ALGEBRA 1

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

Mathematics at RJ Grey JHS and ABRHS are aligned with the [Massachusetts Math Framework 2017](#) and seek to develop deep mathematical proficiency for <u>all</u> students in **five interrelated strands**:

- **Conceptual Understanding** – The comprehension and connection of concepts, operations, and relations that establish the foundation of and are necessary for developing procedural fluency.
- **Procedural Fluency** – To use math effectively, students must be able to do much more than carry out mathematical procedures. They must know which procedure is appropriate and most productive in a given situation, what a procedure accomplishes, and what kind of results to expect.
- **Problem Solving** – The ability to formulate, represent, and solve mathematical problems.
- **Justify Reasoning** – The capacity to think logically and to justify one's thinking and critique the reasoning of others.
- **Productive Disposition** – We want students to understand that math is useful, interesting, and worthwhile, and that they can become really good at it if they persevere and apply effective effort.

The **Algebra 1** course in 8th Grade is aligned with the high school Algebra 1AE curriculum. Students who successfully complete this course will take Geometry in 9th grade.

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

8th Grade Algebra 1 Only as Part of 8th-Grade Standards

40] Use scientific notation to solve real-life problems

41] Apply the Pythagorean Theorem to real-life problems.