6-2a Square Roots and Radicals
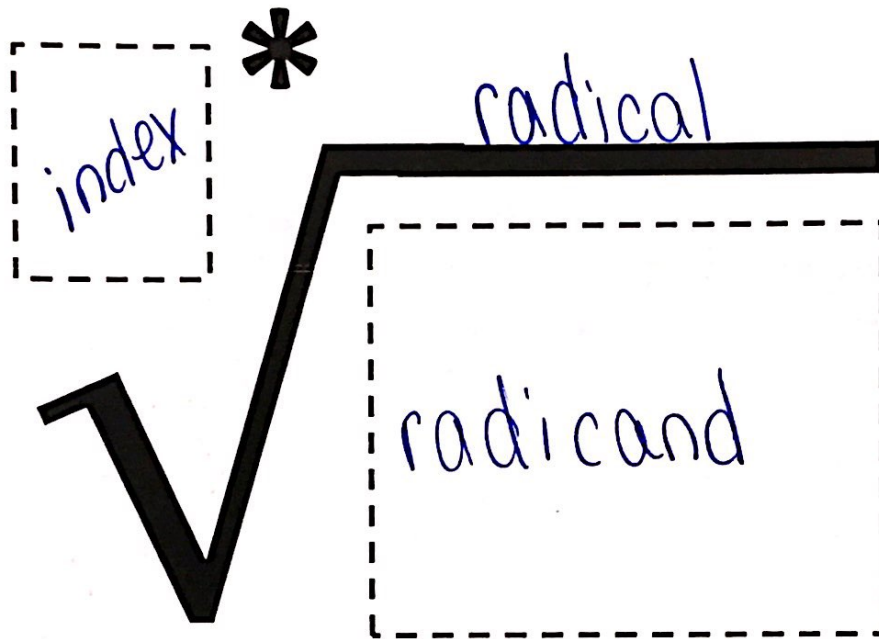
$$\sqrt{}$$

index · radical · radicand

*If the index is not written, it is automatically __2__.

Square root is the opposite of __square__. Cube root is the opposite of __cube__.

Since $9^2 = 9 * 9 = 81,$ $\sqrt{81} = $ __9__

Since $2^3 = 2 * 2 * 2 = 8,$ $\sqrt[3]{8} = $ __2__

SIMPLIFYING RADICALS

You should easily recognize perfect squares (and some of the cubes, too!)

Simplify.

1. $\sqrt{144} = 12$
   (12·12)

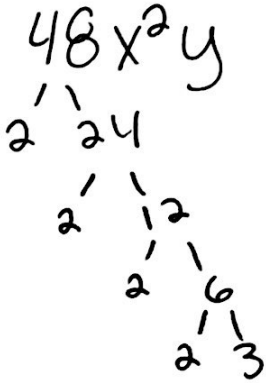2. $\sqrt[3]{125} = 5$
   (5·5·5)

3. $\sqrt{64} = 8$

4. $\sqrt[3]{x^3} = x$
   x·x·x

5. $\sqrt{y^2} = y$

6. $\sqrt[3]{z^3} = 2$

SIMPLIFYING RADICALS (CONTINUED)

*Square roots are simplified when there are no more squared factors, cube roots are simplified when there are no more cubed factors, and so on.

STEPS	EXAMPLE: Simplify $\sqrt{48x^2y}$
1. Write the <u>prime factorization</u> of your radicand. *factor tree	$48x^2y$ $2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot x \cdot x \cdot y$
2. Determine the index (root) of your radical.	2
3. If the index is 2, circle groups of 2 identical numbers or variables. If the index is 3, circle groups of 3, etc.	$(2 \cdot 2)(2 \cdot 2) 3 \cdot (x \cdot x) y$
4. Put the number or variable from each circled group on the outside of the radical ONE time.	$2 \cdot 2 \cdot x \sqrt{}$
5. Anything left uncircled will remain under the radical. If everything under the radical symbol is circled, the radical symbol will disappear.	$2 \cdot 2 \cdot x \sqrt{3 \cdot y}$
6. Multiply the numbers and variables outside the radical together, and the numbers and variables inside the radical together.	$4x\sqrt{3y}$