

Elementary Algebra with Applications
Southwest Wisconsin Technical College
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Course Information

Title - Elementary Algebra with Applications
Developers - Pete Esser & Kellie Knox
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Number - 10-804-110
Organization - Southwest Wisconsin Technical College

Potential Hours of Instruction - 3
Total Credits - 3

Course Description

Students taking Elementary Algebra perform basic algebraic operations. They solve and graph linear equations. They solve and graph inequalities. Students factor algebraic equations. They solve radical and rational equations. Students solve quadratic equations. In each topic area, students solve application problems.

Target Population

Elementary Algebra is designed for students needing a first year algebra course.

Textbooks

Elementary Algebra Concepts and Applications, Bittinger & Ellenbogen, Seventh Edition.
Addison Wesley

Supplies

Scientific Calculator

Goals

1. Perform basic algebraic operations
2. Solve linear equations and inequalities
3. Solve inequalities
4. Perform operations with algebraic terms
5. Factor equations
6. Solve rational equations
7. Graph linear equations
8. Solve systems of equations
9. Solve radical equations
10. Solve quadratic equations

Core Abilities

- Act Professionally
- Communicate Clearly
- Value Learning
- Work Productively
- Work Cooperatively
- Solve Problems

Course Competencies

1. Perform basic algebraic operations

Properties

Domain : Cognitive
Level : Application
Importance : Essential
Difficulty : Medium

Criteria - Performance will be satisfactory when:

- learner chooses a valid method for solving a problem
- learner shows the steps used to solve the problem
- answer includes correct units of measure
- answer is within 1 % of actual value
- answer is stated with appropriate precision

Conditions for assessment:

- using a scientific calculator

Learning Objectives

- a. Perform arithmetic operations on signed numbers
- b. Perform arithmetic operations on fractions
- c. Use order of operations
- d. Evaluate numeric expressions involving powers and roots
- e. Evaluate algebraic expressions
- f. Evaluate formulas

Linked Core Abilities

Solve Problems

2. Solve linear equations and Inequalities

Properties

Domain : Cognitive
Level : Application
Importance : Essential
Difficulty : Medium

Criteria - Performance will be satisfactory when:

- learner chooses a valid method for solving a problem
- learner writes an equation representing the problem
- learner manipulates an existing formula to solve for an unknown
- learner draws an accurate diagram representing the problem
- learner shows the steps used to solve the problem
- answer includes correct units of measure
- answer is within 1 % of actual value
- answer is stated with appropriate precision

Conditions for assessment:

- using a scientific calculator

Learning Objectives

- a. Combine like terms

- b. Multiply algebraic expressions
- c. Solve linear equations with one variable
- d. Rearrange a formula to solve for an indicated first-degree variable
- e. Translate English phrases into equations using variables to represent unknowns
- f. Apply skill to technical problems
- g. Graph inequalities
- h. Solve single inequalities
- i. Solve compound inequalities
- j. Solve inequalities containing absolute value
- k. Apply skills to technical problems

Linked Core Abilities

Solve Problems

3. Graph linear equations

Properties

Domain : Cognitive

Level : Application

Importance : Essential

Difficulty : Medium

Criteria - Performance will be satisfactory when:

- learner chooses a valid method for solving a problem
- learner chooses an appropriate formula
- learner writes an equation representing the problem
- learner manipulates an existing formula to solve for an unknown
- learner draws an accurate diagram representing the problem
- learner shows the steps used to solve the problem
- answer is within 1 % of actual value

Conditions for assessment:

- using a scientific calculator

Learning Objectives

- a. Locate ordered pairs on Cartesian coordinate system
- b. Graph line by creating a table of ordered pairs
- c. Graph a line given the slope and y-intercept
- d. Graph a line given a point and slope
- e. Write an equation of a line in all forms
- f. Evaluate relations and functions

Linked Core Abilities

Communicate Clearly

4. Perform operations with algebraic terms

Properties

Domain : Cognitive

Level : Analysis

Importance : Essential

Difficulty : Medium

Criteria - Performance will be satisfactory when:

- learner chooses a valid method for solving a problem
- learner shows the steps used to solve the problem
- answer is within 1 % of actual value

Conditions for assessment:

- using a scientific calculator

Learning Objectives

- a. Perform algebraic operations on variables with exponents
- b. Perform algebraic operations on polynomials

Linked Core Abilities

Solve Problems

5. Factor equations

Properties

Domain : Cognitive
Level : Analysis
Importance : Essential
Difficulty : High

Criteria - Performance will be satisfactory when:

- learner chooses a valid method for solving a problem
- learner manipulates an existing formula to solve for an unknown
- learner shows the steps used to solve the problem
- answer is within 1 % of actual value

Conditions for assessment:

- using a scientific calculator

Learning Objectives

- a. Factor whole numbers
- b. Factor greatest common factor from algebraic expressions
- c. Factor the difference of two squares
- d. Factor simple trinomials
- e. Factor perfect square trinomials
- f. Factor general trinomials
- g. Factor by grouping
- h. Factor quadratics

Linked Core Abilities

Solve Problems

6. Solve rational equations

Properties

Domain : Cognitive
Level : Analysis
Importance : Important
Difficulty : High

Criteria - Performance will be satisfactory when:

- learner chooses a valid method for solving a problem
- learner chooses an appropriate formula
- learner writes an equation representing the problem
- learner manipulates an existing formula to solve for an unknown
- learner draws an accurate diagram representing the problem
- learner shows the steps used to solve the problem
- answer includes correct units of measure
- answer is within 1 % of actual value
- answer is stated with appropriate precision

Conditions for assessment:

- using a scientific calculator

Learning Objectives

- a. Simplify rational expressions
- b. Multiply and divide rational expressions
- c. Add and subtract rational expressions with like denominators
- d. Add and subtract rational expressions with different denominators
- e. Simplify complex rational expressions
- f. Solve rational equations
- g. Apply skills to technical problems

Linked Core Abilities

Solve Problems

7. Solve systems of equations

Properties

Domain : Cognitive
Level : Application
Importance : Essential
Difficulty : High

Criteria - Performance will be satisfactory when:

- learner chooses a valid method for solving a problem
- learner chooses an appropriate formula
- learner writes an equation representing the problem
- learner manipulates an existing formula to solve for an unknown
- learner draws an accurate diagram representing the problem
- learner shows the steps used to solve the problem
- answer includes correct units of measure
- answer is within 1 % of actual value
- answer is stated with appropriate precision

Conditions for assessment:

- using a scientific calculator

Learning Objectives

- a. Solve system of two linear equations by graphing
- b. Solve system of equations by addition
- c. Solve system of equations by substitution
- d. Apply skills to technical problems

Linked Core Abilities

Solve Problems

8. Solve radical equations

Properties

Domain : Cognitive
Level : Analysis
Importance : Important
Difficulty : High

Criteria - Performance will be satisfactory when:

- learner chooses a valid method for solving a problem
- learner chooses an appropriate formula
- learner writes an equation representing the problem
- learner manipulates an existing formula to solve for an unknown
- learner draws an accurate diagram representing the problem
- learner shows the steps used to solve the problem
- answer includes correct units of measure
- answer is within 1 % of actual value
- answer is stated with appropriate precision

Conditions for assessment:

- using a scientific calculator

Learning Objectives

- a. Multiply and divide radicals
- b. Simplify radicals
- c. Add and subtract radicals
- d. Rationalize denominators
- e. Multiply polynomials involving radicals
- f. Solve radical equations
- g. Apply skills to technical problems

Linked Core Abilities

Solve Problems

9. Solve quadratic equations

Properties

Domain : Cognitive
Level : Application
Importance : Essential
Difficulty : Medium

Criteria - Performance will be satisfactory when:

- learner chooses a valid method for solving a problem
- learner chooses an appropriate formula
- learner writes an equation representing the problem
- learner manipulates an existing formula to solve for an unknown
- learner draws an accurate diagram representing the problem
- learner shows the steps used to solve the problem

- answer includes correct units of measure
- answer is within 1 % of actual value
- answer is stated with appropriate precision

Conditions for assessment:

- using a scientific calculator

Learning Objectives

- a. Solve quadratic equations by factoring
- b. Use square root property to solve quadratics
- c. Complete the square to solve quadratic equations
- d. Use the quadratic formula
- e. Graph simple quadratics
- f. Apply skills to technical problems

Linked Core Abilities

Solve Problems