

# Simplifying Radicals 46

## TO SIMPLIFY RADICALS ...

- ☆ Create a factor tree. Circle all prime numbers
- ☆ Write all prime factors under the radicand
- ☆ Circle any pairs
- ☆ Move one of each pair to the front.
- ☆ Multiply the remaining numbers if necessary.

$$\sqrt{75} = \begin{array}{c} \wedge \\ 25 \text{ (3)} \\ \wedge \\ 5 \cdot 5 \end{array} \quad \boxed{5\sqrt{3}}$$

$$\sqrt{200} = \begin{array}{c} \wedge \\ 2 \cdot 100 \\ \wedge \\ 10 \cdot 10 \end{array} \quad \boxed{10\sqrt{2}}$$

$$\sqrt{99} = \begin{array}{c} \wedge \\ 3 \cdot 33 \\ \wedge \\ 3 \cdot 11 \end{array} \quad \boxed{3\sqrt{11}}$$

$$\begin{array}{c} \wedge \\ 3 \cdot 18 \\ \wedge \\ 9 \cdot 2 \end{array} \quad \boxed{9\sqrt{2}}$$

$$\sqrt{6} \cdot \sqrt{10} = \sqrt{6 \cdot 10} = \begin{array}{c} \wedge \\ 2 \cdot 2 \cdot 5 \end{array} \quad \boxed{2\sqrt{15}}$$

$$2\sqrt{15} \cdot \sqrt{3} = 2\sqrt{15 \cdot 3} = \begin{array}{c} \wedge \\ 5 \cdot 3 \end{array} \quad \boxed{6\sqrt{5}}$$

$$\sqrt{\frac{7}{4}} = \frac{\sqrt{7}}{\sqrt{4}} = \boxed{\frac{\sqrt{7}}{2}}$$

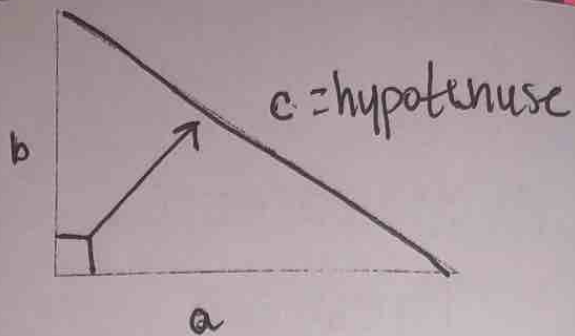
$$\sqrt{\frac{49}{20}} = \frac{\sqrt{49}}{\sqrt{20}} = \frac{7}{\begin{array}{c} \wedge \\ 2 \cdot 5 \end{array}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{7\sqrt{5}}{10}$$

$$\sqrt{\frac{12}{5}} = \frac{\sqrt{12}}{\sqrt{5}} = \frac{\begin{array}{c} \wedge \\ 2 \cdot 3 \end{array} \sqrt{5}}{\sqrt{5} \sqrt{5}} = \boxed{\frac{2\sqrt{15}}{5}}$$

$$\sqrt[4]{\frac{125}{6}} = \sqrt[4]{\frac{5 \cdot 5 \cdot 5}{\begin{array}{c} \wedge \\ 2 \cdot 3 \end{array}}} = \frac{5 \sqrt[4]{5}}{\sqrt[4]{2 \cdot 3}}$$

12  
4.3

$$\frac{125}{\begin{array}{c} \wedge \\ 2 \cdot 5 \end{array}} = \frac{\begin{array}{c} \wedge \\ 10 \cdot 130 \end{array}}{3} = \frac{20\sqrt{30}}{6}$$

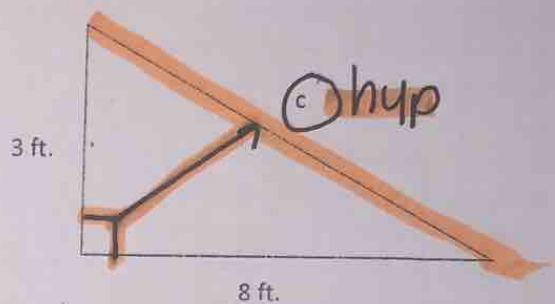


$$a^2 + b^2 = c^2$$

a and b are the legs  
c is the hypotenuse

Work Space

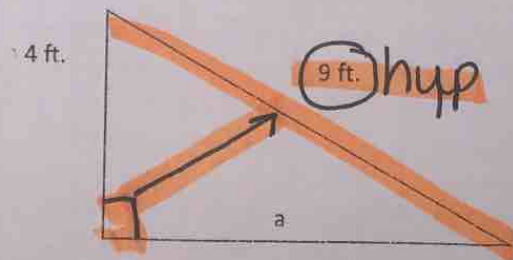
$$\begin{aligned} a^2 + b^2 &= c^2 \\ 8^2 + 3^2 &= c^2 \\ 64 + 9 &= c^2 \\ \sqrt{73} &= \sqrt{c^2} \\ c &= \sqrt{73} \end{aligned}$$



1. Start with the formula
2. Label the variables
3. Substitute numbers in formula
4. Solve for c

Work Space

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 4^2 + x^2 &= 9^2 \\ 16 + x^2 &= 81 \\ \underline{-16} \quad \underline{-16} & \\ \sqrt{x^2} &= \sqrt{65} \\ x &= \sqrt{65} \end{aligned}$$



1. Start with the formula
2. Label the variables
3. Substitute numbers in formula
4. Solve for a

1

Maria walked 3 km west and 4 km south. How far is she from her starting point?

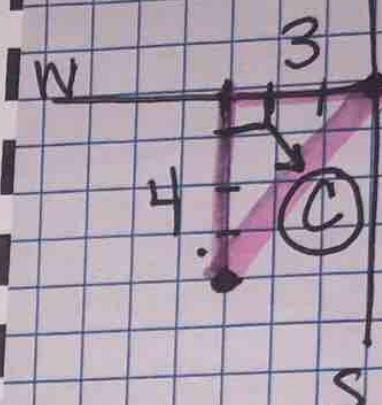
$$a^2 + b^2 = c^2$$

$$3^2 + 4^2 = c^2$$

$$9 + 16 = c^2$$

$$\sqrt{25} = c$$

$$c = 5$$



7

The diagonal of a rectangle is 25 inches and the width is 15 inches. What is the length?

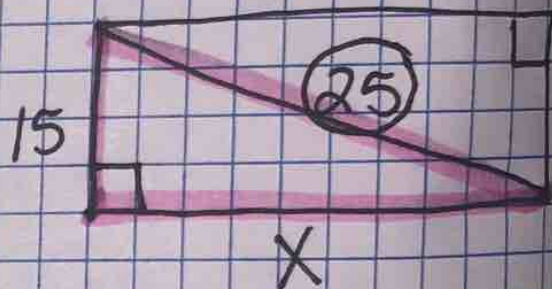
$$15^2 + x^2 = 25^2$$

$$225 + x^2 = 625$$

$$\begin{array}{r} 225 + x^2 = 625 \\ -225 \qquad -225 \\ \hline \end{array}$$

$$x = 20$$

$$\sqrt{x^2} = \sqrt{400}$$



8

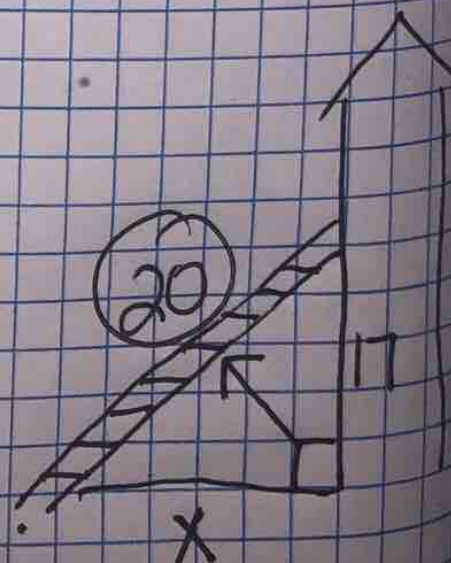
$$x = 10.5$$

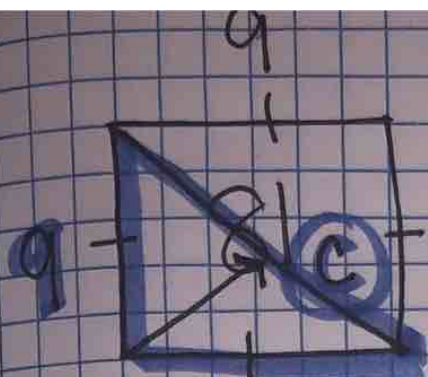
A 20-foot ladder leaning against a wall is used to reach a window that is 17 feet above the ground. How far from the wall is the bottom of the ladder? Round to the nearest tenth.

$$x^2 + 17^2 = 20^2$$

$$\sqrt{x^2} = 11.1$$

$$\begin{array}{r} x^2 + 289 = 400 \\ -289 \qquad -289 \\ \hline \end{array}$$





to find the sides  
you need to find  
the square root  
of the area

# 14

The area of a square is 81 square centimeters. Find the length of the diagonal.

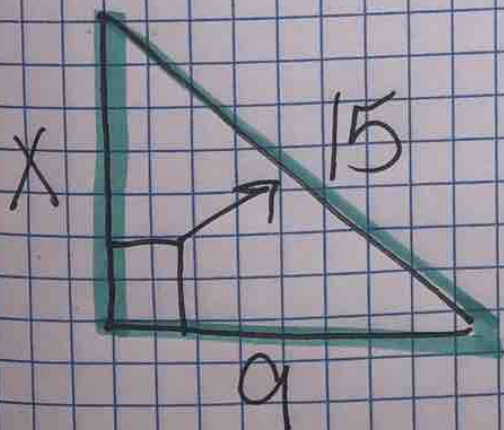
Round to the nearest tenth.

$$9^2 + 9^2 = c^2 \quad \sqrt{162} = \sqrt{c^2}$$

$$81 + 81 = c^2 \quad \boxed{c = 12.7}$$

# 16

What is the perimeter of a right triangle if the hypotenuse is 15 centimeters and one of the legs is 9 centimeters?



$$x^2 + 9^2 = 15^2$$

$$x^2 + 81 = 225$$

$$x^2 = 144$$

$$\boxed{x = 12}$$

perimeter add all sides

$$12 + 15 + 9$$

$$\boxed{36}$$