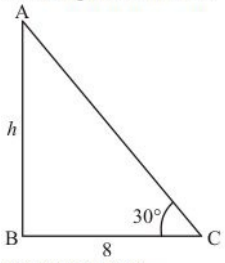
Some Applications of Trigonometry Ex 12.1 Q19

Answer :

Let *AB* be the tree of height *h*. And the top of tree makes an angle 30° with ground. The distance between foot of tree to the point where the top touches is 8m. Let $BC = 8$. And $\angle ACB = 30°$.

Here we have to find height of tree.

So we trigonometric ratios



In a triangle *ABC*,

$$\Rightarrow \quad \tan C = \frac{AB}{BC}$$

$$\Rightarrow \quad \tan 30^{\circ} = \frac{AB}{BC}$$

$$\Rightarrow \quad \frac{1}{\sqrt{3}} = \frac{h}{8}$$

$$\Rightarrow \qquad h = \frac{8}{\sqrt{3}}$$

Now in triangle ABC

$$\sin 30° = \frac{AB}{AC}$$

$$\Rightarrow \qquad \frac{1}{2} = \frac{h}{AC}$$

$$\Rightarrow \qquad \frac{1}{2} = \frac{\frac{8}{\sqrt{3}}}{AC}$$

$$\Rightarrow \qquad AC = \frac{16}{\sqrt{3}}$$

So the height of the tree is $h + AC$

$$h + AC = \frac{8}{\sqrt{3}} + \frac{16}{\sqrt{3}}$$

$$= 8\sqrt{3}$$

Hence the height of tree is $\boxed{8\sqrt{3}}$ m.

Some Applications of Trigonometry Ex 12.1 Q20

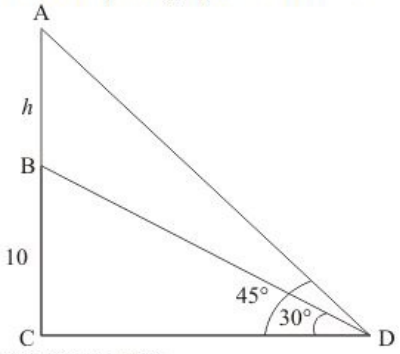
Answer :

Let AB be the flag of length h m on the building BC.

We assume that $BC = 10$, $CP = y$ and $\angle APC = 45°$, $\angle BPC = 30°$

Now we have to find height of flag-staff and distance of the point P from the building

The corresponding figure is as follows



In a triangle BPC,

$$\Rightarrow \qquad \tan P = \frac{BC}{CP}$$

$$\Rightarrow \qquad \tan 30° = \frac{BC}{CP}$$

$$\Rightarrow \qquad \frac{1}{\sqrt{3}} = \frac{10}{y}$$

$$\Rightarrow \quad y = 10\sqrt{3}$$
$$\Rightarrow \quad y = 17.32$$

Again in a triangle *ACP*,

$$\Rightarrow \quad \tan P = \frac{AB + BC}{CP}$$
$$\Rightarrow \quad \tan 45° = \frac{h + 10}{y}$$
$$\Rightarrow \quad 1 = \frac{h + 10}{17.32}$$
$$\Rightarrow \quad h = 10 - 17.32$$
$$\Rightarrow \quad h = 7.32$$

Hence the length is $\boxed{17.32}$ m and distance is $\boxed{7.32}$ m.

Some Applications of Trigonometry Ex 12.1 Q21

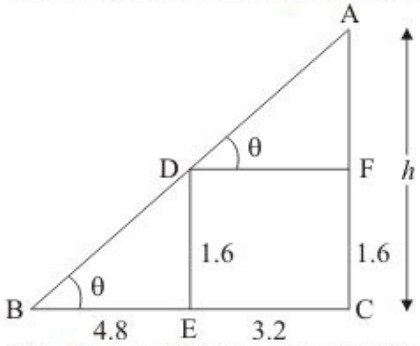
Answer :

Let *AC* be the lamp post of height h.

We assume that *ED = 1.6* m, *BE = 4.8* m and *EC* = 3.2 m

We have to find the height of the lamp post

Now we have to find height of lamp post using similar triangles.



Since triangle *BDE* and triangle *ABC* are similar.

$$\frac{AC}{BC} = \frac{ED}{BE}$$
$$\frac{h}{4.8 + 3.2} = \frac{1.6}{4.8}$$
$$h = \frac{8}{3}$$

Again, we have to find height of lamp post using trigonometric ratios.

In ΔADE

$$\Rightarrow \quad \tan\theta = \frac{1.6}{4.8}$$

$$\Rightarrow \quad \tan\theta = \frac{1}{3}$$

Again in ΔABC

$$\Rightarrow \quad \tan\theta = \frac{h}{4.8+3.2}$$

$$\Rightarrow \quad \frac{1}{3} = \frac{h}{8}$$

$$\Rightarrow \quad h = \frac{8}{3}$$

Hence the height of lamp post is $\boxed{\frac{8}{3}}$ m.

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