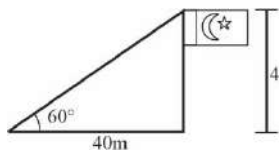


Hence, man is 30 m far from the tower.

EXERCISE 6.6

The angle of elevation of the top of a flag post from a point on the ground level 40 m away from the flag post is 60° . Find the height of the post.

Ans:



$$\tan \theta = \frac{\text{Prep}}{\text{base}}$$

$$\tan 60 = \frac{h}{40}$$

$$40 \tan 60 = h$$

$$h = 40\sqrt{3} \text{ m}$$

Or

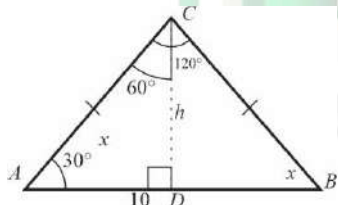
$$h = 69.28$$

Q.1

A

n isosceles triangle has a vertical angle of 120° and a base 10 cm long. Find the length of its altitude.

Ans:



In isosceles opposite angle are equal and by the rule

$$\angle A + \angle B + \angle C = 180^\circ$$

$$x + x + 120 = 180$$

$$2x = 180 - 120$$

$$2x = 60$$

$$x = \frac{60}{2}$$

$$x = 30^\circ$$

$$\triangle ADC$$

$$\tan \theta = \frac{\text{Prep}}{\text{base}}$$

$$\tan 30 = \frac{h}{5}$$

$$5 \tan 30 = h$$

$$h = \frac{5\sqrt{3}}{3} \text{ m}$$

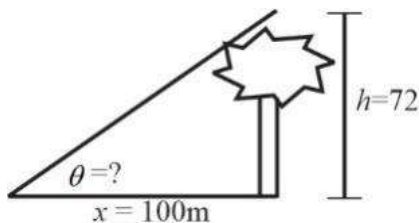
Or

$$h = 2.89$$

Q.2

A

tree is 72 m high. Find the angle of elevation of its top from a point 100 m away on the ground level.



Ans:

$$\tan \theta = \frac{\text{Prep}}{\text{base}}$$

$$\theta = \tan^{-1} \left(\frac{72}{100} \right)$$

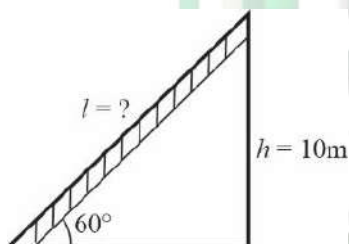
$$\theta = 35.75^\circ$$

Q.3

A

ladder makes an angle of 60° with the ground and reaches a height of 10m along the wall. Find the length of the ladder.

Ans:



$$\sin \theta = \frac{\text{Prep}}{\text{Hyp}}$$

$$\sin 60^\circ = \frac{10}{\ell}$$

$$\ell = \frac{10}{\sin 60^\circ}$$

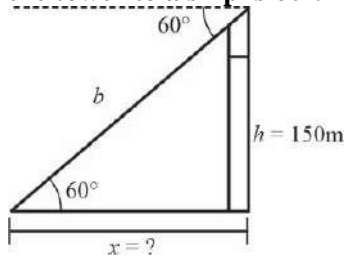
$$\ell = \frac{20\sqrt{3}}{3} \text{ m}$$

$$\ell = 11.55 \text{ m}$$

Q.4

A

light house tower is 150 m high from the sea level. The angle of depression from the top of the tower to a ship is 60° . Find the distance between the ship and the tower.



Ans:

$$\sin \theta = \frac{\text{Prep}}{\text{Hyp}}$$

$$\tan 60 = \frac{150}{x}$$

$$x = \frac{150}{\tan 60}$$

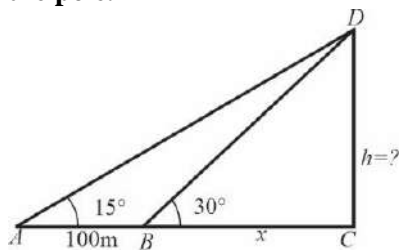
$$x = 56\sqrt{3} \text{ m}$$

$$x = 86.60$$

Q.5

M

measure of an angle of elevation of the top of a pole is 15° from a point on the ground, in Walking 100 m towards the pole the measure of angle is found to be 30° . Find the height of the pole.



Ans:

$$\tan \theta = \frac{\text{Prep}}{\text{base}}$$

$$\tan 15 = \frac{h}{100 + x}$$

$$\tan 15 [100 + x] = h$$

$$100 \tan 15 + x \tan 15 = h \text{ ---- (i)}$$

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

$$x \tan 30 = h \text{ ---- (ii)}$$

Comparing equation (i) and (ii)

$$100 \tan 15 + x \tan 15 = x \tan 30$$

$$100 \tan 15 = x \tan 30 - x \tan 15$$

$$26.79 = x [\tan 30 - \tan 15]$$

$$26.79 = x ()$$

$$26.79 = x(0.58 - 2.27)$$

$$26.79 = 0.31x$$

$$\frac{26.79}{0.31} = x$$

$$x = 86.41m$$

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

$$\tan 30 = \frac{h}{86.41}$$

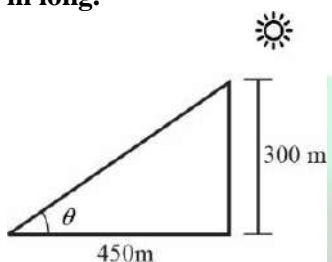
$$h = 86.41 \tan 30$$

$$h = 49.89m$$

Q.6

F

Find the measure of an angle of elevation of the sun, if a tower 300 m high casts a shadow 450 m long.



Ans:

$$\tan \theta = \frac{\text{Perp}}{\text{Base}}$$

$$\tan \theta = \frac{300}{450}$$

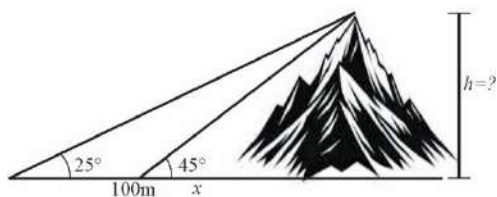
$$\theta = \tan^{-1} \left(\frac{300}{450} \right)$$

$$\theta = 33.69^\circ$$

Q.7

M

The measure of angle of elevation of the top of a cliff is 25° , on walking 100 metres towards the cliff, measure of angle of elevation of the top is 45° . Find the height of the cliff.



Ans:

$$\tan \theta = \frac{\text{Perp}}{\text{Base}}$$

$$\tan 25 = \frac{h}{100 + x}$$

$$\tan 25(100 + x) = h$$

$$100 \tan 25 + x \tan 25 = h \text{ ---(i)}$$

$$\tan 45 = \frac{h}{x}$$

$$x \tan 45 = h \text{ ---(ii)}$$

$$100 \tan 25 + x \tan 25 = x \tan 45$$

$$100 \tan 25 = x \tan 45 - x \tan 25$$

$$46.63 = x(\tan 45 - \tan 25)$$

$$46.63 = x(0.53)$$

$$\frac{46.63}{0.53} = x$$

$$x = 87.98m$$

$$\tan 45 = \frac{h}{x}$$

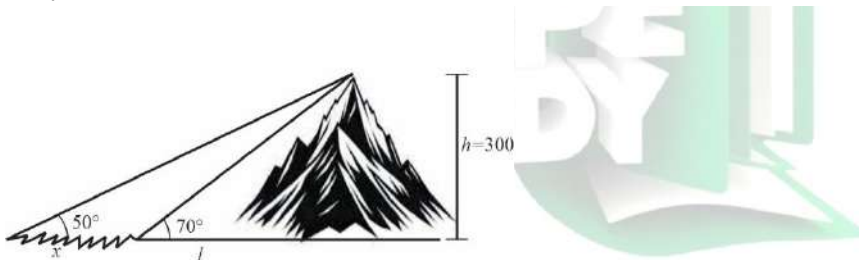
$$1 = \frac{h}{(87.98)}$$

$$h = 87.98m$$

Q.8

F

From the top of a hill 300 m high, the measure of the angle of depression of a point on the nearer shore of the river is 70° and measure of the angle of depression of a point, directly across the river is 50° . Find the width of the river How far is the river from the foot of the hill?



Ans:

$$\tan \theta = \frac{P}{b}$$

$$\tan 70 = \frac{300}{\ell}$$

$$\ell = \frac{300}{\tan 70}$$

$$\ell = 109.19m$$

$$\tan 50 = \frac{300}{x + \ell}$$

$$\tan 50(x + \ell) = 300$$

$$x \tan 50 + \ell \tan 50$$

$$x \tan 50 + (109.19) \tan 50$$

$$x \tan 50 + 130.13 = 300$$

$$x \tan 50 = 300 - 130.13$$

$$x \tan 50 = +169.87$$

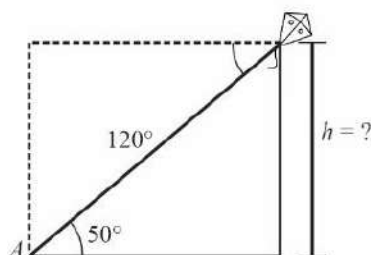
$$x = \frac{169.87}{\tan 50}$$

$$x = 142.53m$$

Q.9

A

kite has 120 m of string attached to it when at an angle of elevation of 50° . How far is it above the hand holding it? (Assume that the string is stretched)



Ans:

$$\sin \theta = \frac{\text{Opp}}{\text{Hyp}}$$

$$\sin 50 = \frac{h}{120}$$

$$120 \times \sin 50 = h$$

$$h = 91.93m$$

