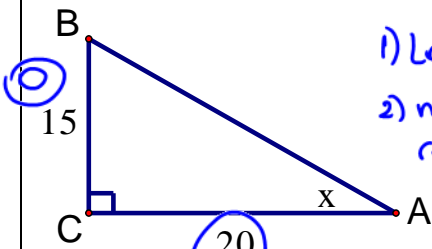


CASE 1: UNKNOWN ANGLE

Determine the value of angle x to the nearest angle.
SOH CAH TOA



- 1) Label given info
- 2) match the right ratio

$$\tan \theta = \frac{O}{A}$$

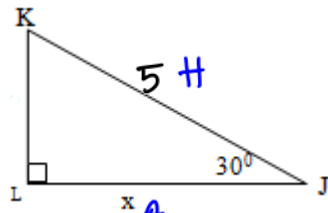
$$\tan x = \frac{15}{20}$$

$$\tan^{-1}\left(\frac{15}{20}\right) = x$$

$$x \doteq 37^\circ$$

CASE 2: UNKNOWN SIDE

In $\triangle JKL$ find the length of x to one decimal place the
SOH CAH TOA



- 1) Label given info
- CAH

$$\cos \theta = \frac{A}{H}$$

$$\cos 30 = \frac{x}{5}$$

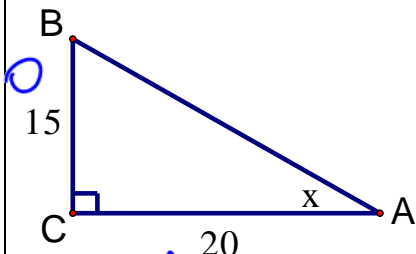
cross multiply

$$5 \cdot \cos 30 = x$$

$$x \doteq 4.3$$

PRACTICE CASE 1: Finding an Angle Using Trig Ratios

Ex1: Determine the value of angle x to the nearest angle.

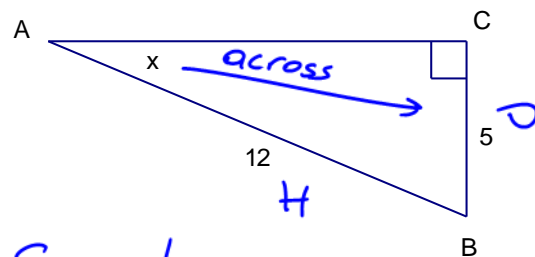


$$\tan x = \frac{15}{20}$$

$$\tan^{-1}\left(\frac{15}{20}\right) = x$$

$$x \doteq 37^\circ$$

Ex2: Determine the value of angle x to the nearest angle.



$$\sin \theta = \frac{O}{H}$$

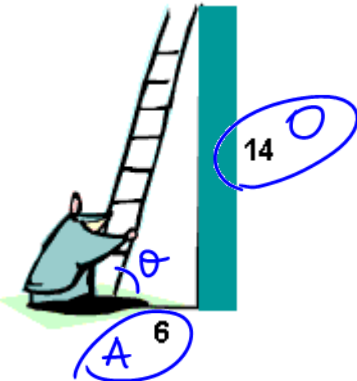
$$\sin x = \frac{5}{12}$$

$$\sin^{-1}\left(\frac{5}{12}\right) = x$$

$$x \doteq 25^\circ$$

Example 3:

A ladder leans against a building. The foot of the ladder is 6 feet from the building. The ladder reaches height of 14 feet on the building. Determine to the nearest degree, the angle the ladder makes with the ground.



$$\tan \theta = \frac{O}{A}$$

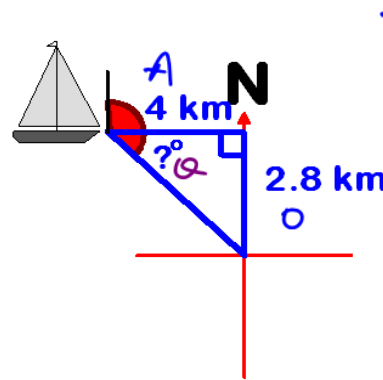
$$\tan \theta = \frac{14}{6}$$

$$\tan^{-1}\left(\frac{14}{6}\right) = \theta$$

$$\theta = 67^\circ$$

Example 4:

A boat sails from port North for 2.8 km, then west for 4 km. What is the bearing back to port now? **Bearing:** Clockwise angle from NORTH.



TOA

$$\tan \theta = \frac{2.8}{4}$$

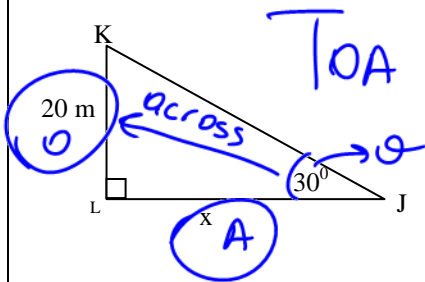
$$\tan^{-1}\left(\frac{2.8}{4}\right) = \theta$$

$$\theta = 35^\circ$$

Bearing is $90 + 35 = 125^\circ$

PRACTICE CASE 2: Finding a Side Length

Ex1 In ΔJKL find the length of x to one decimal place.



TOA

$$\tan \theta = \frac{O}{A}$$

$$\tan 30 = \frac{20}{x}$$

plug tan 30 into calc 4 d.p.

$$0.5774 = \frac{20}{x}$$

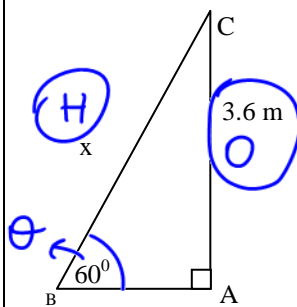
cross mult.

$$0.5774x = 20$$

$$\frac{0.5774x}{0.5774} = \frac{20}{0.5774}$$

$x = 34.6$

Ex2 In ΔABC find the length of x to one decimal place.



SOH

$$\sin \theta = \frac{O}{H}$$

$$\sin 60 = \frac{3.6}{x}$$

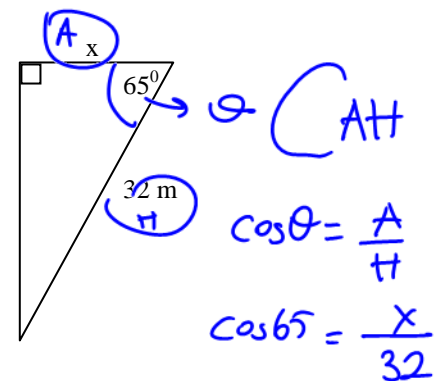
$$0.8660 = \frac{3.6}{x}$$

$$0.8660x = 3.6$$

$$\frac{0.8660x}{0.8660} = \frac{3.6}{0.8660}$$

$x = 4.2$

Ex3 In ΔJKL find the length of x to one decimal place.



CAH

$$\cos \theta = \frac{A}{H}$$

$$\cos 65 = \frac{x}{32}$$

$$32 \cdot \cos 65 = x$$

$$x = 13.5$$