

Module 4c: Finding Side Lengths of Right Triangles

Math Practice(s):

-Make sense of problems & persevere in solving them.

Learning Target(s):

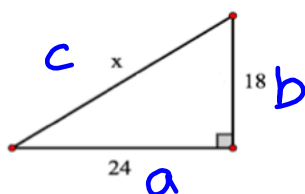
-Apply the Pythagorean Thm to determine the lengths of missing sides of a right triangle (in geometric figures & in context).

Homework:

HW#3: 4c #1-7

Now let's find the missing side length of right triangles.

Example 1



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

$$24^2 + 18^2 = x^2$$

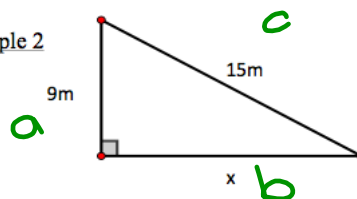
$$576 + 324 = x^2$$

$$\sqrt{900} = \sqrt{x^2}$$

$$x = \pm 30$$

$$x = 30 \text{ units}$$

Example 2



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

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

$$81 + x^2 = 225$$

$$-81 \quad -81$$

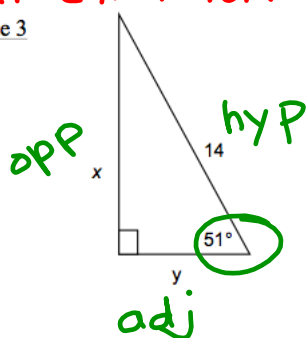
$$\sqrt{x^2} = \sqrt{144}$$

$$x = \pm 12$$

$$x = 12 \text{ m}$$

SOH-CAH-TOA

Example 3



$$(\sin 51^\circ) = \left(\frac{x}{14}\right)$$

$$.774 \quad .774$$

$$x \approx 10.880 \text{ units}$$

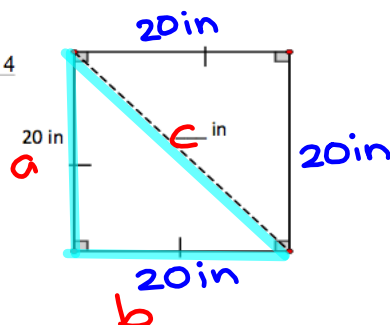
$$(\cos 51^\circ) = \left(\frac{y}{14}\right)$$

$$.634 \quad .634$$

$$y \approx 8.810 \text{ units}$$

$$\begin{array}{r} 800 \\ 8 \overline{) 800} \\ 8 \\ \hline 0 \\ 0 \\ \hline 0 \end{array}$$

Example 4



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

$$20^2 + 20^2 = c^2$$

$$400 + 400 = c^2$$

$$\sqrt{800} = \sqrt{c^2}$$

$$\sqrt{400 \cdot 2}$$

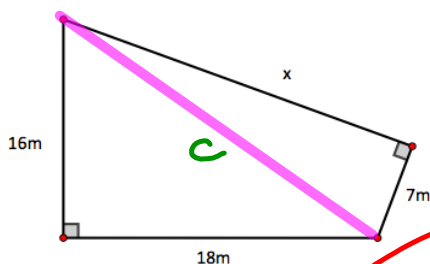
$$\sqrt{400} \cdot \sqrt{2}$$

$$c = \pm 20\sqrt{2}$$

$$20\sqrt{2} \text{ in}$$

$$\approx 28.284 \text{ in}$$

Example 5



$$16^2 + 18^2 = c^2$$

$$256 + 324 = c^2$$

$$580 = c^2$$

$$\begin{array}{r} 531 \\ 3 \overline{) 177} \\ \underline{3} 59 \end{array}$$

$$7^2 + x^2 = c^2$$

$$49 + x^2 = 580$$

$$\begin{array}{r} -49 \\ \hline x^2 = 531 \end{array}$$

$$\sqrt{9 \cdot 59}$$

$$x = \pm 3\sqrt{59}$$

$$x = 3\sqrt{59} \text{ m}$$

$$x \approx 23.043 \text{ m}$$

Example 6

Determine if the side lengths form a right triangle.

a) $a = 8$ in, $b = \sqrt{17}$ in, $c = 9$ in

$$\sqrt{64} \quad \sqrt{81}$$

$$8^2 + \sqrt{17}^2 = 9^2$$

$$64 + 17 = 81$$

$$81 = 81$$

right \triangle

b) $a = \sqrt{115}$ yd, $b = 8$ yd, $c = 14$ yd

$$\sqrt{115}^2 + 8^2 = 14^2$$

$$115 + 64 = 196$$

$$179 = 196$$

\neq

not a right \triangle

c) $a = 9$ cm, $b = 5\sqrt{7}$ cm, $c = 16$ cm

$$\sqrt{175} \quad \sqrt{256}$$

$$9^2 + \sqrt{175}^2 = 16^2$$

$$81 + 175 = 256$$

$$256 = 256$$

right \triangle