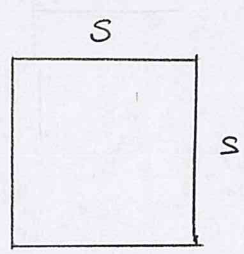
Algebra 1: 12.6 Notes & Practice — Name ______________________ Period _____

Approximating and Rewriting Radicals

Main Ideas/Questions	Notes/Examples
WARM UP	**Directions:** Simplify.
	1. $(8)^2 =$ 64 2. $(-8)^2 =$ 64 64 is a perfect square!
VOCABULARY See page 763. $(-8)(-8) = 64$ $\sqrt{64} = +8$ and -8	A ***radical expression*** involves a radical symbol. radical symbol → $\sqrt{64}$ ← radicand A number b is the ***square root*** of a if $b^2 = a$. The square root of 64 is 8 if $8^2 = 64$. In other words, $\sqrt{64} = 8$. If $(-8)^2 = 64$, then is -8 also the square root of 64? Yes Why or why not? A negative number multiplied by itself results in a positive product. There are 2 square roots for every whole number, a ***positive square root*** called the principal square root and a negative square root.
EXAMPLES	**Finding the Square Root of Perfect Squares** **Directions:** Solve each equation by extracting the square root. 1. $\sqrt{16} = \pm 4$ — 2. $\sqrt{25} = \pm 5$ 3. $\sqrt{36} = \pm 6$ — 4. $\sqrt{0} = 0$ Not + or −. These are all perfect squares!
Rewriting Radicals	**Rewriting Radicals by Extracting Perfect Squares** • Simplify a radical to find an ***exact*** answer. Accuracy is important! • Try to factor out the perfect square(s).
EXAMPLES	**Directions:** Rewrite each radical by extracting the perfect squares. 1. $\sqrt{20}$ $\sqrt{4} \cdot \sqrt{5}$ 4 is a perfect square! $2\sqrt{5}$ 2. $\sqrt{45}$ $\sqrt{9} \cdot \sqrt{5}$ 9 is a perfect square. $3\sqrt{5}$

Sometimes there is more than 1 perfect square. Choose the largest one.	3. $\sqrt{50}$ $\sqrt{25}\cdot\sqrt{2}$ 25 is a perfect square $5\sqrt{2}$	4. $\sqrt{27}$ $\sqrt{9}\cdot\sqrt{3}$ 9 is a perfect square $3\sqrt{3}$
	5. $\sqrt{48}$ $\sqrt{16}\cdot\sqrt{3}$ 16 is a perfect square. $4\sqrt{3}$	6. $\sqrt{24}$ $\sqrt{4}\cdot\sqrt{6}$ 4 is a perfect square. $2\sqrt{6}$
Approximating Radicals	You can ***estimate*** the square root of a number using a calculator and rounding the answer.	
EXAMPLES	**Directions:** Determine the square root of each radical by finding an approximate value. Round to the nearest $\underline{10^{th}}$.	
Round up if the number in the 100th place is 5 or more. $4.56 \approx 4.6$ $4.72 \approx 4.7$	1. $\sqrt{20}$ ≈ 4.5	2. $\sqrt{45}$ ≈ 6.7
	3. $\sqrt{50}$ ≈ 7.1	4. $\sqrt{27}$ ≈ 5.2
EXIT SLIP $\sqrt{s^2} = (s^2)^{\frac{1}{2}}$ $= s^{\frac{2}{2}}$ $= s^1$	This summer, new square floor tiles will be installed in each classroom. The area of each tile is 18 inches^2. Determine the exact and the approximate length of the tile's side.  Area = 18 in^2 Area of a square $= s^2$ $18 = s^2$ $18 = s^2$ $\sqrt{18} = \sqrt{s^2}$ $\sqrt{9}\cdot\sqrt{2} = s$ $3\sqrt{2} = s$ $3\sqrt{2} \approx 4.2$	

The exact length of a side is $3\sqrt{2}$ inches

The approximate length of a side is 4.2 inches