

JUNIOR HIGH MATHEMATICS DEPARTMENT

8 MATH (AE)

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 organizational skills, self-confidence and a positive attitude toward 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

- All students can learn mathematics.
- 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 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 mathematics and real life situations.

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

Credits Offered: None

Prerequisites: Pre-Algebra

Background to the Curriculum

This course is now using the 1998 edition of the Heath McDougal Littell Algebra I text: An Integrated Approach by Larson, Kanold, and Stiff. Chapters 1 through 9 are covered. The course addresses the Massachusetts State Frameworks recommendations for a first-year Algebra course and meets the 2000 edition of the National Council of Teachers of Mathematics. Teachers utilize other materials to enhance and deepen the curriculum content where appropriate and make minor changes after consultation with the BDL.

Core Topics/Questions/Concepts/Skills

Solve real-life problems using algebraic skills and concepts
Create an environment conducive to learning algebra
Stress organizational skills and the need to provide proof of all solutions
Perform operations/simplify expressions
Solve linear and non-linear equations in one variable
Apply algebra to modeling
Operations on polynomials
Graph linear and non-linear functions
Writing linear equations in a variety of forms
Review topics in probability and statistics
Apply the laws of exponents
Explore exponential growth and decay situations
Solve systems of equations and inequalities in more than one variable
Use of irrational and rational numbers in the Pythagorean Theorem
Solve quadratic equations using the quadratic formula
Solve real life problems involving quadratic equations

Course-End Learning Objectives

<u>Learning objectives</u>	<u>Corresponding state standards, where applicable</u>
1] use tables and graphs to organize real-life data	8.D.02
2] use rates, ratios, and percents to solve real-life problems	8.N.03
3] apply the Pythagorean Theorem to real-life problems	10.G.07
4] add, subtract, multiply and divide real numbers and solve real-life problems using real numbers	10.N.01
5] apply the distributive property to algebraic expressions and use the distributive property to solve real-life problems	10.N.01 10.N.01
6] use the properties of exponents to evaluate and solve exponential expressions	10.N.01
7] use scientific notation to solve real-life problems	10.N.01
8] simplify and evaluate numerical and algebraic expressions with and without exponents	10.N.02
9] write, use, and graph models of exponential growth and decay	10.P.01
10] find exact and approximate solutions to equations involving real numbers	10.P.02
11] add, subtract, and multiply polynomials	10.P.03
12] rewrite and evaluate an equation in function form	10.P.04
13] graph quadratic equations	10.P.05
14] solve quadratic equations using the quadratic formula	10.P.05
15] solve and graph absolute value equations and inequalities on a number line and coordinate plane	10.P.06
16] graph horizontal and vertical equations	10.P.07
17] graph linear equations and inequalities using slope and y-intercepts	10.P.07
18] use standard form and slope intercept form to solve real-life problems	10.P.07
19] solve linear equations and inequalities using one or more transformations	10.P.07
20] solve literal equations and formulas for one of its variable	10.P.07
21] solve problems using a linear verbal model	10.P.07
22] draw a diagram to help understand real-life problems	10.P.07
23] represent real numbers on the number line	10.P.07
24] solve systems of equations and inequalities in two variables using graphing, substitution or linear combination	10.P.08

25] identify linear systems having one solution, no solution, or infinitely many solutions	10.P.08
26] apply systems of linear inequalities to real life problems	10.P.08
27] add and subtract matrices and organizing data into matrices	10.P.explor

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 student's 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. 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.)

<u>Course activity: skills &/or topics taught</u>	<u>Standard(s) addressed through this activity</u>
1] Introduction to the use of graphing calculators in areas such as graphing of linear and polynomial functions, solving systems of linear equations, and introducing the concept of data analysis and best fit lines.	

Materials and Resources

Teachers use other texts for supplementary ideas and more challenging examples, and “Algebra with Pizzazz” puzzle sheets. Basic and practice worksheets that coordinate to each lesson are used.

Graphing calculators are utilized throughout the course to enhance various concepts and skills.