Name: _____ Date: Dec 5 Hour: 6th

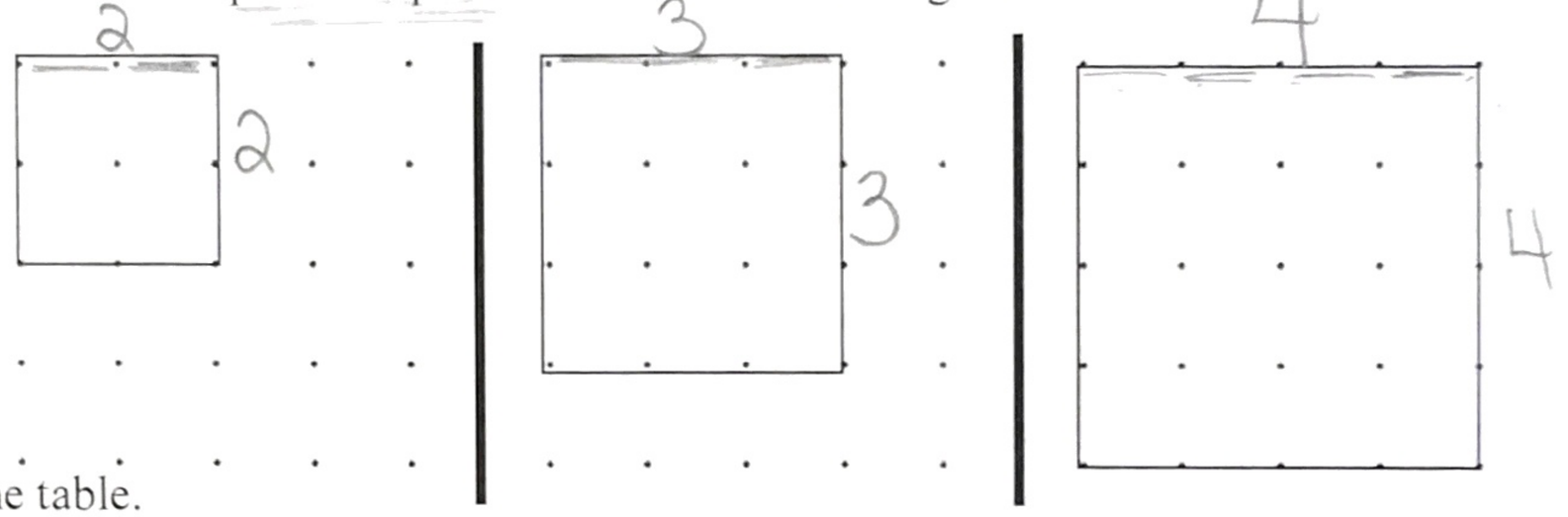
Unit 4A: Day 4: Square Roots

Focus Question: What is the relationship between a square's area and its side length?

# of square units in a shape

A. Developing the formula for area of a square

1. The squares below are "perfect squares." Find their side length and area.



2. Complete the table.

Side length	2	3	4
How to find area mathematically	$2 \cdot 2$ or 2^2	$3 \cdot 3$ or 3^2	$4 \cdot 4$ or 4^2
Area	4	9	16

The formula for area of a square is: $S^2 = A$ S is side length

The exponent 2 is called "squared" because you are making a square out of the side length.

B. Finding the side length if you know the area

1. For each square below, the area is given. What would its side length be?

Square	Area	Think…	Side length
7 / 49 / 7	49 units^2	What number times itself is 49? (7)(7)=49	7 units
11 / 121 / 11	121 units^2	What number times itself is 121? (11)(11)=121	11 units
8 / 64 / 8	64 units^2	What number times itself is 64? (8)(8)=64	8 units
81	81 units^2	What number times itself is 81? (9)(9)=81	9 units

Area for a square

2. The problem above can be solved using mathematical symbols.

$s^2 = A$ ← substitute

$s^2 = 81$

$\sqrt{s^2} = \sqrt{81}$

$s = 9$

$\sqrt{}$ is called a radical symbol. It is used to indicate a **square root**. In our case we only want the positive answer because it is finding the side length of a square with the given area. When you see it, you should think "**what number times itself equals the number under the radical**?"

When you say it out loud, you say "the square root of ."

letter by itself

3. Solve the following problems mathematically. Indicate whether you found the side length or the area.

a. $\sqrt{x^2} = \sqrt{225}$

$x = 15$

sidelength

b. $6^2 = m$

$36 = m$

Area

c. $13^2 = k$

$169 = k$

Area

d. $\sqrt{h^2} = \sqrt{25}$

$h = 5$

sidelength

e. $\sqrt{e^2} = \sqrt{196}$

$e = 14$

sidelength

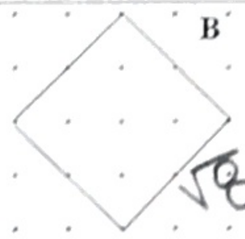
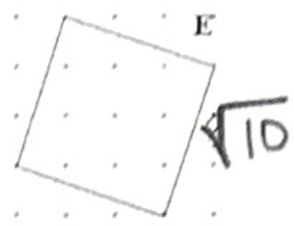
f. $1^2 = b$

$1 = b$

Area

C. "Non- Perfect" Squares

Not all squares are "perfect." Yesterday we found the area of these squares. Fill in the table for their area and side length. Then show what whole number their side lengths are between.

Square	Area	Side length	This is between…
	2	$S^2 = A$ $\sqrt{S^2} = \sqrt{2}$ $S = \sqrt{2}$	$\sqrt{1}$ $\sqrt{2}$ $\sqrt{4}$ 1 and 2
	5	$S^2 = A$ $\sqrt{S^2} = \sqrt{5}$ $S = \sqrt{5}$	$\sqrt{4}$ $\sqrt{5}$ $\sqrt{9}$ 2 and 3
	8	$S^2 = A$ $\sqrt{S^2} = \sqrt{8}$ $S = \sqrt{8}$	$\sqrt{4}$ $\sqrt{8}$ $\sqrt{9}$ 2 and 3
	10	$S^2 = A$ $\sqrt{S^2} = \sqrt{10}$ $S = \sqrt{10}$	$\sqrt{9}$ $\sqrt{10}$ $\sqrt{16}$ 3 and 4