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

Course Frequency: Full-year course, five times per week
Credits Offered: Five
Prerequisites: None

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 mathematics and real-life situations.

Course-End Learning Objectives

Students will:

1] Perform operations/simplify expressions with rational numbers.
2] Perform operations/simplify expressions using the order of operations, including exponents.
3] Solve equations using geometric formulas for perimeter, area and volume.
4] Apply the distributive property to algebraic expressions and use the distributive property to solve real-life problems.
5] Solve more complex linear equations including those with fractional and decimal coefficients.
6] Solve word problems in one variable involving perimeter, coins, mixture, and motion.
7] Identify linear systems having one solution, no solution, or infinitely many solutions.
8] Solve literal equations and formulas for one of its variables.
9] Understand the concepts of rates of change and slope.
10] Calculate slope from a graph or from two points.
11] Graph lines in Slope Intercept Form, Point-Slope Form, and Standard Form including horizontal and vertical lines.
12] Identify patterns that connect lines, tables and graphs in Slope-Intercept Form.
13] Use Point Slope Form and Standard Form to solve real-life problems.
14] Find equations of lines in Slope Intercept Form, Point-Slope Form, and Standard Form.
15] Understand the connections of the slopes of parallel and perpendicular lines, and find equations of parallel and perpendicular lines.
16] Solve systems of equations in two variables using graphing, substitution or linear combination.
17] Identify linear systems having one solution, no solution, or infinitely many solutions.
18] Solve word problems using two variables.
19] Use the properties of exponents to simplify exponential expressions.
20] Write, use, and graph models of exponential growth and decay.
21] Find the domain and range of functions.
22] Use function notation to evaluate functions and the composition of functions.
23] Understand and apply piecewise functions.
24] Solve quadratic functions by finding square roots.
25] Solve quadratic equations by factoring, using the quadratic formula, and completing the square.

26] Identify, use, and apply the discriminant to find the number of solutions of quadratic equations and real-life problems.

27] Graph quadratic equations.

28] Apply many factoring techniques to solve quadratic, cubic and quartic expressions.

29] Apply factoring patterns of special products of polynomials.

30] Add, subtract, and multiply polynomials.

31] Find the distance between, and the midpoint between, two points.

32] Add, subtract, multiply polynomials.

33] Apply the quadratic formula or complete the square to solve quadratic equations and inequalities.

34] Solve and graph simple and compound inequalities, including those with absolute value.

35] Add, subtract, multiply and divide radical expressions.

36] Solve and graph radical equations.

37] Understand and use arithmetic and geometric sequences.

38] Understand and use transformations of a parent function $y = f(x)$ to $y = af(x-h)+k$.

39] Determine a line of best fit, interpret the correlation coefficient, plot residuals, and predict values using interpolation and extrapolation.