Essential Learning from 7th Grade to 8th Grade

In middle grades, multiplication and division develop into powerful forms of ratio and proportional reasoning. The properties of operations take on prominence as arithmetic matures into algebra. The theme of quantitative relationships also becomes explicit in grades six through eight, developing into the formal notion of a function by grade eight. Meanwhile, the foundations of deductive geometry are laid in the middle grades. The gradual development of data representations in kindergarten through grade five leads to statistics in middle school: the study of shape, center, and spread of data distributions; possible associations between two variables; and the use of sampling in making statistical decisions (adapted from PARCC 2012).

To be prepared for grade-eight mathematics, students should be able to demonstrate mastery of particular mathematical concepts and procedural skills by the end of grade seven and that they have met the fluency expectations for grade seven. The expected fluencies for students in grade seven are to solve equations of the form $px + q = r$ and $p(x + q) = r$ (7.EE.4), which also requires fluency with rational-number arithmetic (7.NS.1–3), and to apply (to some extent) properties of operations to rewrite linear expressions with rational coefficients (7.EE.1). Also, adding, subtracting, multiplying, and dividing rational numbers (7.NS.1–2) is the culmination of numerical work with the four basic operations. The number system continues to develop in grade eight, expanding to become the real numbers with the introduction of irrational numbers, and develops further in high school, expanding again to become the complex numbers with the introduction of imaginary numbers. These fluencies and the conceptual understandings that support them are foundational for work in grade eight.

It is particularly important for students in grade seven to develop skills and understandings to analyze proportional relationships and use them to solve real-world and mathematical problems (7.RP.1–3); apply and extend previous understanding of operations with fractions to add, subtract, multiply, and divide rational numbers (7.NS.1–3); use properties of operations to generate equivalent expressions (7.EE.1–2); and solve real-life and mathematical problems using numerical and algebraic expressions and equations (7.EE.3–4).