Some Applications of Trigonometry Ex 12.1 Q7

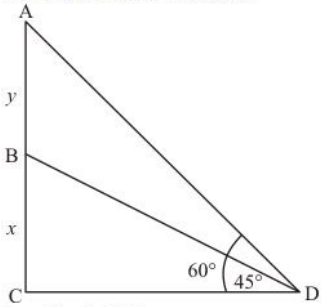
Answer :

Let BC be the tower of height x m and AB be the flag staff of height y, 70 m away from the tower, makes an angle of elevation are 60° and 45° respectively from top and bottom of the flag staff.

Let $AB = y$ m, $BC = x$ m and $CD = 70$ m.

$\angle ADC = 45°$ and $\angle ADC = 60°$

So we use trigonometric ratios.



In a triangle BCD,

$$\Rightarrow \quad \tan D = \frac{BC}{CD}$$

$$\Rightarrow \quad \tan 45° = \frac{x}{70}$$

$$\Rightarrow \quad 1 = \frac{70}{x}$$

$$\Rightarrow \quad x = 70$$

Again in a triangle ADC,

$$\Rightarrow \quad \tan D = \frac{AB + BC}{CD}$$

$$\Rightarrow \quad \tan 60° = \frac{y + x}{70}$$

$$\Rightarrow \quad \sqrt{3} = \frac{y + 70}{70}$$

$$\Rightarrow \quad 70\sqrt{3} = 70 + y$$

$$\Rightarrow \quad y = 70\left(\sqrt{3} - 1\right)$$

$$\Rightarrow \quad y = 51.24$$

Hence the height of flag staff is $\boxed{51.24}$ m and height of tower is $\boxed{70}$ m.

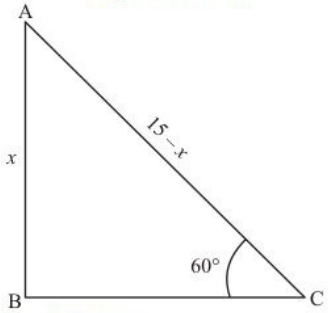
Some Applications of Trigonometry Ex 12.1 Q8

Answer :

Let AB be the tree of desired height x m and tree is broken by wind then tree makes an angle $C = 60°$. Let AC=15 − x

Here we have to find height x

So we use trigonometric ratios.



In a triangle ACB,

$$\Rightarrow \quad \sin C = \frac{AB}{AC}$$

$$\Rightarrow \quad \sin 60° = \frac{x}{15-x}$$

$$\Rightarrow \quad \frac{\sqrt{3}}{2} = \frac{x}{15-x}$$

$$\Rightarrow \quad 15\sqrt{3} - \sqrt{3}x = 2x$$

$$\Rightarrow \quad 15\sqrt{3} = 2x + \sqrt{3}x$$

$$\Rightarrow \quad 15\sqrt{3} = x\left(2+\sqrt{3}\right)$$

$$\Rightarrow \quad x = \frac{15\sqrt{3}}{2+\sqrt{3}}$$

$$\Rightarrow \quad x = 6.9$$

Hence the height of tree is $\boxed{6.9}$ m.

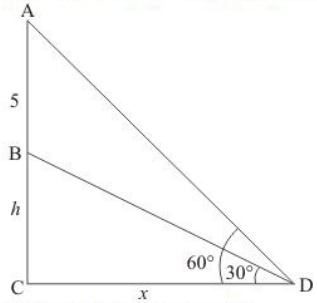
Some Applications of Trigonometry Ex 12.1 Q9

Answer :

Let BC be the tower of height h m and AB be the flag staff with distance 5m.Then angle of elevation from the top and bottom of flag staff are 60° and 30° respectively.

Let $CD = x$ and $\angle ADC = 60°$, $\angle BDC = 30°$

Here we have to find height h of tower.



So we use trigonometric ratios.

In a triangle BCD,

$$\Rightarrow \quad \tan D = \frac{BC}{CD}$$

$$\Rightarrow \quad \tan 30° = \frac{h}{x}$$

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

$$\Rightarrow \quad x = \sqrt{3}h$$

Again in a triangle ACD

$$\Rightarrow \quad \tan D = \frac{AB + BC}{CD}$$

$$\Rightarrow \quad \tan 60^\circ = \frac{h+5}{x}$$

$$\Rightarrow \quad \sqrt{3} = \frac{h+5}{x}$$

$$\Rightarrow \quad \sqrt{3}x = h+5$$

$$\Rightarrow \quad \sqrt{3} \times h\sqrt{3} = h+5$$

$$\Rightarrow \quad 3h = h+5$$

$$\Rightarrow \quad 2h = 5$$

$$\Rightarrow \quad h = 2.5$$

Hence the height of tree is $\boxed{2.5}$ m.

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