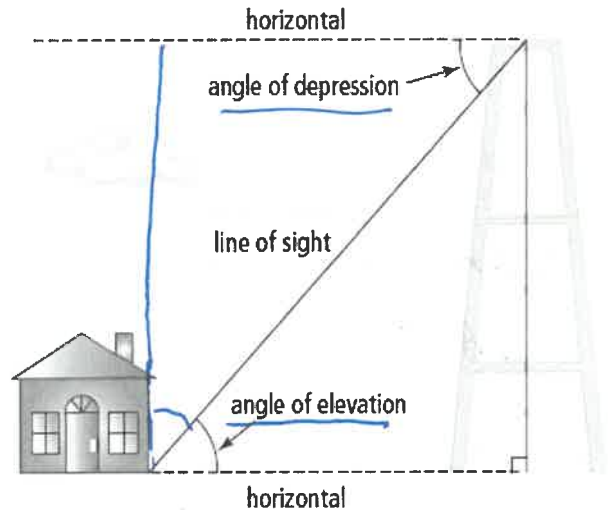


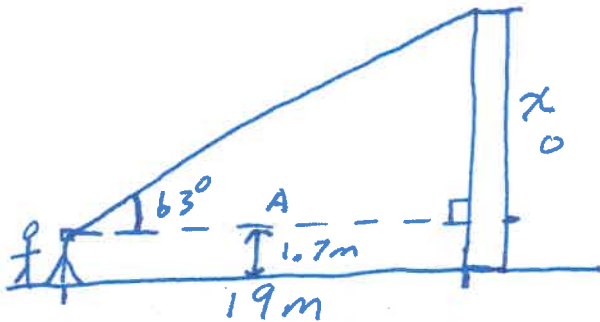
1.3 Problems & Solving Triangles

Angle of Elevation: the angle between the line of sight and the horizontal when an observer looks upward

Angle of Depression: the angle between the line of sight and the horizontal when an observer looks downward



Ex. Sean wants to calculate the height of the First Nations Native Totem Pole. He positions his transit (to measure the angle of sight) 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?



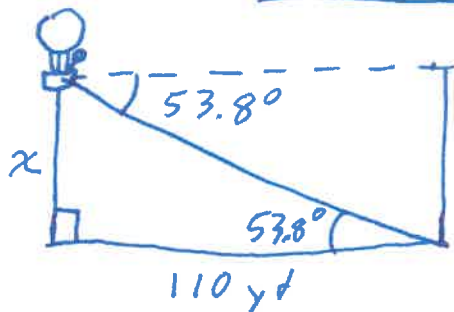
$$\tan(63^\circ) = \frac{x}{19\text{m}}$$

$$x = 19 \cdot \tan 63$$

$$x = 37.29\text{ m}$$

$$\begin{array}{r} 37.29\text{ m} \\ + 1.7\text{ m} \\ \hline 38.99 = 39.0\text{ m} \end{array}$$

Ex. A balloonist decides to use an empty football field for his landing area. When the balloon is directly over the goal post, he measures the angle of depression to the base of the other goal post to be 53.8° . Given that the distance between goal posts in a Canadian football field is 110 yd, determine the height of the balloon.



$$\tan(53.8^\circ) = \frac{x}{110\text{ yd}}$$

$$x = 110\text{ yd} \times \tan(53.8)$$

$$x = 150.3\text{ yd}$$

Solve a Triangle: Find all missing sides & angles.

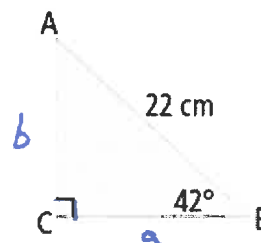
*use: SOHCAHTOA

Pythagoras

$\angle$ sum of $\Delta = 180^\circ$

*use given info as much as possible!!!

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



$$\angle A = 180^\circ - 90^\circ - 42^\circ$$

$$\angle A = 48^\circ$$

Find a:

$$\cos 42^\circ = \frac{a}{22m}$$

$$a = 22 \times \cos(42^\circ)$$

$$a = 16 \text{ cm}$$

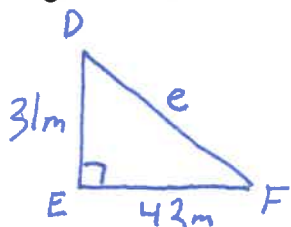
Find b:

$$\sin(42^\circ) = \frac{b}{22 \text{ cm}}$$

$$b = 22 \times \sin 42$$

$$b = 15 \text{ cm}$$

Ex. Solve $\triangle DEF$ if $\angle E = 90^\circ$, $d = 42 \text{ m}$, and $f = 31 \text{ m}$. Express sides to the nearest tenth & angles to the nearest degree.



$$\frac{e}{a^2 + b^2 = c^2}$$

$$31^2 + 42^2 = e^2$$

$$e = 52.2 \text{ m}$$

$$\frac{\angle D}{\tan D} = \frac{42 \text{ m}}{31 \text{ m}}$$

$$D = \tan^{-1}\left(\frac{42}{31}\right)$$

$$\angle D = 54^\circ$$

$\angle F$

$$F = 180 - 90 - 54$$

$$\angle F = 36^\circ$$