

# Warm Up

Find the prime factorization.

1)  $\sqrt{160}$

$$\begin{array}{c} \wedge \\ 16 \cdot 10 \\ \wedge \quad \wedge \end{array}$$

2)  $255$

$$\begin{array}{c} 5 \wedge \\ 5 \cdot 51 \\ \wedge \quad \wedge \\ 5 \cdot 3 \cdot 17 \end{array}$$

$$\sqrt{255}$$

	255
5	51
3	17
17	1

3) List the first ten perfect squares.

$$\begin{array}{c} 4 \cdot 4 \cdot 25 \\ \wedge \quad \wedge \quad | \quad | \\ 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 5 \end{array}$$

$$\sqrt{4 \cdot 4 \cdot 2 \cdot 5}$$
$$\begin{array}{c} \wedge \quad \wedge \quad \wedge \quad \wedge \\ 2 \cdot 2 \cdot 2 \cdot 2 \cdot 5 \end{array}$$

4  $\sqrt{10}$

1, 4, 9, 16, 25  
36, 49, 64, 81, 100  
...

## Simplifying Radical Expressions

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What is it?

A **radical expression** is an expression that contains a radical or square root.

How do we simplify?

Break numbers down into **products of a perfect square**

(Even exponents are perfect squares)

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

## Simplifying Radicals

A radical expression is an expression that contains a radical or square root.

How do you simplify radical expressions?

Look for perfect squares!

Even exponents are perfect squares

Ex 1:  $\sqrt{160}$

$$\sqrt{16 \times 10} = 4\sqrt{10}$$

Ex 2:  $\sqrt{42}$

$$\sqrt{2 \times 3 \times 7} = \sqrt{42}$$

Ex 3:  $\sqrt{275}$

$$\sqrt{25 \times 11} = 5\sqrt{11}$$

Ex 4:  $\sqrt{18n^3}$

$$\sqrt{9n^2 \cdot 2n} = 3n\sqrt{2n}$$

Ex 5:  $\sqrt{45n^7}$

$$\sqrt{5 \cdot 9n^6 \cdot n} = 3n^3\sqrt{5n}$$

$n^3 \cdot n^3 = n^6$   
 $\sqrt{n^6} = n^3$

You Try:

$$\sqrt{260} \rightarrow \sqrt{4 \cdot 65} = 2\sqrt{65}$$

13.5

$$\sqrt{27x^2} = \sqrt{3 \cdot 9x^2}$$

$$3\sqrt{3}$$

$$\sqrt{85} \rightarrow \sqrt{5 \cdot 17} = \sqrt{85}$$

$x^2 \cdot x^2 = 4 \cdot 4 = 16$

$$\sqrt{48x^5} = \sqrt{6x^4 \cdot 8x}$$

$\begin{matrix} \uparrow & \uparrow \\ 2 \cdot 2 & 2 \cdot 2 \end{matrix}$

$$\sqrt{4 \cdot 4 \cdot 3 \cdot 4 \cdot x} = 2 \cdot 2 \cdot x^2 = 4x^2$$

$$4x^2\sqrt{3x}$$

## Simplifying Radicals

Do you have multiple radical expressions?

Now it's time to multiply then simplify.

Remember to still look for perfect squares including exponents!

Ex 1:  $\sqrt{14} \times \sqrt{7} = \sqrt{98}$

$$\sqrt{7x7x2} = 7\sqrt{2}$$

Ex 2:  $\sqrt{3} \times \sqrt{42} = \sqrt{126}$

$$\sqrt{2x3x3x7} = 3\sqrt{14}$$

Ex 3:  $\sqrt{12x^2} \times \sqrt{2x^3}$

$$\sqrt{24x^5} = \sqrt{4 \cdot 6 \cdot x \cdot x^4} = 2x^2\sqrt{6x}$$

Ex 4:  $3\sqrt{6} \times \sqrt{18}$

$$3\sqrt{108} = 3\sqrt{9x4x3} =$$

$$332\sqrt{3} = 18\sqrt{3}$$

You Try:

$$\sqrt{2} \times \sqrt{6} = \sqrt{12}$$

↑  
 $\sqrt{4 \cdot 3}$   
 $2\sqrt{3}$

$$\sqrt{8x} \times \sqrt{3x} = \sqrt{24x^2}$$

↑  
 $\sqrt{4 \cdot 6 \cdot x^2}$   
 $2x\sqrt{6}$

$$\sqrt{7x^2} \times \sqrt{12x}$$

=  $\sqrt{84x^3} = \sqrt{7 \cdot 4 \cdot 3 \cdot x^2 \cdot x}$   
 $2x\sqrt{21x}$

$$\sqrt{9x^4} \times \sqrt{8x} =$$

$3x^2 \sqrt{4 \cdot 2x} = 2 \cdot 3x^2 \sqrt{2x}$   
 $6x^2 \sqrt{2x}$

$$\sqrt{2a} \times \sqrt{9a^3}$$

$\sqrt{2 \cdot 9 \cdot \frac{a \cdot a^3}{a}} = 3a^2 \sqrt{2}$

## Classwork

Notes titled:

"Simplifying Radicals"

Practice Sheet:

"What happened when the owl lost its voice?"

Done? Take this opportunity to practice on Khan Academy. It is a weekly assignment stretched over 7 days, so don't wait!

