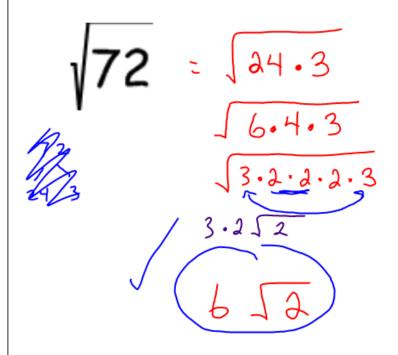
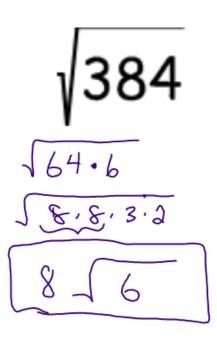
## Warmup:

#### Simplify the following radicals:





#### Simplify the following:

$$-\sqrt{18} - 3\sqrt{8} - \sqrt{24}$$

$$-3\sqrt{2} - 6\sqrt{2} - 2\sqrt{6}$$

$$-9\sqrt{2} - 2\sqrt{6}$$

$$2\sqrt{18} + 3\sqrt{6} - \sqrt{72}$$
 $6\sqrt{2} + 3\sqrt{6} - \sqrt{5}$ 
 $3\sqrt{6}$ 

#### Simplify the following:

$$\sqrt{14 \cdot \sqrt{35}} = \sqrt{14 \cdot 35}$$

$$= \sqrt{7 \cdot 2 \cdot 7 \cdot 5}$$

$$\sqrt{=7\sqrt{10}}$$

#### Simplify the following:

$$4\sqrt{2(\sqrt{2}+\sqrt{3})}$$
 $4\sqrt{2}$ 
 $\sqrt{2}$ 
 $\sqrt{2}$ 
 $\sqrt{2}$ 
 $\sqrt{3}$ 
 $\sqrt$ 

$$-2\sqrt{3}(\sqrt{15}+3\sqrt{8})$$

$$-2\sqrt{3}(\sqrt{15}+3\sqrt{8})$$

$$-2\sqrt{3}(\sqrt{15}+3\sqrt{8})$$

$$-2\sqrt{3}(\sqrt{15}+6\sqrt{3}\sqrt{8})$$

$$-2\sqrt{3}(\sqrt{15}+6\sqrt{8})$$

#### Dividing with Radicals:

Like multiplication, you are allowed to divide underneath a radical symbol:

$$\frac{\sqrt{8}}{\sqrt{2}} = \sqrt{\frac{3}{2}}$$

$$= \sqrt{\frac{4}{2}}$$

$$= \sqrt{2}$$

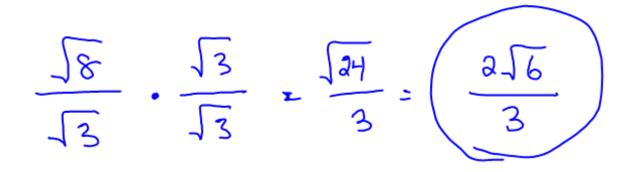
You are not allowed to leave a radical in the denominator of a fraction though:

What we do is rationalize the denominator by multiplying by that radical on top and on bottom.

$$\frac{\sqrt{8}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{16}}{\sqrt{4}} = \frac{4}{2} = 2$$

"Rationalize the denominator"

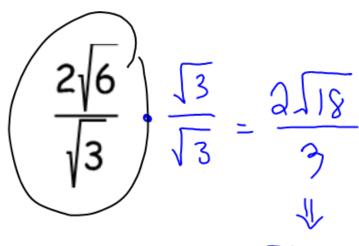
$$\frac{\sqrt{8}}{\sqrt{2}} \left( \frac{\sqrt{2}}{\sqrt{2}} \right) = \frac{\sqrt{16}}{2} = \frac{4}{2} = \frac{2}{2}$$



### You try:

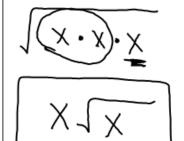
$$\frac{3}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{3\sqrt{2}}{2}$$

$$\frac{2\sqrt{6}}{\sqrt{3}} = 2\sqrt{\frac{6}{3}} = 2\sqrt{2}$$



#### Simplifying with variables:

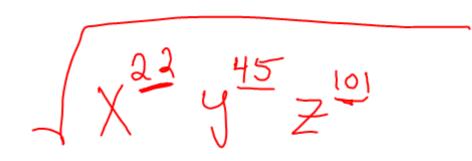
$$\sqrt{x^3} = x\sqrt{x}$$



$$\sqrt{x^{5}y^{6}z^{7}} = x^{2}y^{3}\sqrt{xz}$$

$$\sqrt{x \times x} \times \sqrt{yyyy} = 222222$$

$$8x^{10}y^{9} = 2x^{5}y^{4}\sqrt{2y}$$



#### You try:

$$\sqrt{a^{11}b^{13}c^{17}}$$

$$\sqrt{50} = 5\sqrt{2}$$

$$\sqrt{50}x^{5}y^{21}z^{3}$$

$$5x^{2}y^{0} \neq \sqrt{2}xy^{2}$$

# Practice simplifying Radicals