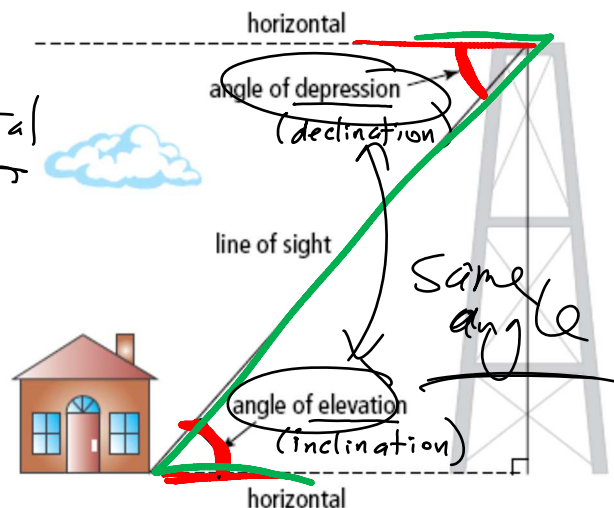


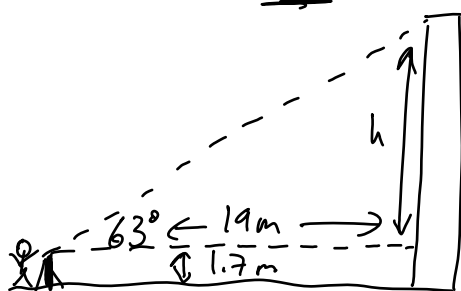
2.3 Problems & Solving Triangles

Angle of Elevation: angle between the line of sight and a horizontal looking upward

Angle of Depression: angle between the line of sight and a horizontal looking downward

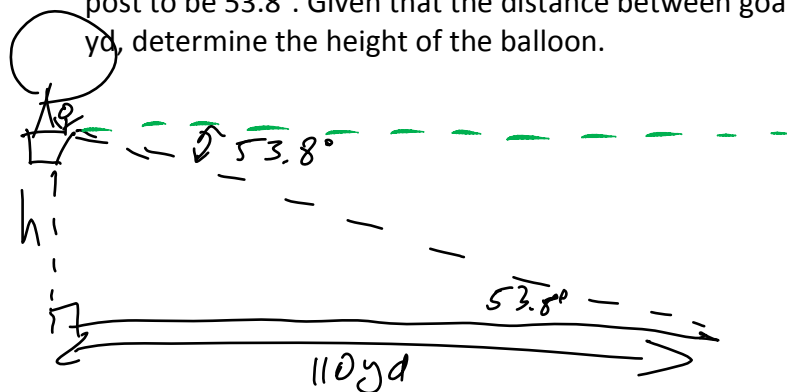


Ex. Sean wants to calculate the height of the First Nations Native Totem Pole. He positions his transit 19.0 m to the side of the totem pole and records an angle of elevation of 63° to the top of the totem pole. If the height of Sean's transit is 1.7 m, what is the height of the totem pole, to the nearest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



$$\begin{aligned}\tan 63^\circ &= \frac{h}{19} \\ h &= 19 \tan 63 \\ &= 37.29 \text{ m} \\ &\quad + 1.7 \text{ m} \\ &= 38.99 \text{ m} = \boxed{39.0 \text{ m}}\end{aligned}$$

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.



$$\begin{aligned}\tan 53.8^\circ &= \frac{h}{110} \\ h &= 110 \tan 53.8 \\ &= \boxed{150.3 \text{ yd}}\end{aligned}$$

Solve a Triangle: Find all missing sides & angles.

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

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

$$\boxed{\angle A = 48^\circ}$$

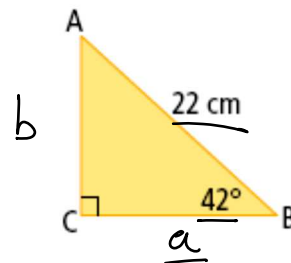
Find a:

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

$$a = 22 \cos 42^\circ$$

$$a = 16.3491$$

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



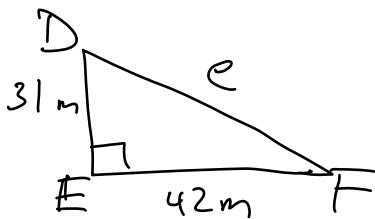
Find b:

$$\sin 42^\circ = \frac{b}{22}$$

$$b = 22 \sin 42^\circ$$

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

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.



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

$$e = \sqrt{\quad}$$

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

$$\tan D = \frac{42}{31}$$

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

$$= 53.6^\circ$$

$$\boxed{\angle D = 54^\circ}$$

$$F = 180 - 90 - 54$$

$$\boxed{\angle F = 36^\circ}$$