Algebra 1: 12.6 Guided Notes **Name** _____ **Period** _____
Approximating and Rewriting Radicals

Learning Goals:
To determine the square root of perfect squares.
To rewrite radicals by extracting perfect squares.
To solve radical equations.

Vocabulary (Page 763)

The number a is a _____ of b if $a^2 = b$.

So, the square root of 9 is 3 and –3 because $3^2 = 9$ and $(-3)^2 = 9$.

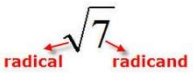
The _____ or _____ square root is written as _____.

So, $\sqrt{16} = 4$

The _____ square root is written as _____.

So, $-\sqrt{25} = -5$

The expression under the radical sign is called the _____.



You can use $\pm\sqrt{\ }$ to indicate the _____ and _____ square roots.

So, $\pm\sqrt{36} = \pm 6$

Finding the Square Root of Perfect Squares

1. $\sqrt{49}$ = _____
2. $\pm\sqrt{36}$ = _____
3. $-\sqrt{121}$ = _____
4. $\sqrt{\frac{1}{25}}$ = _____

These are all _____.

Note, $\pm\sqrt{0}$ is always _____.

In Algebra 2, you will find out how to take the square root of a negative number!

Rewriting Radicals by Extracting Perfect Squares

Why would you want to simplify radicals? Isn't rounding your answer good enough?

When you simplify radicals, try to factor out the perfect squares…

$\sqrt{20}$

$\sqrt{4} \cdot \sqrt{5}$ *4 is a perfect square!*

$2\sqrt{5}$

$\sqrt{45}$

$\sqrt{9} \cdot \sqrt{5}$ *9 is a perfect square!*

$3\sqrt{5}$

Practice

1. $\sqrt{50}$
2. $\sqrt{27}$
3. $\sqrt{48}$
4. $\sqrt{200}$

If you want an accurate answer, it's best to leave radicals in their exact form (with the root).
Sometimes, you can approximate using a calculator and rounding the answer. For example, $\sqrt{14} \approx 3.7$.

Solving Radical Equations

Solve each quadratic equation by taking the square root of each side. Round to the nearest tenth.

1. $x^2 = 40$

   $\sqrt{x^2} = \pm\sqrt{40}$

   $x \approx \pm 6.3$

2. $x^2 = 75$
3. $x^2 - 4 = 23$

Math Challenge!

Solve each quadratic equation by taking the square root of each side. Round to the nearest tenth.

$(x - 1)^2 = 17$

$\sqrt{(x-1)^2} = \pm\sqrt{17}$

$x - 1 = \pm\sqrt{17}$

$x = 1 \pm \sqrt{17}$

$x = 1 + \sqrt{17}$ $x = 1 - \sqrt{17}$

$x \approx 5.1$ $x \approx -3.1$

$(x + 8)^2 = 83$