.
- Evaluate expressions containing rational exponents.
- Simplify expressions involving rational exponents.

Concepts

- index
- principal root
- radical
- radicand
- rational exponents
- simplify

Lesson 2. Simplifying Radicals

Code: C302G0SU07L02

Objectives

- Simplify radical expressions.
- Rationalize the denominator of a fraction.
- Reduce the index of a radical expression.

Concepts

- denominator
- fraction
- radical expressions
- rationalize

Lesson 3. Operations with Radicals

Code: C302G0SU07L03

Objectives

- Add and subtract similar radical expressions.
- Multiply and divide radical expressions.
- Rationalize the denominators of radical expressions involving sums or differences.

Concepts

- add
- conjugate expression
- denominator
- like radical expressions
- rationalize
- subtract

Lesson 4. Solving Equations Containing Radicals

Code: C302G0SU07L04

Objectives

- Solve equations involving radicals.
- Solve applications involving radical equations.

Concepts

- radical equations
- radical expressions

Lesson 5. Complex Numbers

Code: C302G0SU07L05

Objectives

- Write the square root of a negative integer in terms of i .
- Add and subtract complex numbers.
- Multiply and divide complex numbers.
- Find powers of i .

Concepts

- complex numbers
- i
- negative integer
- pure imaginary numbers
- square root

Unit 8. Quadratic Equations and Inequalities

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 0. Quadratic Equations and Inequalities

Code: C302G0SU08L00

Unit Documents: Collaborative Learning, Cumulative Review, Practice Test, PreTest, Research Questions, Review Exercises and Summary.

Lesson 1. Solving Quadratics Completing Square

Code: C302G0SU08L01

Objectives

- Solve quadratic equations of the form $ax^2 + c = 0$
- Solve quadratic equations of the form $a(x + b)^2 = 0$
- Solve quadratic equations by completing the square.
- Applications Involving Quadratic Equations.

Concepts

- completing the square
- quadratics equations
- square root

Lesson 2. The Quadratic Formula. Applications

Code: C302G0SU08L02

Objectives

- Solve equations using the quadratic formula.
- Solve factorable cubic equations.
- Solve applications involving quadratic equations.

Concepts

- quadratic equations
- quadratic formula
- standard equations

Lesson 3. Discriminant and Its Applications

Code: C302G0SU08L03

Objectives

- Use the discriminant to determine the number and type of solutions of a quadratic equation.
- Use the discriminant to determine whether a quadratic expression is factorable and then factor it.
- Find a quadratic equation with specified solutions.
- Verify the solutions of a quadratic equation.

Concepts

- discriminant
- Non-real complex numbers

Lesson 4. Solving Equations Quadratic Form

Code: C302G0SU08L04

Objectives

- Solve equations involving rational expressions by converting them to quadratic equations.
- Solve equations that are quadratic in form by substitution.

Concepts

- extraneous solution
- rational expressions
- solve equations

Lesson 5. Nonlinear Inequalities

Code: C302G0SU08L05

Objectives

- Solve quadratic inequalities.
- Solve polynomial inequalities of degree 3 or higher.
- Solve rational inequalities.
- Solve an application involving inequalities.

Concepts

- critical values
- nonlinear inequalities
- polynomial inequalities
- quadratic inequalities

Unit 9. Quadratic Functions and the Conic Sections

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 0. Quadratic Functions and the Conic Sections

Code: C302G0SU01L00

Unit Documents: Collaborative Learning, Cumulative Review, Practice Test, PreTest, Research Questions, Review Exercises and Summary.

Lesson 1. Quadratic Functions (Parabolas) and Their Graphs

Code: C302G0SU09L01

Objectives

- Graph a parabola of the form $y = f(x) = ax^2 + k$.
- Graph a parabola of the form $y = f(x) = a(x - h)^2 + k$.
- Graph a parabola of the form $y = f(x) = ax^2 + bx + c$.
- Graph a parabolas that are not functions with form $x = a(y - k)^2 + h$ and $x = ay^2 + by + c$.
- Solve applications involving parabolas.

Concepts

- applications
- downward
- graphs
- Parabolas
- Upward

Lesson 2. Circles and Ellipses

Code: C302G0SU09L02

Objectives

- Find the distance between two points.
- Find an equation of a circle with a given center and radius.
- Find the center and radius and sketch the graph of a circle when its equation is given.
- Graph an ellipse when its equation is given.
- Solve applications involving circles and ellipses.

Concepts

- center
- circle
- ellipse
- equation
- graph
- radius

Lesson 3. Hyperbolas and Identification of Conics

Code: C302G0SU09L03

Objectives

- Graph hyperbolas.
- Identify conic sections by examining their equations.

Concepts

- conic
- ellipse
- Hyperbolas

Lesson 4. Nonlinear Systems of Equations

Code: C302G0SU09L04

Objectives

- Solve nonlinear systems by substitution.
- Solve systems with two second degree equations by elimination.
- Solve applications involving nonlinear systems.

Concepts

- nonlinear
- systems

Lesson 5. Nonlinear Systems of Inequalities

Code: C302G0SU09L05

Objectives

- Graph second-degree inequalities.
- Graph the solution set of a system of nonlinear inequalities.

Concepts

- graph
- inequalities
- nonlinear

Unit 10. Functions—Inverse, Exponential, and Logarithmic

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 0. Functions—Inverse, Exponential, and Logarithmic

Code: C302G0SU10L00

Unit Documents: Collaborative Learning, Cumulative Review, Practice Test, PreTest, Research Questions, Review Exercises and Summary.

Lesson 1. The Algebra of Functions

Code: C302G0SU10L01

Objectives

- Find the sum, difference, product, and quotient of two functions.
- Find the composite of two functions.
- Find the domain of $(f + g)(x)$, $(f - g)(x)$, $(f \cdot g)(x)$, and $(f \div g)(x)$.
- Applications involving operations with functions.

Concepts

- difference
- function
- product
- sum

Lesson 2. Inverse Functions

Code: C302G0SU10L02

Objectives

- Find the inverse of a relation when the relation is given as a set of ordered pairs.
- Find the equation of the inverse of a relation.
- Graph a function and its inverse and determine whether the inverse is a function.
- Solve applications involving inverse functions

Concepts

- difference
- function
- product
- relation
- sum

Lesson 3. Exponential Functions

Code: C302G0SU10L03

Objectives

- Graph exponential functions of the form a^x or a^{-x} ($a > 0$ and $a \neq 1$).
- Determine whether exponential functions are increasing or decreasing.
- Solve applications involving exponential functions.

Concepts

- applications
- constant
- decreasing
- exponential
- functions
- graph
- increasing

Lesson 4. Logarithmic Functions and Their Properties

Code: C302G0SU10L04

Objectives

- Graph logarithmic functions.
- Write an exponential equation in logarithmic form and a logarithmic equation in exponential form.
- Solve logarithmic equations.
- Use the properties of logarithms to simplify logarithms of products, quotients, and powers.
- Solve applications involving logarithmic functions.

Concepts

- logarithmic
- logarithmic equation
- logarithmic form

Lesson 5. Common and Natural Logarithms

Code: C302G0SU10L05

Objectives

- Find common logarithms.
- Find natural logarithms.
- Change the base of a logarithm.
- Graph exponential and logarithmic functions base e .
- Solve applications involving common and natural logarithms.

Concepts

- common logarithms
- graph
- logarithmic equation
- natural logarithms
- number e
- power
- products
- quotients

Lesson 6. Exponential and Logarithmic Equations and Applications

Code: C302G0SU10L06

Objectives

- Solve exponential equations.
- Solve logarithmic equations.
- Solve applications involving exponential or logarithmic equations.

Concepts

- exponential
- logarithmic
- logarithmic equation