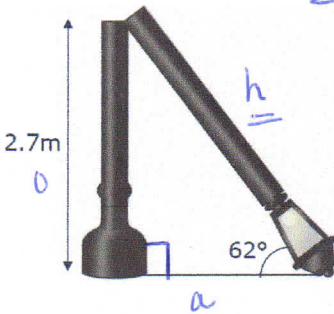


# Trigonometry: Applying Trigonometry

Date: Notes.

## Example 1:

While on icy roads, a truck slid into the ditch and hit a light post, breaking it 2.7m up the base. The top portion of the light post was now touching the ground. The angle to which the top of the post made with the ground is  $62^\circ$ . How tall was the light post before it was broken? Round to 1 decimal place.



SOH

$$\sin 62^\circ = \frac{\text{opp}}{\text{hyp}}$$

$$\sin 62^\circ = \frac{2.7}{h}$$

$$\frac{h \sin 62^\circ}{\sin 62^\circ} = \frac{2.7}{\sin 62^\circ}$$

$$h = \frac{2.7}{0.8829}$$

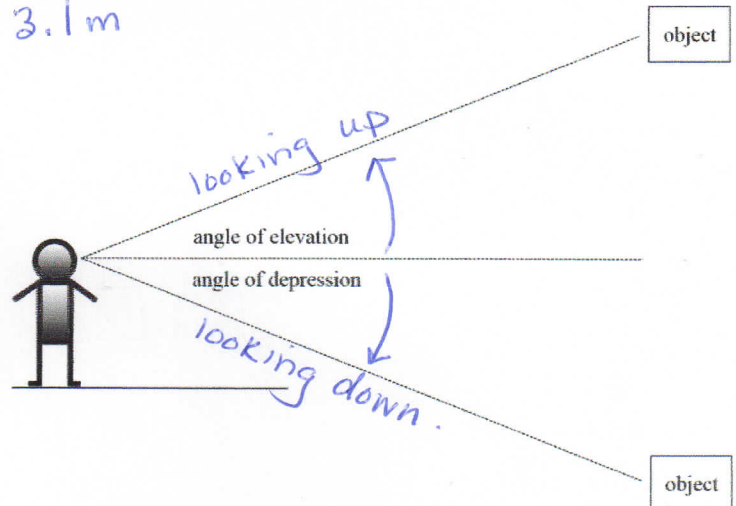
$$h = 3.1 \text{ m}$$

$$\text{Height} = 3.1 + 2.7 = 5.8 \text{ m}$$

$\therefore$  total height of post is 5.8m.

## Angle of Elevation:

Angle that your line of sight makes from the horizontal line when looking up.

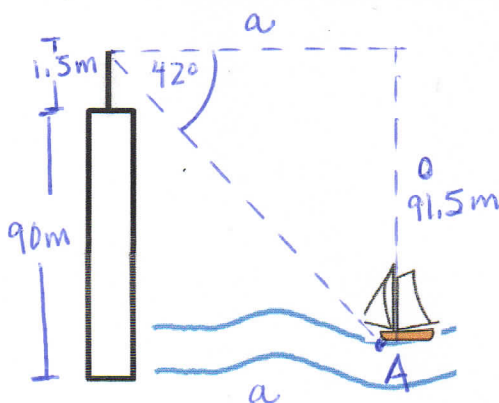


## Angle of Depression:

Angle that your line of sight makes from the horizontal line when looking down.

## Example 2:

The highest point along the cliffs in Toronto is 90m above the shore. From the top of the cliffs, a surveyor using a 1.5m tall transit instrument spots a boat in the lake at an angle of depression of  $42^\circ$ . How far is the boat from shore? Round to 1 decimal place.



TOA

$$\tan 42^\circ = \frac{\text{opp}}{\text{adj}}$$

$$\tan 42^\circ = \frac{91.5}{a}$$

$$\frac{a \tan 42^\circ}{\tan 42^\circ} = \frac{91.5}{\tan 42^\circ}$$

$$a = \frac{91.5}{0.9004}$$

$$a = 101.6 \text{ m}$$

$\therefore$  boat is 101.6m from shore.

# Trigonometry: Applying Trigonometry

Date: Notes -

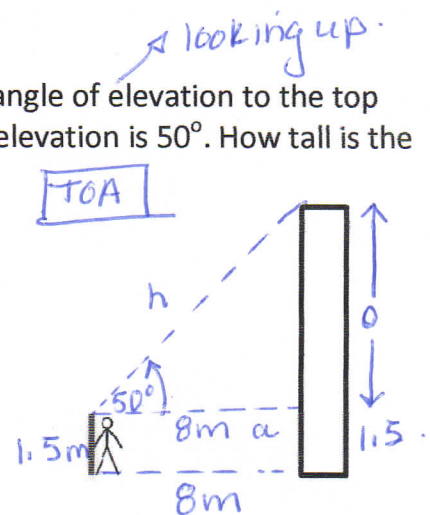
## Example 3:

From a point 8m from the base of a building, Ross measures the angle of elevation to the top of the building using a 1.5m tall transit instrument. The angle of elevation is  $50^\circ$ . How tall is the building? Round to 1 decimal place.

$$\begin{aligned} \tan 50^\circ &= \frac{\text{opp}}{\text{adj}} \\ \tan 50^\circ &= \frac{o}{8} \\ 8 \tan 50^\circ &= o \\ 9.5 &= o \end{aligned}$$

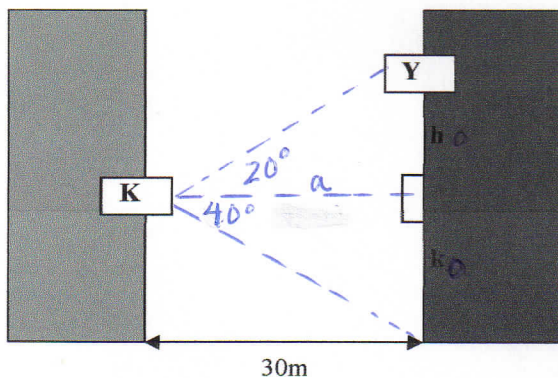
$$\begin{aligned} \text{Total Height} &= 9.5 + 1.5 \\ &= 11.0 \text{ m} \end{aligned}$$

$\therefore$  total height of building is 11.0 m.



## Example 4:

Kim and Yuri live in apartment buildings that are 30m apart. The angle of depression from Kim's balcony to where Yuri's building meets the ground is  $40^\circ$ . The angle of elevation from Kim's balcony is  $20^\circ$ . How high is Kim's balcony above the ground, to the nearest metre? How high is Yuri's balcony above the ground, to the nearest metre?



Kim TOA

$$\begin{aligned} \tan 40^\circ &= \frac{\text{opp}}{\text{adj}} \\ \tan 40^\circ &= \frac{o}{30} \\ 30 \tan 40^\circ &= o \\ 25.17 &= o \\ 25 &= o \end{aligned}$$

$\therefore$  Kim's balcony is 25m from the ground.

Yuri TOA

$$\begin{aligned} \tan 20^\circ &= \frac{\text{opp}}{\text{adj}} \\ \tan 20^\circ &= \frac{o}{30} \\ 30 \tan 20^\circ &= o \\ 10.9 &= o \\ 11 &= o \end{aligned}$$

Height =  $11 + 25 = 36 \text{ m}$

$\therefore$  Yuri's balcony is 36m from the ground.