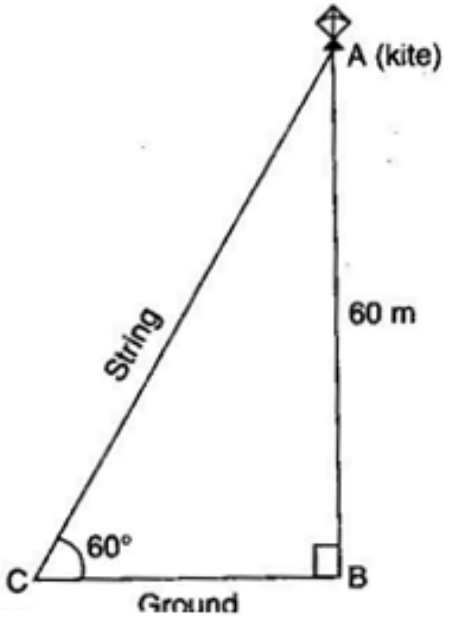
Exercise 9.1



$$\Rightarrow AB = \frac{30}{\sqrt{3}} \text{ m}$$

$$\Rightarrow \frac{30}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 10\sqrt{3} \text{ m}$$

Q5. A kite is flying at a height of 60 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60°. Find the length of the string, assuming that there is no slack in the string.

Ans: In right triangle ABC,

$$\sin 60^\circ = \frac{AB}{AC}$$

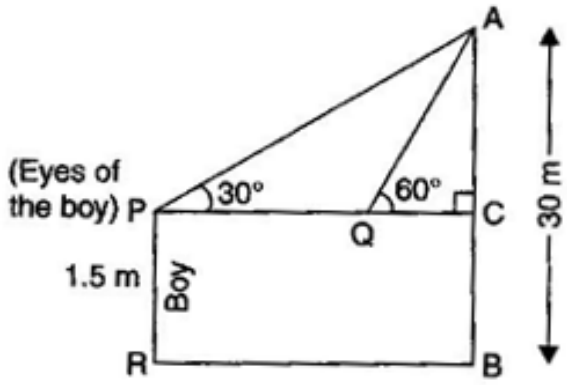
$$\Rightarrow \frac{\sqrt{3}}{2} = \frac{60}{AC}$$

$$\Rightarrow AC = 40\sqrt{3} \text{ m}$$

Hence the length of the string is $40\sqrt{3}$ m.

Q6. A 1.5 m tall boy is standing at some distance from a 30 m tall building. The angle of elevation from his eyes to the top of the building increases from 30° to 60° as he walks towards the building. Find the distance he walked towards the building.

Ans: AB = 30 m and PR = 1.5 m



AC = AB − BC

= AB − PR

= 30 − 1.5

= 28.5 m

In right triangle ACQ,

$$\tan 60^\circ = \frac{AC}{QC}$$

$$\Rightarrow \sqrt{3} = \frac{28.5}{QC} \Rightarrow QC = \frac{28.5}{\sqrt{3}} \text{ m}$$

In right triangle ACP,

$$\tan 30^\circ = \frac{AC}{PC} \Rightarrow \frac{1}{\sqrt{3}} = \frac{28.5}{PQ + QC}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{28.5}{PQ + \frac{28.5}{\sqrt{3}}}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{28.5 \times \sqrt{3}}{PQ\sqrt{3} + 28.5}$$

$$\Rightarrow PQ\sqrt{3} + 28.5 = 85.5$$

$\Rightarrow PQ\sqrt{3} = 57$

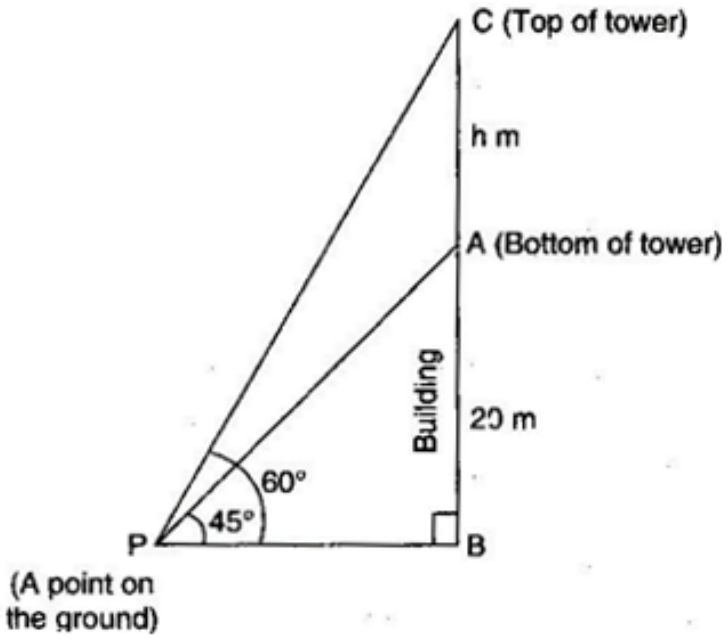
$\Rightarrow PQ = \frac{57}{\sqrt{3}}$

$\Rightarrow PQ = \frac{57}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 19\sqrt{3}$ m

Hence, the walked towards the building is $19\sqrt{3}$ m.

Q7. From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are 45and60° respectively. Find the height of the tower.

Ans: Let the height of the tower be hm. Then, in right triangle CBP,



$$\tan 60^\circ = \frac{BC}{BP}$$

$$\Rightarrow \sqrt{3} = \frac{AB + AC}{BP}$$

$$\Rightarrow \sqrt{3} = \frac{20 + h}{BP} \quad \text{.....(i)}$$

In right triangle ABP,

$$\tan 45^\circ = \frac{AB}{BP}$$

$$\Rightarrow 1 = \frac{20}{BP} \Rightarrow BP = 20 \text{ m}$$

Putting this value in eq. (i), we get,

$$\sqrt{3} = \frac{20 + h}{20}$$

$$\Rightarrow 20\sqrt{3} = 20 + h$$

********** END **********