

## **MATHEMATICS DEPARTMENT**

## **ALGEBRA 1 (AE): COURSE #312**

### **Contact Information**

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### **The Department's Educational Philosophy**

The study of mathematics will enhance the ability of all students to problem solve and to reason. Through a strong standardized departmental program that emphasizes problem solving, communicating, reasoning and proof, making connections, and using representations, students will develop self-confidence and a positive attitude towards mathematics.

Our curriculum matches that of the Massachusetts Mathematics Curriculum Framework, and we are philosophically aligned with the National Council of Teachers of Mathematics Standards.

### **Guiding Principles**

- Mathematical ideas should be explored in ways that stimulate curiosity, create enjoyment of mathematics, and develop depth of understanding.
- Effective mathematics programs focus on problem solving and require teachers who have a deep knowledge of the discipline.
- Technology is an essential tool in a mathematics education, and all students should gain facility in using it where advantageous.
- All students should have a high-quality mathematics program.
- Assessment of student learning in mathematics should take many forms to inform instruction and learning.
- All students should understand the basic structure of mathematics.
- All students should recognize that the techniques of mathematics are reflections of its theory and structure.
- All students should gain facility in applying mathematical skills and concepts.
- All students should understand the role of inductive and deductive reasoning in mathematic and real life situations.

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**Course Frequency:** Full-year course, five times per week

**Credits Offered:** Five

**Prerequisites:** None

**Background to the Curriculum**

This course uses the 2003 edition of the Glencoe Algebra I text, which replaced the 1997 edition of the D.C. Heath Algebra I text. This text was used for five years and, prior to 1997, the 1992 edition of the Dolciani Algebra I text was used. The text is followed quite closely and goes far beyond the 2000 edition of the National Council of Teachers of Mathematics curriculum standards, as well as the 2000 edition of the Massachusetts State Framework recommendation for a first-year Algebra course. The course is, therefore, well aligned with national and state guidelines. Teachers bring in other material where appropriate and make minor changes as to the specific sections taught each year, after consultation with the RDL

**Core Topics/Questions/Concepts/Skills**

Solving linear equations and inequalities  
Solving non-linear equations and inequalities  
Solving everyday word problem applications  
Solving systems of linear and quadratic equations  
Graphing and writing line equations  
Using functions, including compositions  
Simplifying and factoring polynomials  
Simplifying rational expressions  
Simplifying radical expressions using formulae  
Understanding ways to represent data

## Course-End Learning Objectives

<u>Learning Objective</u>	<u>Corresponding state standards, where applicable</u>
1] simplifying numerical expressions	Algebra I.N.2
2] solving linear equations and inequalities	Algebra I.P.10
3] solve word problems involving perimeter, coins, percentage, mixture, investment, etc.	Algebra I.P.11
4] add, subtract, multiply, and divide polynomials	Algebra I.P.7
5] factor polynomials	Algebra I.P.8
6] solve quadratic equations by factoring	Algebra I.P.9
7] operations on rational expressions using factoring	Algebra I.P.8
8] solving fractional equations	Algebra I.P.11
9] graphing points and lines in the plane	Algebra I.P.5
10] graphing line using slope and y-intercept	Algebra I.P.5
11] solving systems of equations in two variables	Algebra II.P.10
12] simplifying square root radicals	Algebra II.N.2
13] applying the Pythagorean Theorem	Geometry.G.7
14] solving word problems using two variables	Algebra I.P.12
15] solving absolute value equations and inequalities	Algebra I.P.10
16] understanding the topics of set theory	Algebra I.N.1
17] solving quadratic equations by completing the square and using the quadratic formula	Algebra I.P.9
18] finding the domain and range of functions	Algebra I.P.3
19] using function notation and evaluating functions	Algebra I.P.4
20] solving direct, inverse, joint, and combined variation problems	Algebra I.P.11
21] composition of functions	Algebra II.P.5
22] simplifying higher index radical expressions	Algebra II.N.2
23] graphing parabolic and other polynomial functions	Algebra I.P.11
24] fit a line to data	Algebra I.D.2
25] applying introductory techniques in Probability and Statistics	Algebra I.D.1
26] solving compound inequalities	Algebra I.P.10

### **Assessment**

Students are generally assessed by in-class tests and quizzes, which are administered regularly throughout a marking period. Generally, two quizzes are equivalent to a test. The students' attitude, effort, and quality of homework preparations will also impact their term grade to a small degree. Teachers informally assess students every day by asking pivotal questions, as well as questions involving mechanics or concepts, and the students' term grades may be positively affected to a small degree based on their responses.

A standardized midyear examination and final examination are administered to all students in this course in order to assess the students' long-term retention of the course material.

### **Technology Learning Objectives Addressed in This Course**

**(This section is for faculty and administrative reference; students and parents may disregard.)**

<b><u>Course activity: skills &amp;/or topics taught</u></b>	<b><u>Technology standard(s) addressed through this activity</u></b>
1] Graphing calculators to solve systems of Linear and Quadratic Equations 2] Graphing calculators to graph Polynomial Functions 3] Graphing calculators to introduce Data Analysis and Best Fit Line	

### **Materials and Resources**

Teachers use other texts for supplementary ideas, such as the Dolciani Algebra I and both the Glencoe Algebra I and Algebra II texts. Review materials that resemble the departmental exams are used by all teachers of the course. Some teachers may employ the software package "Algebra Plotter Plus" to have students investigate a concept at the Mac Lab. Teachers may also have students investigate problems using graphing calculators.