PETERS TOWNSHIP HIGH SCHOOL
COURSE SYLLABUS: ALGEBRA 1 ACADEMIC

Course Overview and Essential Skills

This course is a study of the language, concepts, and techniques of Algebra that will prepare students to approach and solve problems following a logical succession of steps. This course is the foundation for high school mathematics courses. Topics include the study of equations, inequalities, functions, linear and quadratic functions, systems of equations and inequalities, exponents and polynomials, factoring, and data and statistical analysis. Real world applications are presented and are emphasized within the course content.

Course Textbook and Required Materials

- *Algebra 1*, Holt McDougal, ISBN# 978-0-030-99574-3
- Online textbook: my.hrw.com (Students given login and password during first week of course.)
- Required daily materials: Textbook, Three-Ring Binder, Pencil, Graphing Calculator (TI-83 Plus, TI-84, or TI-84 Plus)

Course Outline of Material Covered:

Unit or Topic	Concepts/Skills/Resources	Timeframe
Chapter 1 Foundations for Algebra	- Algebra uses symbols to represent quantities that are unknown. - Symbols and operations can represent mathematical phrases and real-world applications. - Number line models can be used to add or subtract any real number. - One can use the properties of real numbers and/or definitions of operations to multiply/divide real numbers. - Powers can be used to shorten repeated multiplication and represent various geometric models. - Square root is a number that is multiplied by itself to form a product. - Real numbers can be classified by their characteristics. - Expressions can be simplified by PEMDAS - Commutative, Associative and the Distributive properties help one to simplify expressions. - A coordinate plane is formed by the intersection of two perpendicular number lines called axes. - One can graph ordered pairs and	Three weeks

	functions from ordered pairs.	
Chapter 2 Equations	• Equivalent equations are equations that have the same solution(s). • Properties of equality and inverse operations help one find the solution of a one-step and two-step equations. • Properties of equality can be used to isolate variables. • Properties of equality and real numbers and inverse operations help one find the solution in a multi-step equation. • Properties of equality and inverse operations help one find the solution to equations with variables on both sides and literal equations. • Literal equation is an equation with two or more variables. • Absolute value equations can be solved by isolating the absolute value expression and then one can write an equivalent pair of linear equations. • Proportion is an equation that states that two ratios are equal. • Proportions can be used to solve similar figure problems. • Percent is a ratio that compares a number to 100. • Percent problems can be solved by proportions or percent equations. • Percent change is an increase or decrease given as a percent of the original amount.	Four weeks
Chapter 3 Inequalities	• Inequality is a mathematical sentence that uses an inequality symbol to compare the values of two expressions. • Inequalities can be represented by symbols. • Solutions of inequalities can be written on a number line. • Properties of inequalities can be used to solve inequalities. • Reverse the inequality sign when multiplying or dividing by a negative number.	Four weeks

	• Solutions of compound inequalities are either the overlap or combination of the solution sets of distinct inequalities. • Compound inequality graph with (AND) contains the overlap of the two inequalities. • Compound inequality graph with (OR) contains each graph of the two inequalities. • Absolute value inequalities can be solved by isolating the variable expression and then writing a pair of inequalities.	
Chapter 4 Functions	• Tables and graphs can show relationships between variables. • Graphs can visually represent the relationship between two variable quantities. • The set of all solutions of an equation forms its graph. • Functions are special types of relations where each value in the domain is paired with one value in the range. • Vertical line test determines if a graph is a function. • Graphing ordered pairs will determine if two sets of numerical data are related. • Trend lines can be used on a scatter plot to predict values.	Four weeks
Chapter 5 Linear Functions	• Linear function is a graph that forms a straight line. • Slope of a line can be positive, negative, zero or undefined. • Slope is the ratio of vertical change over horizontal change. • Y- intercept is where the graph crosses the y - axis. • X - intercept is where the graph crosses the x - axis. • Slope and y - intercept of a line can be used to write an equation and graph an equation of a line. • Slope- intercept and point- slope form are ways to write an equation of a line. • Standard form of a linear equation makes it possible to find	Four weeks

	intercepts and draw graphs. • Parallel lines have the same slope and never intersect. • Perpendicular lines slopes form a right angle. • Horizontal lines have a zero slope. • Vertical lines have an undefined slope.	
Chapter 6 Systems of Equations and Inequalities	• Systems of equations can be solved in more than one way; graphing, substitution and elimination. • Solutions to a linear inequality can be represented in the coordinate plane as the set of all points on one side of a boundary line. • Solutions of a systems of linear inequalities can be graphed on a coordinate plane. • Solutions of a system of linear inequalities are where the shading overlaps.	Four weeks
Chapter 7 Exponents and Polynomials	• Nonzero numbers raised to zero are one. • Powers of 10 can be used to write and compare very large or very small numbers. • Scientific notation is a shorthand way to write numbers using powers of 10. • Properties of exponents can be used to simplify a power raised to a power, multiply powers with the same base, product raised to a power and divide powers with the same base. • Monomials can be used to form larger expressions called polynomials. • Polynomials can be added, subtracted and multiplied. • Special rules apply for simplifying the square of a binomial or the product of a sum and a difference.	Four weeks

Chapter 8 Factoring Polynomials	• Factoring a polynomial reverses the multiplication process. • First step of factoring a monomial from a polynomial is finding the greatest common factor (GCF). • Signs and factors of the coefficients of the trinomial indicate how the trinomial can be factored. • Some trinomials of the form $x^2 + bx + c$ and $ax^2 + bx + c$ (only with GCF) can be factored into equivalent forms that are the product of two binomials. • Sometimes the GCF should be factored out before factoring. • Some trinomials can be factored by reversing the rules for multiplying special-case binomials.	Three weeks
Chapter 10 Data Analysis and Probability	• Sometimes it is helpful to organize numerical data into intervals. (ie: frequency tables and histograms) • Three measures of central tendency of a set of data are mean, median and mode. • There are many ways to organize data: bar graph, line graph, circle graph, etc... • Graphs may be misleading. • Box-and-whisker plot displays the maximum, minimum and quartiles of a data set. • Counting methods can be used to find the number of possible ways to choose objects with and without regard to order. • Probability of an event, tells how likely it is that the event will occur. • Compound events are two or more events linked by the words *and* or the word *or*. • Independent events occur when one event does not affect the probability of the other. • Dependent events occur when one event does affect the probability of the other.	Three weeks

Keystone Review (Study Island)		Three weeks
Chapter 9 Quadratic Functions and Equations	• Quadratic function can be written in the form $y = ax^2 + bx + c$ • Quadratic functions are graphed by a symmetric curve with a highest (maximum) or lowest (minimum) point. • In the quadratic function: $y = ax^2 + bx + c$, the value of b translate the position of the axis of symmetry. • Axis of symmetry is the vertical line that divides a parabola into two symmetrical halves. • Graphs of quadratic functions can help one determine how high an object goes. • One can look at a quadratic equation and tell what transformations have been made to the parent function. • Quadratic equations can be solved with a variety of methods: graphing, finding the square root, factoring and quadratic formula. • Discriminate of a quadratic equation can be used to determine the number of solutions an equation has.	Three weeks

Depending on the needs of the class or changes in the school year, the course outline is subject to change.