8th Grade Math Rationale for the Year

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| 1st Quarter | Module 1: Integers Exponents and Scientific Notation | This year begins with students extending the properties of exponents to integer exponents in Module 1. They use the number line model to support their understanding of the rational numbers and the number system. The number system is revisited at the end of the year (in Module 7) to develop the real number line through a detailed study of irrational numbers. |
| Module 2: The Concept of Congruence | In Module 2, students study congruence by experimenting with rotations, reflections, and translations of geometrical figures. Their study of congruence culminates with an introduction to the Pythagorean Theorem in which the teacher guides students through the “square-within-a-square” proof of the theorem. Students practice the theorem in real‐world applications and mathematical problems throughout the year. (In Module 7, students learn to prove the Pythagorean Theorem on their own and are assessed on that knowledge in that module.) |
| 2nd Quarter | Module 3: Similarity | The experimental study of rotations, reflections, and translations in Module 2 prepares students for the more complex work of understanding the effects of dilations on geometrical figures in their study of similarity in Module 3. They use similar triangles to solve unknown angle, side length and area problems. Module 3 concludes with revisiting a proof of the Pythagorean Theorem from the perspective of similar triangles. |
| Module 4: Linear Equations | In Module 4, students use similar triangles learned in Module 3 to explain why the slope of a line is well‐defined. Students learn the connection between proportional relationships, lines, and linear equations as they develop ways to represent a line by different equations (y = mx + b, y – y1 = m (x – x1), etc.). They analyze and solve linear equations and pairs of simultaneous linear equations. The equation of a line provides a natural transition into the idea of a function explored in the next two modules. |
| 3rd Quarter |
| Module 5: Examples of Functions from Geometry | Students are introduced to functions in the context of linear equations and area/volume formulas in Module 5. They define, evaluate, and compare functions using equations of lines as a source of linear functions and area and volume formulas as a source of non-linear functions. |
| Module 6: Linear Functions | In Module 6, students return to linear functions in the context of statistics and probability as bivariate data provides support in the use of linear functions. |
| 4th Quarter | Module 7: Introduction to Irrational Numbers Using Geometry | By Module 7 students have been using the Pythagorean Theorem for several months. They are sufficiently prepared to learn and explain a proof of the theorem on their own. The Pythagorean Theorem is also used to motivate a discussion of irrational square roots (irrational cube roots are introduced via volume of a sphere). Thus, as the year began with looking at the number system, so it concludes with students understanding irrational numbers and ways to represent them (radicals, non-repeating decimal expansions) on the real number line. |