

Algebra II

GOALS: Students will develop skills and understanding in:

1. The basic concepts of Algebra
2. Graphs of functions and linear equations
3. Systems of linear equations and problem solving
4. Solving systems of linear inequalities and linear programming
5. Solving polynomial equation and operations with polynomial expressions
6. Simplifying rational expressions and solving rational equations
7. Solving radical equations and properties of exponents and powers
8. Solving quadratic equations by square roots, graphing, completing the square, and the quadratic formula.
9. Properties of exponential and logarithmic functions
10. Conic sections
11. Sequences, Series and the Binomial Theorem

Goal 1. The basic concepts of Algebra

OBJECTIVES: Students will be able to: (*Objective numbers refer to Intermediate Algebra, Bittinger and Ellenbogen, sixth edition*)

- 1.11 Use the real number line to graph and order real numbers
- 1.12 Use the properties of real numbers
- 1.2 Evaluate an algebraic expression
- 1.3 Solve a linear equation
- 1.4 Use problem solving strategies to solve real-life problems
- 1.5 Solve a literal equation for a given variable and evaluate it for specified values
- 1.6 Use properties of exponents to simplify algebraic expressions
- 1.7 Convert to and from scientific notation.

Goal 2. The Algebra of functions

OBJECTIVES: Students will be able to:

- 2.11 Sketch a graph using a table of values
- 2.12 Identify and evaluate functions.
- 2.2 Find the slope of a line and identify parallel and perpendicular lines from their slopes
- 2.31 Use intercepts and slopes to sketch a graph of a line
- 2.41 Solve equations of lines graphically
- 2.42 Transform linear equations to standard form and slope-intercept form.
- 2.51 Find point-slope form of the equation of a line.
- 2.52 Use data from real life models to write equations of lines
- 2.61 Identify functions and relations
- 2.62 Add, subtract, multiply and divide two functions

Goal 3. Solving systems of linear equations by graphing, substitution, linear combination and Cramer's rule.

OBJECTIVES: Students will be able to:

- 3.1 Graph and solve a system of linear equations
- 3.2 Use algebraic methods to solve a linear system
- 3.3 Write and use linear systems to model real-life problems
- 3.4 Solve a system of linear equations in three variables.
- 3.5 Solve a system of equations using determinants and Cramer's Rule (3.5, 3.7)
- 3.6 Apply the function model to business and economic applications (3.8)

Goal 4. Solving a system of linear inequalities

OBJECTIVES: Students will be able to:

- 4.1 Use properties of inequalities to simplify and graph
- 4.2 Solve and graph compound inequalities
- 4.3 Convert absolute value inequalities into graphs and solve
- 4.4 Graph inequalities in two variables
- 4.5 Solve linear programming applications

Goal 5. Solving polynomial equation and operations with polynomial expressions

OBJECTIVES: Students will be able to:

- 5.1 Add and subtract polynomials
- 5.2 Multiply polynomials
- 5.3 Factor polynomial expressions and equations
- 5.4 Factor trinomials
- 5.5 Factor special trinomials
- 5.6 Factor cubic polynomials
- 5.7 Simplify mixed factoring problems
- 5.8 Solve polynomial equations by factoring

Goal 6. Relations and functions

OBJECTIVES: Students will be able to:

- 6.1 Multiply and divide rational expressions
- 6.2 Add and subtract rational expressions
- 6.3 Simplify complex expressions
- 6.4 Solve and graph rational equations
- 6.5 Solve applications using rational equations
- 6.6 Divide polynomials
- 6.7 Streamline long division and apply remainder theorem.
- 6.8 Solve formulas for a specific letter
- 6.81 Solve applications of rational expressions: direct, inverse and joint variation

Goal 7. Solving radical equations and properties of exponents and powers

OBJECTIVES: Students will be able to:

- 7.1 Use properties of exponents to evaluate and simplify exponential expressions
- 7.2 Use the properties of rational exponents to simplify radical expressions
- 7.3 Evaluate nth roots of real numbers using radical notation and rational exponent notation
- 7.4 Use the properties of roots to evaluate and simplify expressions containing radicals and rational exponents
- 7.5 Perform operations involving radical expressions.
- 7.6 Solve equations that have radicals and rational exponents
- 7.7 Solve geometric applications involving radical expressions.
- 7.8 Use complex numbers and their properties.

Goal 8. Solving quadratic equations

OBJECTIVES: Students will be able to:

- 8.1 Solve quadratic equations by completing the square
- 8.2 Apply the quadratic formula
- 8.3 Use quadratic equations in formulas
- 8.4 Determine the nature of the roots of a quadratic using the discriminant.
- 8.5 Solve equations that are quadratic in nature.
- 8.6 Translate the graphs of quadratic functions.
- 8.7 Graph quadratic functions using the intercepts.
- 8.8 Use quadratic functions in applications problem solving.
- 8.9 Solve polynomial inequalities

Goal 9. Properties of exponential and logarithmic functions

OBJECTIVES: Students will be able to:

- 9.1 Graph inverse functions; find composition of functions.
- 9.2 Graph exponential functions and evaluate exponential expressions
- 9.3 Evaluate logarithmic expressions and graph logarithmic functions
- 9.4 Use the properties of logarithms
- 9.5 Use the number e as the base of an exponential function
- 9.6 Solve exponential and logarithmic equations
- 9.7 Solve real world problems using logarithmic and exponential functions.

Goal 10. Quadratic relations and systems

OBJECTIVES: Students will be able to:

- 10.1 Write equations for circles and parabolas and sketch their graphs.
- 10.2 Write the equation for an ellipse and sketch its graph.
- 10.3 Write the equation of a hyperbola and sketch its graph using asymptotes.
- 10.4 Graph and algebraically solve a system of quadratic equations.

Goal 11. Sequences and Series

OBJECTIVES: Students will be able to:

- 11.1 Find a rule for a sequence or a specific term
- 11.2 Evaluate an arithmetic series or find a specific term of an arithmetic sequence.
- 11.3 Evaluate finite and infinite geometric series.
- 11.4 Raise binomials to powers using the Binomial Theorem