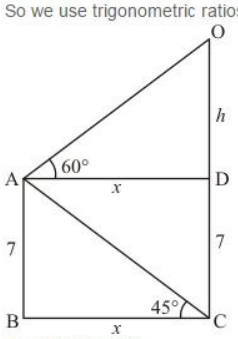
Some Applications of Trigonometry Ex 12.1 Q28

Answer :

Let OC be the tower of height H m and 7 m high building makes an angle of elevation of top of cable wire is $60°$ and an angle of depression from the its foot is $45°$.

Let $BC = x$, $AD = x$ and $CD = 7$, $AB = 7$ and $\angle OAD = 60°$, $\angle ACB = 45°$

So we use trigonometric ratios.



In a triangle ABC,

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

$$\Rightarrow \quad \tan 45° = \frac{7}{x}$$

$$\Rightarrow \quad 1 = \frac{7}{x}$$

$$\Rightarrow \quad x = 7$$

Again in a triangle OAD,

$$\Rightarrow \quad \tan A = \frac{OD}{AD}$$

$$\Rightarrow \quad \tan 60° = \frac{h}{x}$$

$$\Rightarrow \quad \sqrt{3} = \frac{h}{7}$$

$$\Rightarrow \quad h = 7\sqrt{3}$$

$$\Rightarrow \quad H = h + 7$$

$$\Rightarrow \quad H = 7\sqrt{3} + 7$$

$$\Rightarrow \quad H = 7\left(\sqrt{3} + 1\right)$$

Hence the height of tower is $\boxed{7\left(\sqrt{3}+1\right)}$ m.

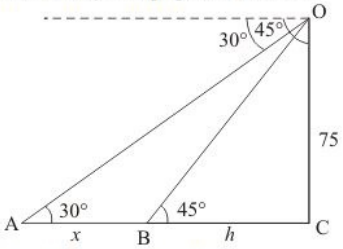
Some Applications of Trigonometry Ex 12.1 Q29

Answer :

Let OC be the height of light house 75 m. and A and B the position of two ships and angle of depression are $A = 30°$ and $B = 45°$. Let $OC = 75$ and $BC = h$, $AB = x$

Here we have to find distance between two ships.

The corresponding figure is as follows



So we trigonometric ratios,

In ΔOBC

$$\Rightarrow \quad \tan 45° = \frac{OC}{BC}$$

$$\Rightarrow \quad 1 = \frac{75}{h}$$

$$\Rightarrow \quad h = 75$$

Again in ΔOAC

$$\Rightarrow \quad \tan 30° = \frac{OC}{AB + BC}$$

$$\Rightarrow \quad \frac{1}{\sqrt{3}} = \frac{75}{x + h}$$

$$\Rightarrow \quad x + h = 75\sqrt{3}$$

$$\Rightarrow \quad x + 75 = 75\sqrt{3}$$

$$\Rightarrow \quad y = 75\left(\sqrt{3} - 1\right)$$

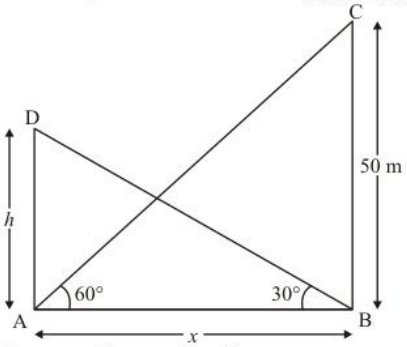
Hence distance between two ships is $\boxed{75\left(\sqrt{3} - 1\right)}$ m.

Some Applications of Trigonometry Ex 12.1 Q30

Answer :

Let AD be the building of height h m. and an angle of elevation of top of building from the foot of tower is 30° and an angle of the top of tower from the foot of building is 60°.

Let $AD = h$, $AB = x$ and $BC = 50$ and $\angle DBA = 30°$, $\angle CAB = 60°$



So we use trigonometric ratios.

In a triangle ABC,

$$\Rightarrow \quad \tan 60° = \frac{50}{x}$$

$$\Rightarrow \quad \sqrt{3} = \frac{50}{x}$$

$$\Rightarrow \qquad x = \frac{50}{\sqrt{3}}$$

Again in a triangle ABD,

$$\Rightarrow \qquad \tan 30^\circ = \frac{AD}{AB}$$

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

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

$$\Rightarrow \qquad h = \frac{50}{\sqrt{3} \times \sqrt{3}}$$

$$\Rightarrow \qquad h = \frac{50}{3}$$

Hence the height of building is $\boxed{\frac{50}{3}}$ m.

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