

Lake Zurich High School

Mathematics Department

Algebra II

Course Description

Prerequisites: Geometry
Open To: 11, 12
Credit: 1 unit
Level: College Prep

This course builds on the foundation laid in Algebra I. The understanding and use of essential algebraic skills are reinforced. Additional topics stressed are systems, relations, graphing, and linear and quadratic functions, sequences and series, and probability. Polynomials and conic sections are also studied in depth. This course prepares the student for Adv. Math/Trig. Students are required to bring a TI-83 or TI-84 graphing calculator to class on a daily basis.

Textbook

Title:	Algebra 2
Publisher:	McDougal Littell
Author(s)	Larson, Boswell, Kanold, Stiff
Copyright date:	2007 / 2008
ISBN number:	(0-618-59541-4) (978-0-618-59541-9)

Course Objectives

At the end of the course, the student will be able to:

1. Evaluate and simplify expressions to solve problems involving linear, absolute value, and inequality models.
2. Recognize relations, functions, and graph and write linear equations and inequalities of two variables.
3. Solve systems of equations and inequalities using a variety of methods.
4. Graph, write, and solve quadratic functions using a variety of methods.
5. Graph, solve, and perform operations with polynomial functions.
6. Graph and perform operations with rational exponents, inverse functions, and radical functions, and solve radical equations.
7. Solve and Graph Exponential Functions
8. Graph and Solve Rational Functions
9. Graph and Write Equations of Conic Sections
10. Analyze sequences, find sums of series, and apply recursive rules.
11. Apply trigonometric functions, use trigonometry with right triangles.

Course Syllabus

1st Semester

Chapter	Topic
1	Equations and Inequalities
2	Linear Equations and Functions
3	Linear Systems and Matrices
4	Quadratic Functions and Factoring
5	Polynomials and Polynomial Functions

2nd Semester

Chapter	Topic
6	Rational Exponents and Radical Functions
7	Exponential and Logarithmic Functions
8	Rational Functions
9	Quadratic Relations and Conic Sections
13	Trigonometric Ratios and Functions

Chapter and Unit Objectives

Chapter # 1 Equations and Inequalities

Major objective: Evaluate and simplify expressions to solve problems involving linear, absolute value, and inequality models.

Detailed Unit objectives:

1. Apply properties of real numbers
2. Evaluate and simplify algebraic expressions involving real numbers
3. Solve linear equations
4. Rewrite and evaluate formulas and equations
5. Set up and solve problems using verbal models, formulas, patterns, or diagrams.
6. Solve and graph simple and compound linear inequalities
7. Solve and graph absolute value equations and inequalities

Chapter # 2 Linear Equations and Functions

Major objective: Recognize relations, functions, and graph and write linear equations and inequalities of two variables.

Detailed Unit objectives:

1. Represent relations and functions
2. Find slope and rate of change
3. Graph equations of lines
4. Write equations of lines
5. Model direct variation
6. Draw scatter plots and best-fitting lines
7. Use absolute value functions and transformations
8. Graph linear inequalities in two variables

Chapter # 3 Linear Systems and Matrices

Major objective: Solve systems of equations and inequalities using a variety of methods.

Detailed Unit objectives:

1. Solve linear systems graphically
2. Solve linear systems algebraically
3. Graph systems of linear inequalities
4. Solve systems of linear equations in three variables
5. Perform basic operations with matrices
6. Multiply matrices
7. Evaluate determinants of matrices and apply Cramer's Rule
8. Use inverse matrices to solve linear systems

Chapter # 4 Quadratic Functions and Factoring

Major objective: Graph, write, and solve quadratic functions using a variety of methods.

Detailed Unit objectives:

1. Graph quadratic functions in standard form
2. Graph quadratic functions in vertex form or intercept form
3. Solve quadratic equations ($x^2 + bx + c = 0$) by factoring
4. Solve quadratic equations ($ax^2 + bx + c = 0$) by factoring
5. Solve quadratic equations by finding square roots
6. Perform operations with complex numbers
7. Solve quadratic equations by completing the square
8. Solve quadratic equations using the quadratic formula
9. Solve and graph quadratic inequalities
10. Write quadratic functions and models

Chapter # 5 Polynomials and Polynomial Functions

Major objective: Graph, solve, and perform operations with polynomial functions.

Detailed Unit objectives:

1. Simplify expressions using properties of exponents
2. Evaluate and graph other polynomial functions
3. Add, subtract and multiply polynomials
4. Factor and solve polynomial equations
5. Apply the Remainder and Factor Theorems
6. Find rational zeroes of a polynomial function
7. Apply the Fundamental Theorem of Algebra
8. Analyze graphs of polynomial functions
9. Write polynomial functions and models

Chapter # 6 Rational Exponents and Radical Functions

Major objective: Graph and perform operations with rational exponents, inverse functions, and radical functions, and solve radical equations.

Detailed Unit objectives:

1. Evaluate n^{th} roots and use rational exponents
2. Apply properties of rational exponents
3. Perform functions operations and composition
4. Use inverse functions
5. Graph square root and cube root functions
6. Solve radical equations

Chapter # 7 Exponential and Logarithmic Functions

Major objective: Solving and Graphing Exponential Functions

Detailed Unit objectives:

1. Graph and use exponential growth functions
2. Graph and use exponential decay functions
3. Graph and evaluate functions with the natural base e
4. Graph and evaluate logarithmic functions
5. Expand and condense logarithmic expressions
6. Solve exponential and logarithmic equations

Chapter # 8 Rational Functions

Major objective: Graph and Solve Rational Functions

Detailed Unit objectives:

1. Write and evaluate inverse and joint variation models
2. Graph simple rational functions
3. Graph general rational functions
4. Multiply and divide rational expressions
5. Add and subtract rational expressions
6. Solve rational equations

Chapter # 9 Quadratic Relations and Conic Sections

Major objective: Graph and Write Equations of Conic Sections

Detailed Unit objectives:

1. Apply the distance and midpoint formulas
2. Graph and write equations of parabolas
3. Graph and write equations of circles
4. Graph and write equations of ellipses
5. Graph and write equations of hyperbolas
6. Translate and classify conic sections
7. Solve quadratic systems

Chapter # 13 Trigonometric Ratios and Functions

Major objective: Apply trigonometric functions, use trigonometry with right triangles

Unit Objectives:

Detailed Unit objectives & Student Targets

1. Use trigonometry with right triangles