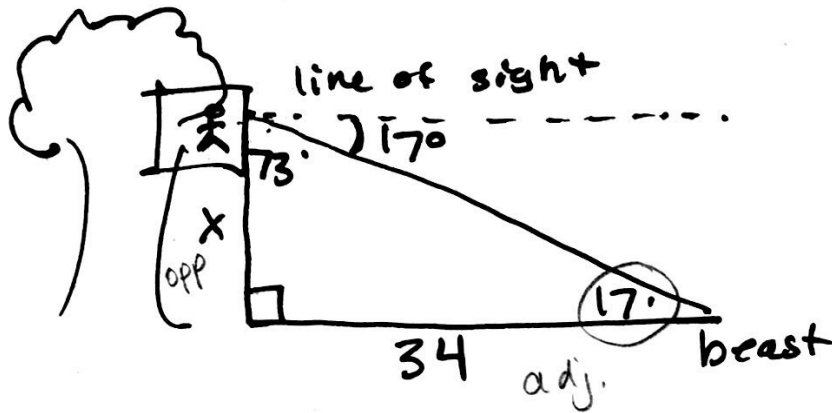


Example 1

SOH CAH TOA

The Sandlot boys are sitting in the treehouse looking at The Beast. The angle of depression from their line of sight to The Beast is 17° . If The Beast is standing 34 feet away from the base of the treehouse, how tall is the treehouse? Round to the nearest tenth.

$90 - 17 = 73$



$$\frac{\tan 17^\circ}{1} = \frac{x}{34}$$

$$x = 34 \tan 17$$

$$x = 10.39$$

$$x = 10.4 \text{ ft}$$

Example 2

A ladder is leaning against a house. The ladder is 8 feet tall. The distance from the bottom of the ladder to the bottom of the house is 6 feet. How far up the house does the ladder go? Round to the nearest tenth of a foot.

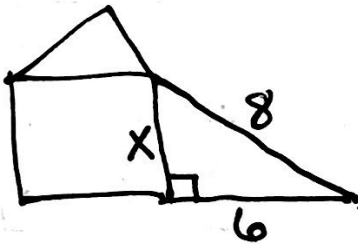
Pythag. Thm.

$$x^2 + 6^2 = 8^2$$

$$x^2 = 8^2 - 6^2$$

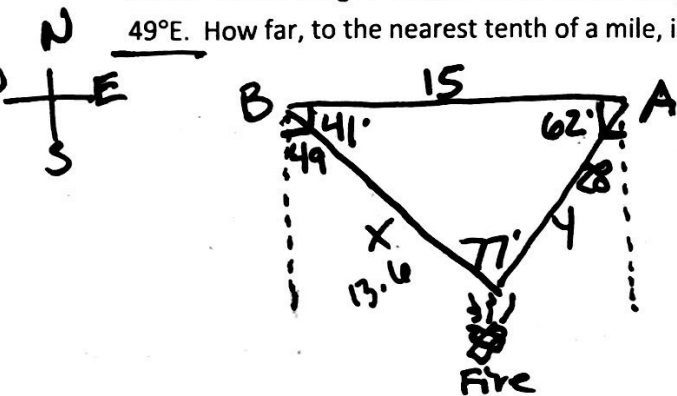
$$\sqrt{x^2} = \sqrt{28} \approx 5.3 \text{ ft}$$

$$x = 5.3 \text{ ft}$$



Example 3

Two fire-lookout stations are 15 miles apart, with station B directly west of station A. Both stations spot a fire. The bearing of the fire from station A is S 28° W and the bearing of the fire from station B is S 49° E. How far, to the nearest tenth of a mile, is the fire from each lookout station? **Sines ASA**



$$\frac{x}{\sin 62} = \frac{15}{\sin 77}$$

$$\frac{x \sin 77}{\sin 77} = \frac{15 \sin 62}{\sin 77}$$

$$x = 13.6 \text{ miles}$$

$$\frac{y}{\sin 41} = \frac{15}{\sin 77}$$

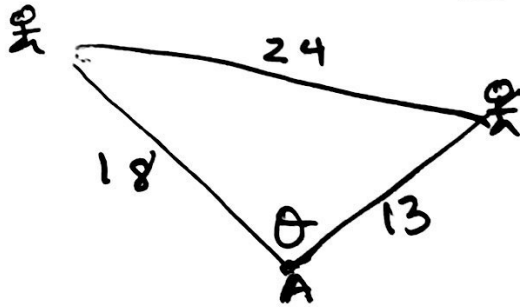
$$\frac{y \sin 77}{\sin 77} = \frac{15 \sin 41}{\sin 77}$$

$$y = 10.1 \text{ miles}$$

Example 4

One side of a ravine is 18 feet long. The other side is 13 feet long. A 24 foot zipline runs from the top of one side of the ravine to the other. To the nearest tenth, at what angle do the sides of the ravine meet?

SSS
COSINES



$$24^2 = 18^2 + 13^2 - 2(18)(13)\cos\theta$$

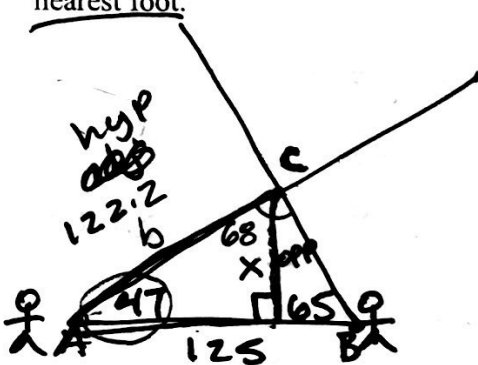
$$\frac{24^2 - 18^2 - 13^2}{-2(18)(13)} = \frac{-2(18)(13)\cos\theta}{-2(18)(13)}$$

$$\frac{83}{-468} = \cos\theta$$

$$\theta = \cos^{-1}\left(\frac{83}{-468}\right) = 100.2^\circ$$

Example 5

Two tourists are 125 feet apart on opposite sides of a monument. The angles of elevation from the tourists to the top of the monument are 47° and 65° . Find the height of the monument to the nearest foot.



$$\frac{125}{\sin 68} \neq \frac{b}{\sin 65}$$

$$\frac{125 \sin 65}{\sin 68} = \frac{b \sin 68}{\sin 68}$$

$$122.2 \text{ ft} = b$$

SOH CAH TOA

$$\frac{\sin 47}{1} = \frac{x}{122.2}$$

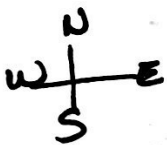
$$x = 122.2 \sin 47$$

$$x = 89 \text{ ft}$$

nearest foot

Example 6

Observatory B is 20 miles east of observatory A in the middle of the desert. A car leaves A and drives 16 miles towards a meteor sighting. At this time, it is sighted from B. If the car is $N51^\circ W$ from observatory B, how far from observatory B is the car? Round your answer to the nearest tenth of a mile.



Sines

$$\frac{20}{\sin C} \neq \frac{16}{\sin 39}$$

$$\frac{16 \sin C}{16} = \frac{20 \sin 39}{16}$$

Finding angle

$$\sin C = \frac{20 \sin 39}{16}$$

$$C = \sin^{-1}\left(\frac{20 \sin 39}{16}\right)$$

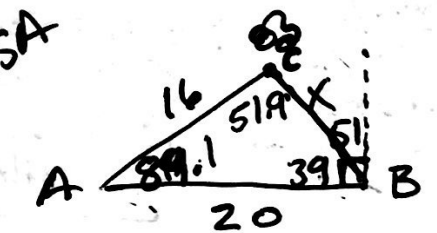
$$C = 51.9^\circ$$

$$\frac{x}{\sin 89.1} \neq \frac{16}{\sin 39}$$

$$\frac{x \sin 39}{\sin 39} = \frac{16 \sin 89.1}{\sin 39}$$

$$x = 25.4 \text{ miles}$$

SSA



$$m\angle A = 180 - 51.9 - 39 = 89.1$$