Name_____

Chapter 7 Real Numbers and the Pythagorean Theorem

Dear Family,

When adding or multiplying small numbers, you rely on tables you memorized long ago. For larger numbers, you follow the rules you've learned. For example, when adding large numbers, you line up the place values and start adding from the right, carrying digits to the left.

The "add and carry" method is an example of a rule that follows a strict, predictable procedure. Perhaps surprisingly, not all problems in mathematics have rules that are this straightforward. One of the oldest ways of solving problems is to use the "guess and check" method.

This method requires us to make a reasonable guess about the answer and check how close it is. You then refine your guess and check the new estimate. Each time you do this, you try to get closer to the answer.

Try this with your student to find the square root of a number. For example, to find the square root of 19, you might do the following steps.

- The square root of 16 is 4 (because $4^2 = 16$) and the square root of 25 is 5 (because $5^2 = 25$). Because 19 is between 16 and 25, the square root of 19 is greater than 4 and less than 5, so guess 4.5.
- Check: $(4.5)^2 = 20.25$, which is too big, so refine your guess. Try 4.2.
- Check: $(4.2)^2 = 17.64$, which is too small, so refine your guess. Try 4.4.
- Check: $(4.4)^2 = 19.36$, which is getting closer, but still a little too big.

If you continue this method, you will soon find out that $19 \approx (4.36)^2$. You could keep going to get the precision you need.

It may appear that computers and calculators have functions like these memorized, because the answers are shown immediately. However, many types of calculations are done using a process very similar to "guess and check." Because computers and calculators can make millions of guesses per second, the answer simply appears to be memorized.

So don't be afraid to guess the answer—just remember to check it!

Chapter 7 Real Numbers and the Pythagorean Theorem (continued)

Lesson	Learning Target	Success Criteria
7.1 Finding Square Roots	Understand the concept of a square root of a number.	• I can find square roots of numbers. • I can evaluate expressions involving square roots. • I can use square roots to solve equations.
7.2 The Pythagorean Theorem	Understand the Pythagorean Theorem.	• I can explain the Pythagorean Theorem. • I can use the Pythagorean Theorem to find unknown side lengths of triangles. • I can use the Pythagorean Theorem to find distances between points in a coordinate plane.
7.3 Finding Cube Roots	Understand the concept of a cube root of a number.	• I can find cube roots of numbers. • I can evaluate expressions involving cube roots. • I can use cube roots to solve equations.
7.4 Rational Numbers	Convert between different forms of rational numbers.	• I can explain the meaning of rational numbers. • I can write fractions and mixed numbers as decimals. • I can write repeating decimals as fractions or mixed numbers.
7.5 Irrational Numbers	Understand the concept of irrational numbers.	• I can classify real numbers as rational or irrational. • I can approximate irrational numbers. • I can solve real-life problems involving irrational numbers.
7.6 The Converse of the Pythagorean Theorem	Understand the converse of the Pythagorean Theorem.	• I can explain the converse of the Pythagorean Theorem. • I can identify right triangles given three side lengths. • I can identify right triangles in a coordinate plane.