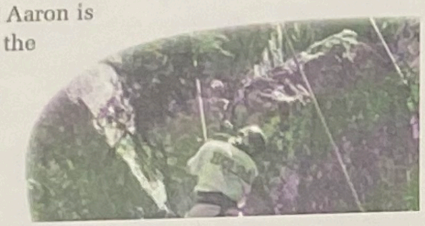
Example 1 Use Angle of Elevation to Calculate a Height

Sean wants to calculate the height of the First Nations Native Totem Pole. He positions his transit 19.0 m to the side of the totem pole and records an angle of elevation of 63° to the top of the totem pole. If the height of Sean's transit is 1.7 m, what is the height of the totem pole, to the nearest tenth of a metre?

Example 2 Calculate a Distance Using Angle of Depression

Natalie is rock climbing and Aaron is belaying. When Aaron pulls the rope taut to the ground, the angle of depression is 73°. If Aaron is standing 8 ft from the wall, what length of rope is off the ground?



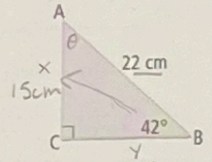
Example 3 Solve a Right Triangle

Solve the triangle shown. Express each measurement to the nearest whole unit.

x → Opp + Hyp → Sin 42

y → Adj + Hyp → Cos 42

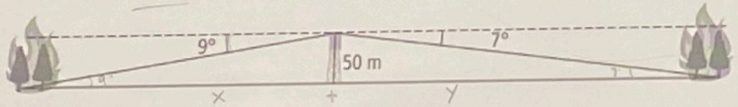
Solution



Example 4 Solve a Problem Using Trigonometry

From a height of 50 m in his fire tower near Francois Lake, BC, a ranger observes the beginnings of two fires. One fire is due west at an angle of depression of 9°. The other fire is due east at an angle of depression of 7°. What is the distance between the two fires, to the nearest metre?

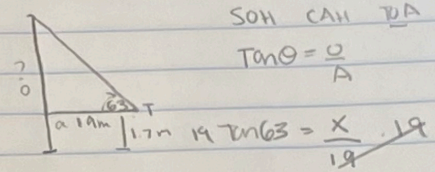
SOH CAH TOA



3.3 Solving Triangles

SOH CAH TOA

Ex. 1



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

$19 \tan 63 = \frac{x}{19} \cdot 19$

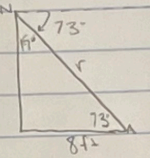
$37.28m = x$

$37.28 + 1.7m = \text{totem}$

$= 39.0m$

The totem pole is about 39 m tall.

Ex 2



SOH CAH TOA

$\theta = 17$ $\sin 17 = \frac{O}{H}$

$r \cdot \frac{\sin 17}{\sin 17} = \frac{8}{\sin 17} \cdot \sin 17$

$r = 8/\sin 17$

$= 27.36$ ft

$\theta = 73$ $\cos 73 = A/H$

$r \cdot \frac{\cos 73}{\cos 73} = \frac{8}{r} \cdot \frac{r}{\cos 73}$

$r = \frac{8}{\cos 73}$

$= 27.36$ ft

Ex 3 $\theta = 180 - 90 - 42$

$= 48°$

$x \cdot 22 \Rightarrow \sin 42 = \frac{x}{22} \cdot 22$

$x = 15$ cm

$y \cdot 22 \Rightarrow \cos 42 = \frac{y}{22} \cdot 22$

$y = 16$ cm

Ex 4 X $\tan\theta = \frac{O}{A}$

$\tan 9 = \frac{50}{x}$

$x = \frac{50}{\tan 9}$

$x = 315.7$ m

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

$\tan 7 = \frac{50}{A}$

$A = 50/\tan 7$

$A = 407.2$

+

Total distance of 723.0m.