



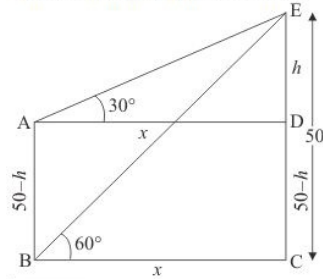
Some Applications of Trigonometry Ex 12.1 Q43

Answer :

Let AB and CE are two temples each at the bank of river. The top of the temple CE makes angle of depressions at the top and bottom of tower AB are 30° and 60°

Let $CE = 50$ m and $AB = H$ m and $\angle CBE = 60^\circ$, $\angle DAE = 30^\circ$

The corresponding figure is as follows



In $\triangle ADE$,

$$\begin{aligned} \Rightarrow \tan 30^\circ &= \frac{h}{x} \\ \Rightarrow \frac{1}{\sqrt{3}} &= \frac{h}{x} \\ \Rightarrow x &= h\sqrt{3} \end{aligned}$$

Again in $\triangle BCE$,

$$\begin{aligned} \Rightarrow \tan 60^\circ &= \frac{50}{x} \\ \Rightarrow \sqrt{3} &= \frac{50}{x} \\ \Rightarrow 50 &= \sqrt{3} \times h\sqrt{3} \\ \Rightarrow h &= \frac{50}{3} \end{aligned}$$

Now the distance between the temples

$$\begin{aligned} x &= h\sqrt{3} \\ &= \frac{50}{3} \times \sqrt{3} \\ &= \frac{50}{\sqrt{3}} \end{aligned}$$

$$\text{Therefore } H = 50 - \frac{50}{3}$$

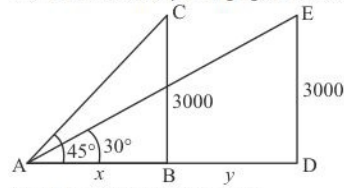
$$\Rightarrow H = 33.33$$

Hence distance between the temples is $\frac{50}{\sqrt{3}}$ m = 28.83 m and height of temple is 33.33 m.

Some Applications of Trigonometry Ex 12.1 Q44

Answer :

Let angle of elevation of an aero plane is 45° . After 15 second angle of elevation is change to 30° . Let DE be the height of aero plane which is 3000 meter above the ground. Let $AB = x$, $BD = y$, $\angle CAB = 45^\circ$ and $\angle EAD = 30^\circ$. Here we have to find speed of aero plane.
We have the corresponding figure as follows



So we use trigonometric ratios.

In $\triangle ABC$

$$\begin{aligned}\Rightarrow \tan A &= \frac{BC}{AB} \\ \Rightarrow \tan 45^\circ &= \frac{3000}{x} \\ \Rightarrow 1 &= \frac{3000}{x} \\ \Rightarrow x &= 3000\end{aligned}$$

Again in $\triangle ADE$

$$\begin{aligned}\Rightarrow \tan A &= \frac{DE}{AB + BD} \\ \Rightarrow \tan 30^\circ &= \frac{3000}{x + y} \\ \Rightarrow \frac{1}{\sqrt{3}} &= \frac{3000}{3000 + y} \\ \Rightarrow 3000 + y &= 3000\sqrt{3} \\ \Rightarrow y &= 3000\sqrt{3} - 3000 \\ \Rightarrow y &= 3000(\sqrt{3} - 1) \\ \Rightarrow y &= 2196\end{aligned}$$

Since 15 sec = 2196

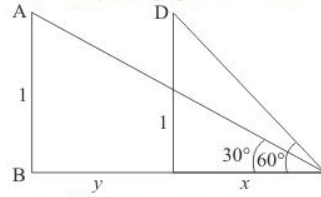
$$\begin{aligned}\Rightarrow \text{sec} &= \frac{2196}{15} = 146.4 \\ &= \frac{146.4 \times 3600}{1000} \\ &= 527.04\end{aligned}$$

Hence the speed of aero plane is 527.04 km/h.

Answer :

An aero plane is flying 1 km above the ground making an angle of elevation of aero plane 60° . After 10 seconds angle of elevation is changed to 30° . Let $CE = x$, $BC = y$, $\angle AEB = 30^\circ$, $\angle DEC = 60^\circ$, $AB = 1$ km and $CD = 1$ km. Here we have to find speed of aero plane.

The corresponding figure is as follows



So we use trigonometric ratios.

In $\triangle DCE$

$$\Rightarrow \tan 60^\circ = \frac{1}{x}$$

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

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

Again in $\triangle ABE$,

$$\Rightarrow \tan 30^\circ = \frac{1}{x+y}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{1}{x+y}$$

$$\Rightarrow x+y = \sqrt{3}$$

$$\Rightarrow y = \sqrt{3} - \frac{1}{\sqrt{3}}$$

$$\Rightarrow y = \frac{2}{\sqrt{3}}$$

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

$$= \frac{y}{10 \text{ sec}}$$

$$= \frac{\frac{2}{\sqrt{3}}}{10}$$

$$= \frac{2}{10 \times \sqrt{3}}$$

$$= 415.68$$

Hence the speed of aero plane is 415.68 km/h.

***** END *****