Essential Math 4

The following learning targets represent the major concepts studied and assessed in this course.

Unit 9
Points, Slopes, and Lines

U9.1 Find distance between points.
U9.2 Use two points to determine the slope and equation for a line.

- This unit builds on the ideas from Unit 6. Students think about two relationships between any two points: distance and slope. They find the length of the straightline path between points, use the ratio of vertical to horizontal distance to quantify the slope of that straight-line path, and use that slope to determine collinearity, test whether points are on a line, generate new points along a line, and create an equation to describe the location of all points on a line.

Unit 10
Thinking Through Things Thoroughly

U10.1 Factor a polynomial with integer coefficients.
U10.2 Solve quadratic equations through factoring.

- This unit presents factoring as one kind of "un-multiplying." Students first divide with area models, working with a given area and one dimension of the rectangle to find the other length. Students connect the models to multiplication and division equations and explore area model puzzles, thinking flexibly with the model in preparation for factoring. The factoring problems in this unit focus primarily on expressing trinomial products as two binomial factors.

Unit 11
Exponents

U8.1 Use proportional reasoning to solve problems.
U8.2 Apply mathematical operations to fractions.
U8.3 Look for and make use of structure by recognizing multiple representations of rational expressions.

- This unit helps students make sense of exponential growth and leads students through extending the ideas of positive exponents to negative and fractional exponents. Students see why, to keep notation consistent, it must be true that $a^1 = a$, $a^0 = 1$, and $a^{-1} = 1/a$. Students practice using exponents in area models and in rational expressions and conclude the unit by examining rational exponents.

Unit 12
Algebraic Habits of Mind

This unit reviews, consolidates, and extends several of the overarching themes of the year: building equations and expressions; distance and area modeling; and solving problems with logic, persistence, and strategy. Students review the use of variables and expressions, the use of the number line and area models, finding distance and slope, and the idea of solving and what a solution looks like in various contexts.