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We would argue that if anyone needs to practice mathematical habits of mind, it is the middle school math teacher. Here we describe our efforts to foster just that via an NSF-MSP professional development project. The primary component of our project is the delivery of three graduate-level math courses that delve deeply into the math taught in middle school in the areas of algebra, geometry, and statistics, respectively. We will provide an illustrative example from each course. For example, in the algebra course we study the standard argument that there is no fraction whose square is 2. Then we ask, “What is special about 2.” We discover that the same argument works for any prime number, not just 2. We continue by exploring just what it means for two fractions to be equal, discovering that they must have exactly the same reduced form. This ultimately leads to our final result: The p th root of a rational number is rational if and only if the reduced form of the original rational number has perfect p powers in both the numerator and denominator (Received September 13, 2012)