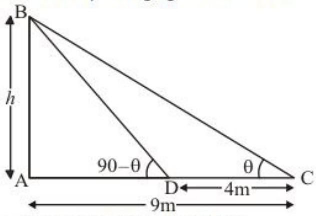
Some Applications of Trigonometry Ex 12.1 Q67

Answer :

Let AB be tower of height h m and angle of elevation of the top of tower from two points are θ and $90° - \theta$

Let, $AB = h$ m and $AC = 4$ m and $AD = 9$

The corresponding figure is as follows



So we use trigonometric ratios.

In ΔABC,

$$\Rightarrow \tan\theta = \frac{AB}{AC}$$

$$\Rightarrow \tan\theta = \frac{h}{4}$$

Again in ΔABD,

$$\Rightarrow \tan(90 - \theta) = \frac{AB}{AD}$$

$$\Rightarrow \tan\theta = \frac{9}{h}$$

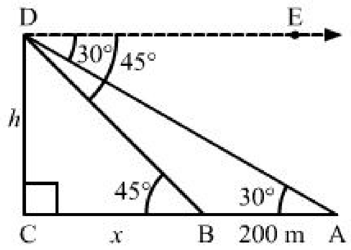
$$\Rightarrow \frac{h}{4} = \frac{9}{h}$$

$$\Rightarrow h = 6$$

Hence the height of tower is $\boxed{6}$ m.

Some Applications of Trigonometry Ex 12.1 Q68

Answer :



Let CD be the the light house and A and B be the positions of the two ships.

AB = 200 m (Given)

Suppose CD = *h* m and BC = *x* m

Now,

∠DAC = ∠ADE = 30° (Alternate angles)

∠DBC = ∠EDB = 45° (Alternate angles)

In right ΔBCD,

$$\tan 45^\circ = \frac{\text{CD}}{\text{BC}}$$
$$\Rightarrow 1 = \frac{h}{x}$$
$$\Rightarrow x = h \qquad .....(1)$$

In right ΔACD,

$$\tan 30^\circ = \frac{\text{CD}}{\text{AC}}$$
$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{h}{x+200}$$
$$\Rightarrow \sqrt{3}h = x + 200 \qquad .....(2)$$

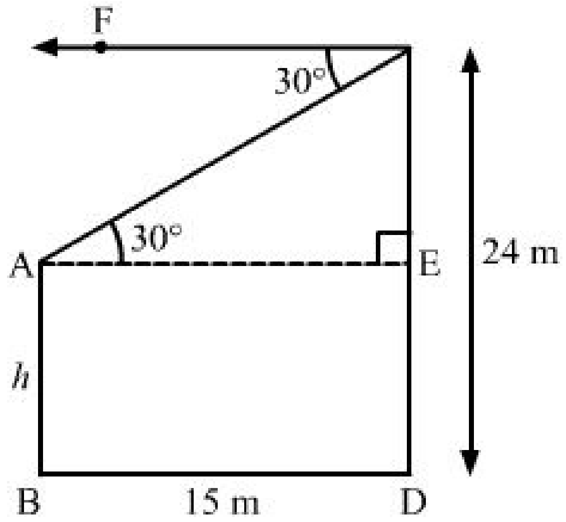
From (1) and (2), we get

$$\sqrt{3}h = 200 + h$$
$$\Rightarrow \sqrt{3}h - h = 200$$
$$\Rightarrow \left(\sqrt{3}-1\right)h = 200$$
$$\Rightarrow h = \frac{200}{\sqrt{3}-1}$$
$$\Rightarrow h = \frac{200\left(\sqrt{3}+1\right)}{\left(\sqrt{3}-1\right)\left(\sqrt{3}+1\right)}$$
$$\Rightarrow h = \frac{200\left(\sqrt{3}+1\right)}{2} = 100\left(\sqrt{3}+1\right) \text{ m}$$

Hence, the height of the light house is $100\left(\sqrt{3}+1\right)$ m.

Some Applications of Trigonometry Ex 12.1 Q69

Answer :



Let AB be the first pole and CD be the second pole.

Distance between the two poles, BD = 15 m

Height of the second pole, CD = 24 m

Suppose the height of the first pole be *h* m.

Draw AE ⊥ CD.

∴ CE = CD − ED = (24 − *h*) m [AB = ED = *h* m]

AE = BD = 15 m

Now, ∠CAE = ∠ACF = 30° (Alternate angles)

In right ΔACE,

$$\tan 30^{\circ} = \frac{CE}{AE}$$
$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{24-h}{15}$$
$$\Rightarrow \frac{15}{\sqrt{3}} = 24 - h$$
$$\Rightarrow h = 24 - 5\sqrt{3}$$

$$\Rightarrow h = 24 - 5 \times 1.732 = 15.34 \text{ m}$$

Hence, the height of the first pole is 15.34 m.

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