

MATHEMATICS DEPARTMENT

FOUNDATIONS FOR ALGEBRA (SP): COURSE #315

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 existed in the 1970s and 1980s as a Pre-Algebra course but had been cancelled due to insufficient enrollment. It was reinstated in 1997 and has been taught every year since then except for 1998, due to lack of enrollment. Currently the text Mathematical Connections (1997), published by Houghton Mifflin, is in use. This course is the bridge to Algebra 1 and eventually Geometry. This text matches both the 2000 edition of the National Council of Teachers of Mathematics curriculum standards and the 2000 edition of the Massachusetts State Framework recommendations. 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/Question/Concepts/Skills

Introduction to Algebra
Computing with integers
Solving linear equations
Fraction concepts
Ratio, proportion, percent
Rational numbers
Graphing on the coordinate plane

Course-End Learning Objectives

<u>Learning objective</u>	<u>Corresponding state standards, where applicable</u>
1] use arithmetic to simplify expressions	Grade 6.N9
2] apply order of operations	Grade 8.N.7
3] simplify expressions involving variables	Grade 8.P.2
4] use the distributive property	Grade 8.N.8
5] simplify algebraic expressions	Grade 8.P.2
6] perform all operations with positive and negative integers	Grade 8.N.10
7] evaluate expressions involving absolute value	Grade 8.N.6
8] graph points on a coordinate plane	Grade 8.P.7
9] solve linear equations	Grade 8.P.7
10] write variable expressions	Grade 8.P.1
11] write equations to model a given situation	Grade 8.P.1
12] solve equations using a four-part procedure	Grade 8.P.7
13] apply formulas	Grade 8.P.4
14] represent data in bar graphs or line graphs	Grade 8.D.2
15] find the mean, median, mode of a set of data	Grade 8.D.3
16] simplify fractional expressions in arithmetic	Grade 8.N.10
17] simplify fractional expressions in algebra	Grade 8.N.12
18] compare fractions	Grade 8.N.1
19] convert fractions to decimals and vice versa	Grade 8.N.1
20] solve equations involving fractions	Grade 8.N.12
21] use ratios and rates	Grade 8.N.3
22] solve proportions	Grade 8.N.3
23] solve problems involving percents	Grade 8.N.10
24] graph equations in two variables	Grade 8.P.7
25] solve inequalities in one variable algebraically	Grade 8.P.7

Assessment

Students are generally assessed by in-class quizzes, which are administered regularly throughout a marking period. The students' attitude, effort, and quality of homework preparation 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 their 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.)

<u>Course activity: skills &/or topics taught</u>	<u>Technology standard(s) addressed through this activity</u>
1] The ability to use a four-function calculator to aid in complex computations.	

Materials and Resources

Teachers use other resources, such as the "Algebra with Pizzazz" series for motivating puzzle worksheets. In addition, current mathematical periodicals, such as "Mathematics Teacher," are utilized by teachers of this course. Review materials that match both departmental examinations are used by all teachers of the course.