



Southmoreland School District

8th Grade Algebra I Curriculum Overview

Algebra I Overview:

Students will formalize and expand on algebraic concepts established in previous coursework. Students will deepen and extend their understanding of linear, nonlinear and exponential relationships by contrasting them with each other and by applying linear models to data that exhibit a linear trend. Students will engage in methods for analyzing data and using functions. Students will fluently move between multiple representations of functions including but not limited to linear, exponential and quadratics.

Module Titles:

Module 1: Relationships between Quantities and Reasoning with Equations

Module 2: Linear and Exponential Relationships

Module 3: Descriptive Statistics

Module 4: Equations and Expressions

Module 5: Quadratic Functions and Modeling

Module Overviews:

Module 1: Relationships between Quantities and Reasoning with Equations

Students analyze and explain the process of solving an equation. Students develop fluency writing, interpreting, and translating between various forms of linear equations and inequalities, and using them to solve problems. Students will develop multiple strategies and apply them appropriately to solve linear equations and the laws of exponents to the creation and solution of simple exponential equations.

Module 2: Linear and Exponential Relationships

In this module, students will learn function notation and develop the concepts of domain and range. They explore examples of functions, including sequences; they interpret functions given graphically, numerically, symbolically, and verbally, translate between representations, and understand the limitations of various representations.

Students build on and informally extend their understanding of integer exponents to consider exponential functions. They compare and contrast linear and exponential



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functions, distinguishing between additive and multiplicative change. Students explore systems of equations and inequalities, and they find and interpret their solutions. They interpret arithmetic sequences as linear functions and geometric sequences as exponential Functions.

Module 3: Descriptive Statistics

This module builds upon students' prior experiences with univariate and bivariate data. Students learn to represent and interpret distributions graphically and numerically. Students write and use linear models to make predictions for bivariate data.

Module 4: Equations and Expressions

In this module, students build on their knowledge from module 2, where they extended the laws of exponents to rational exponents. Students apply this new understanding of numbers and strengthen their ability to see structure in and create quadratic and exponential expressions. They create and solve quadratic equations, quadratic inequalities, and systems of equations involving quadratic expressions.

Module 5: Quadratic Functions and Modeling

In preparation for work with quadratic relationships students explore distinctions between rational and irrational numbers. In this module, students consider quadratic functions, comparing the key characteristics of quadratic functions to those of linear and exponential functions. They select from among these functions to model phenomena. Students learn to anticipate the graph of a quadratic function by interpreting various forms of quadratic expressions. In particular, they identify the real solutions of a quadratic equation as the zeros of a related quadratic function. Students learn that when quadratic equations do not have real solutions the number system must be extended so that solutions exist, analogous to the way in which extending the whole numbers to the negative numbers allows $x+1=0$ to have a solution. Students expand their experience with functions to include more specialized functions—absolute value, step, and those that are piecewise-defined.