

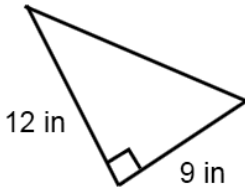
11.2-11.4 Study Guide

Simplifying Radicals and Pythagorean Theorem

11.4 Pythagorean Theorem

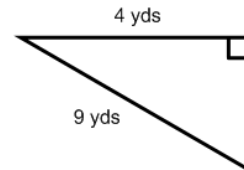
Find the missing side of a triangle:

Ex:



$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 12^2 + 9^2 &= c^2 \\
 144 + 81 &= c^2 \\
 225 &= c^2 \\
 15 &= c
 \end{aligned}$$

Ex:



$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 4^2 + b^2 &= 9^2 \\
 16 + b^2 &= 81 \\
 \underline{-16} \quad \underline{-16} & \\
 b^2 &= 65 \\
 b &= 8.06
 \end{aligned}$$

Decide if three sides could form a **right** triangle.

Ex: 13, 12, 5

$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 5^2 + 12^2 &= 13^2 \quad \text{*Don't forget the longest side has to be c!*} \\
 25 + 144 &= 169 \\
 169 &= 169
 \end{aligned}$$

Yes, this could be a right triangle because the Pythagorean Theorem works.

11.2 Simplifying Radicals

-Simplify radicals using the product property:

Ex: $\sqrt{68}$

$$\begin{aligned}
 \sqrt{4}\sqrt{17} \\
 2\sqrt{17}
 \end{aligned}$$

Ex: $2\sqrt{12} \cdot 4\sqrt{20}$

$$\begin{aligned}
 8\sqrt{240} \\
 8\sqrt{16}\sqrt{15} \\
 32\sqrt{15}
 \end{aligned}$$

Ex: $3\sqrt{32}$

$$\begin{aligned}
 3\sqrt{16}\sqrt{2} \\
 12\sqrt{2}
 \end{aligned}$$

Ex: $7\sqrt{5x^2yz^4} \cdot 2\sqrt{8}$

$$\begin{aligned}
 14\sqrt{40x^2yz^4} \\
 14\sqrt{4}\sqrt{10}\sqrt{x^2}\sqrt{y}\sqrt{z^4} \\
 28xz^2\sqrt{10y}
 \end{aligned}$$

-Simplify radicals using the quotient property:

$$\text{Ex: } \sqrt{\frac{8}{25}}$$

$$\frac{\sqrt{8}}{\sqrt{25}} = \frac{\sqrt{4}\sqrt{2}}{5} = \frac{2\sqrt{2}}{5}$$

$$\text{Ex: } \sqrt{\frac{100}{121}}$$

$$\frac{10}{11}$$

Rationalize the denominator:

$$\text{Ex: } \sqrt{\frac{24}{7}}$$

$$\frac{\sqrt{24}}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{\sqrt{168}}{7} = \frac{\sqrt{4}\sqrt{42}}{7} = \frac{2\sqrt{42}}{7}$$

Perform operations with radicals:

$$\text{Ex: } 2\sqrt{7} + 3\sqrt{63}$$

$$\begin{aligned} &2\sqrt{7} + 3\sqrt{9}\sqrt{7} \\ &2\sqrt{7} + 9\sqrt{7} \\ &11\sqrt{7} \end{aligned}$$

$$\text{Ex: } \sqrt{3}(2 + \sqrt{12})$$

$$\begin{aligned} &2\sqrt{3} + \sqrt{36} \\ &2\sqrt{3} + 6 \end{aligned}$$

Ex: *ACC ONLY*

FOIL

$$\begin{aligned} &(\sqrt{7} + \sqrt{2})(\sqrt{7} - 3\sqrt{2}) \\ &\sqrt{49} - 3\sqrt{14} + 1\sqrt{14} - 3\sqrt{4} \\ &7 - 2\sqrt{14} - 6 \\ &1 - 2\sqrt{14} \end{aligned}$$