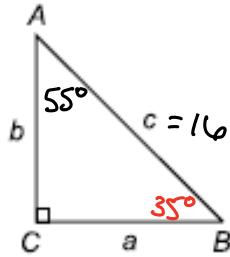## Hw 9.1 Homework

Solve each of the following right triangles by finding all missing sides and angles. Show your work. Use a trigonometric ratio to find each missing piece of information.

1. $A = 55°$ and $c = 16$

$m\angle B = 90° - 55° = 35°$

$\sin(55°) = \dfrac{a}{16}$

$16 \sin(55°) = a$
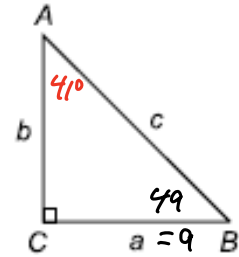
$13.106 \approx a$

$\sin(35°) = \dfrac{b}{16}$

$16 \cdot \sin(35°) = b$

$9.177 \approx b$

2. $a = 9$ and $B = 49°$

$m\angle A = 90° - 49° = 41°$
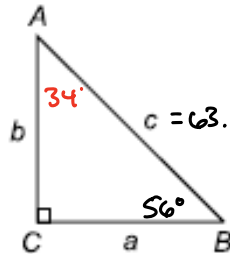
$\tan(49°) = \dfrac{b}{9}$

$9 \cdot \tan(49°) = b$

$10.353 \approx b$

$\cos(49°) = \dfrac{9}{c}$

$c \cdot \cos(49°) = 9$

$c = \dfrac{9}{\cos(49°)}$

$c \approx 13.718$

3. $B = 56°$ and $c = 63.1$

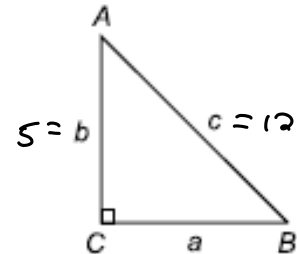$m\angle A = 90° - 56° = 34°$

$\cos(34°) = \dfrac{b}{63.1}$

$63.1 \cos(34°) = b$

$52.312 \approx b$

$\cos(56°) = \dfrac{a}{63.1}$

$63.1 \cdot \cos(56°) = a$

$35.285 \approx a$

4. $c = 12$ and $b = 5$

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

$a^2 + (5)^2 = (12)^2$

$a^2 + 25 = 144$

$a^2 = 119$

$a = \pm\sqrt{119}$

$a \approx 10.909$

$\cos(A) = \dfrac{5}{12}$

$A = \cos^{-1}\left(\dfrac{5}{12}\right)$

$A \approx 65.376°$

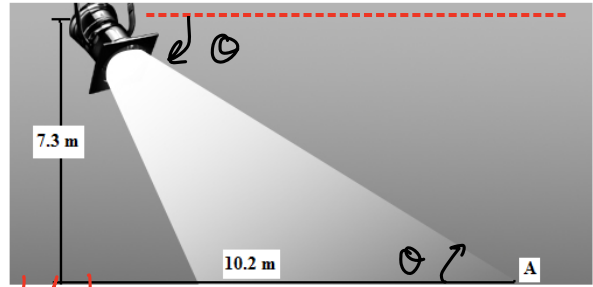$\sin(B) = \dfrac{5}{12}$

$B = \sin^{-1}\left(\dfrac{5}{12}\right)$

$B \approx 24.624°$

5. A spotlight is mounted 7.3 meters high on a pole to illuminate the center of a parking area at point *A*. If *A* is 10.2 meters from the base of the pole, at what angle of depression, θ, should the spotlight be aimed?

$$\tan(\theta) = \frac{7.3}{10.2}$$

$$\theta = \tan^{-1}\left(\frac{7.3}{10.2}\right)$$

$$\theta \approx 35.591°$$

The spotlight's angle of depression should be 35.591°

6. A 30 foot ladder leaning against the side of a house makes a 70° angle with the ground.

a. How far up the side of the house does the ladder reach?

$$\sin(70°) = \frac{y}{30}$$
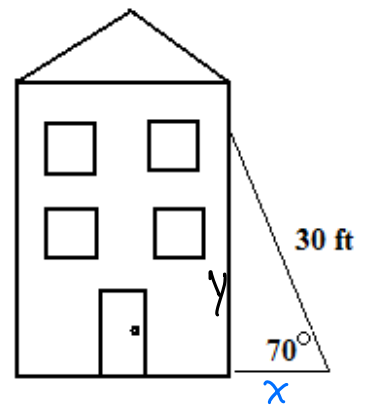
$$30 \cdot \sin(70°) = y$$

$$28.191 \approx y$$

The ladder should reach 28.191 feet high

b. What is the horizontal distance between the bottom of the ladder and the house?

$$\cos(70°) = \frac{x}{30}$$

$$30 \cdot \cos(70°) = x$$

$$10.261 \approx x$$

The horizontal distance between bottom of ladder and house is 10.261 feet.

Find the value of *x* in each of the following equations. Show your work.

7. $\sec x = \frac{15}{11}$

$$\cos x = \frac{11}{15}$$

$$x = \cos^{-1}\left(\frac{11}{15}\right)$$

$$x \approx 42.833°$$

8. $\cot x = \frac{2}{5}$

$$\tan x = \frac{5}{2}$$

$$x = \tan^{-1}\left(\frac{5}{2}\right)$$

$$x \approx 68.199°$$

9. $\csc x = \frac{4}{\sqrt{5}}$

$$\sin x = \frac{\sqrt{5}}{4}$$

$$x = \sin^{-1}\left(\frac{\sqrt{5}}{4}\right)$$

$$x \approx 33.988°$$