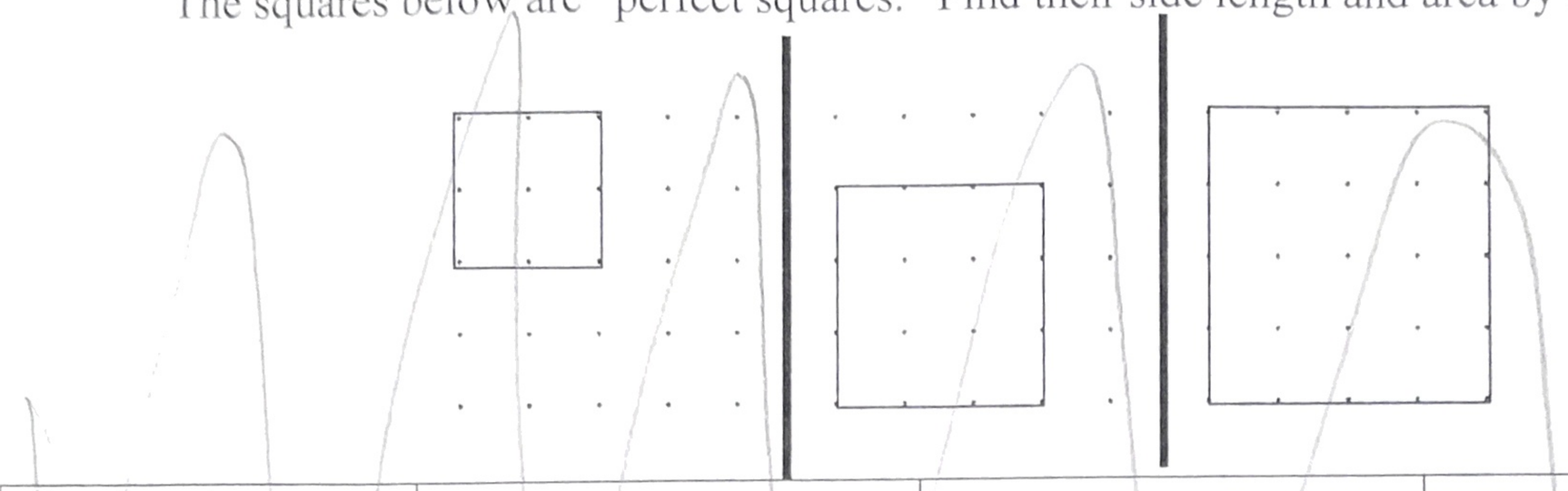
Name: _____ Date: _____ Hour: __Alg 1____

Unit 5a Day 2: Square Roots

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

A. The formula for area of a square:

The squares below are "perfect squares." Find their side length and area by filling in the table.



See yesterday 1st column

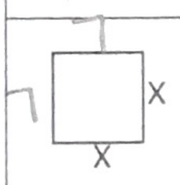
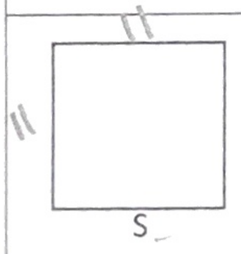
Side length			
How to find area mathematically			
Area			

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

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
	49 cm^2	What number times itself is 49? (7)(7)=49	7cm
	121 yds^2	What number times itself is 121? (11)(11)=121	11 yd.

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

$s^2 = A$

$s^2 = 121$

$\sqrt{s^2} = \sqrt{121}$

$S = 11$

$\sqrt{}$ is called a radical symbol. It is used to indicate a **square root**. FOR PROBLEMS IN CONTEXT, it is finding the side length of a square with the given area, therefore we only want the positive answer (IN CONTEXT!). 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."

You should memorize your perfect squares up to 15^2 to make your mathematical life easier.

1^2	2^2	3^2	4^2	5^2	6^2	7^2	8^2	9^2	10^2	11^2	12^2	13^2	14^2
1	4	9	16	25	36	49	64	81	100	121	144	169	196

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

$h = 5$ side

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

$e = 14$ side

f. $1^2 = b$

$1 = b$ Area

C. Solving more complex equations with exponents.

1. Solve the equation $3x - 4 = 12$. What step did you do 1st? What step did you do 2nd?

$+4 \quad +4$

$\frac{3x}{3} = \frac{16}{3}$

Add 4 Divide 3

$x = \frac{16}{3}$

2. How is this related to the order of operations? the reverse

PEMDAS (2nd, 1st)

Any grap

3. When an equation has an exponent, you eliminate the exponent after A/S & M/D UNLESS there's a grapin

4. Is 9 the only number that you can square and get 81? Explain.

$9^2 = 81$ ☺ No! $(-9)^2 = 81$ $-9^2 = -81$

5. Solve the following equations.

1) $\sqrt{n^2} = \sqrt{-9}$

$n = \emptyset$ (for now!) we learn in unit 7

2) $y^2 - 7 = -3$

$+7 \quad +7$

$\sqrt{y^2} = \sqrt{4}$

$y = \pm 2$

The symbol $\pm$ is read "positive or negative" and means there are two answers, a positive and a negative.

$x = \sqrt{81}$

$x = \pm 9$

3) $2g^2 - 5 = 123$

$+5 \quad +5$

$\frac{2g^2}{2} = \frac{128}{2}$

$\sqrt{g^2} = \sqrt{64}$

$g = \pm 8$

4) $-7x^2 + 2 = -138$

$-2 \quad -2$

$\frac{-7x^2}{-7} = \frac{-140}{-7}$

$\sqrt{x^2} = \sqrt{20}$

$x = \sqrt{20}$

Challenge: $2(x-3)^2 + 7 = 25$

$-7 \quad -7$

$\frac{2(x-3)^2}{2} = \frac{18}{2}$

$\sqrt{(x-3)^2} = \sqrt{9}$

$x - 3 = \pm 3$

$x - 3 = 3$ $\quad +3 \quad +3$ $\quad x = 6$ ✓

$x - 3 = -3$ $\quad +3 \quad +3$ $\quad x = 0$ ✓

*Degree 1 equations could have 1, $\emptyset$, or ∞ solutions.

These are degree two equations so they can have 2, 1, $\emptyset$, or ∞ solutions. (More on this later in quadratics.)

↑ unit 7