Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour: \_\_\_\_\_\_\_\_\_\_\_\_\_

7.4: Square Roots

LT 7.4 I can identify the relationship between a number and its square root.

The area of a square is the length of a side multiplied by itself. This can be expressed by the formula *A* = *s* · *s*, or *A* = *s*2.

If you know the area of a square, you can work backward to find the length of a side. For example, suppose a square has an area of 4 square units. To find the length of a side, you need to figure out what positive number multiplied by itself equals 4. Because 2 · 2 = 4, the side length is 2 units. The number 2 is called a **square root** of 4.

This square has an area of 4 square units. The length of each side is the square root of 4 units, which is equal to 2 units.

In general, if *A* = *s*2, then *s* is a square root of *A*. Because 2 · 2 = 4 and -2 · (-2) = 4, 2 and -2 are both square roots of 4. Every positive number has two square roots. The number 0 has only one square root, 0.

For any positive number *N*, $\sqrt{N}$ indicates the positive square root of *N*. For example, $\sqrt{4}$ = 2. The negative square root of 4 is - $\sqrt{4}$ = -2.

* What is the side length of a square with an area of 2 square units?
* Is this length greater than 1? Is it greater than 2?
* Is 1.5 a good estimate for $\sqrt{2}$?
* Can you find a better estimate for $\sqrt{2}$?
1. In this problem, use your calculator only when instructed to do so.
2. Find the side lengths of squares with areas of 1, 9, 16, and 25 units.

1:

9:

16:

25:

1. Find the values of $\sqrt{1}$, $\sqrt{9}$, $\sqrt{16}$, and $\sqrt{25}$.
2. You may use your calculator for the following problems.
3. What is the area of a square with a side length of 12 units? What is the area of a square with a side length of 2.5 units?
4. Find the missing numbers.
5. $\sqrt{ }$ = 12
6. $\sqrt{ }$ = 2.5
7. Find *x*.
8. *x*2 = 121
9. *x*2 = 2.25
10. $\sqrt{x}$ = 121
11. $\sqrt{2.25}$ = *x*
12. Explain what each positive value of *x* in part (3) might represent in terms of area and length.