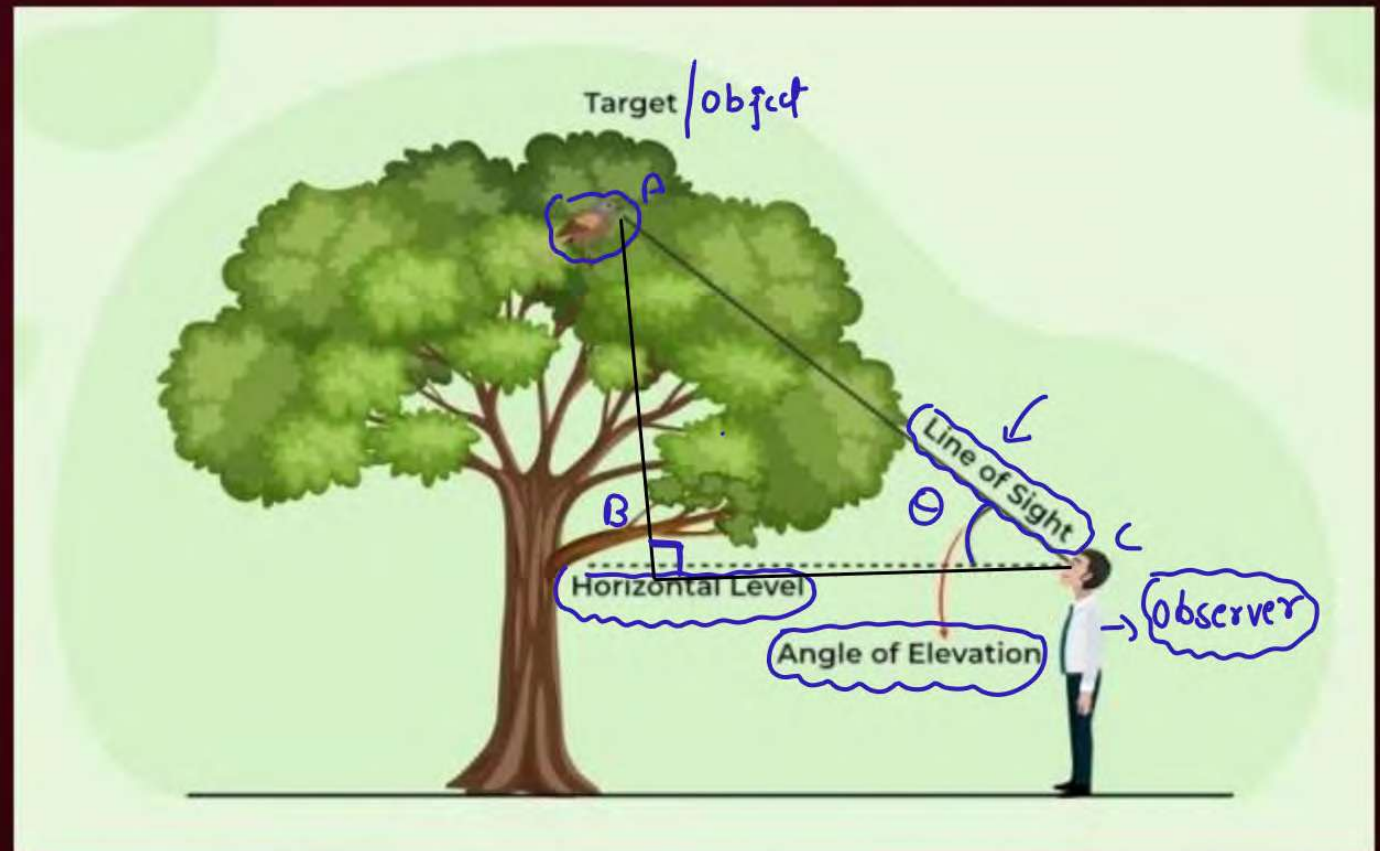


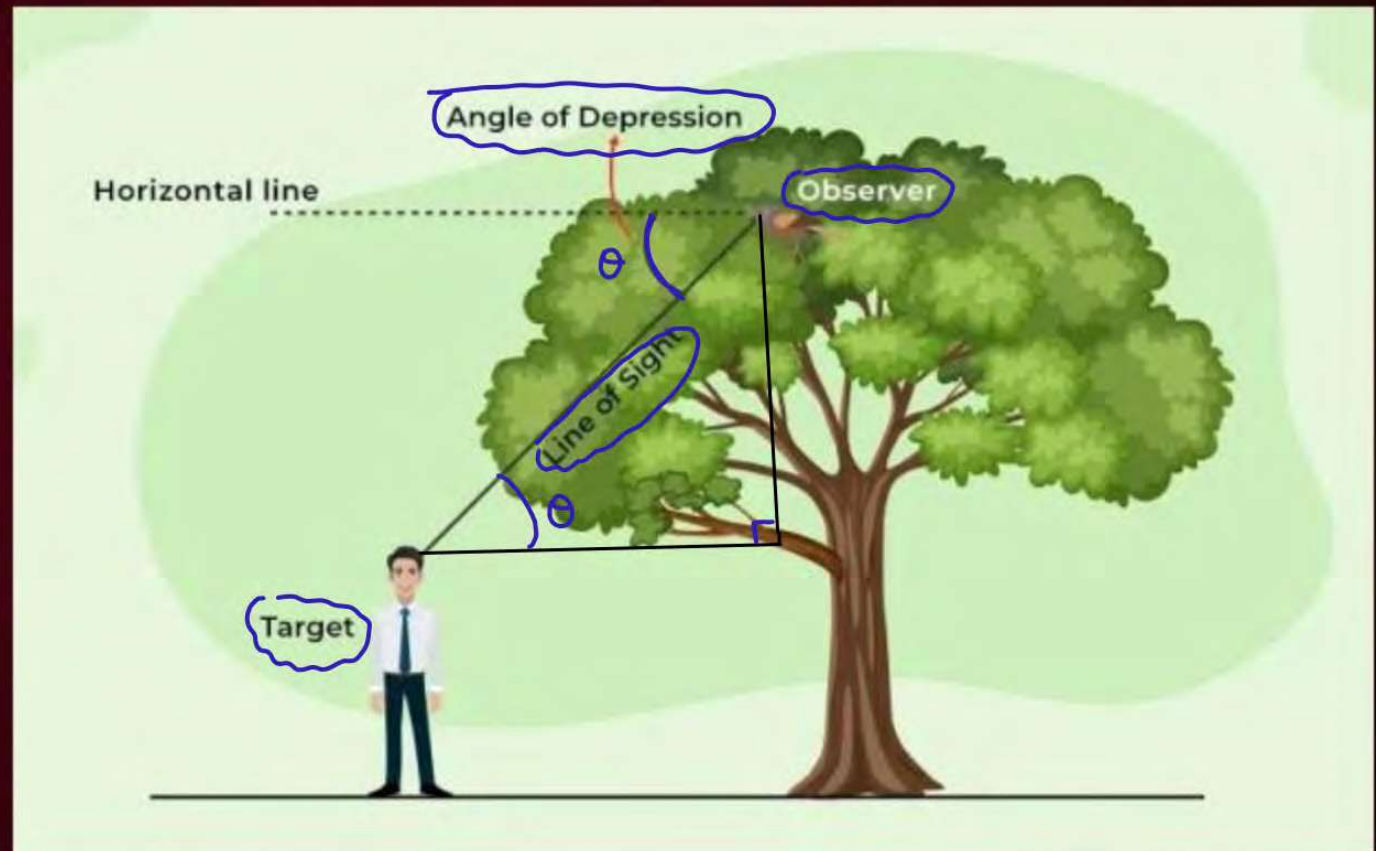


## Angle of elevation





## Angle of Depression



## QUESTION



A circus artist is climbing a 20 m long rope which is tightly stretched and tied from the top of a vertical pole to the ground. Find the height of the pole, if the angle made by the rope with the ground level is  $30^\circ$

Trick

Value  $\times$  पहिली किंसाकी  
ह किंसाकी

In  $\triangle ABC$

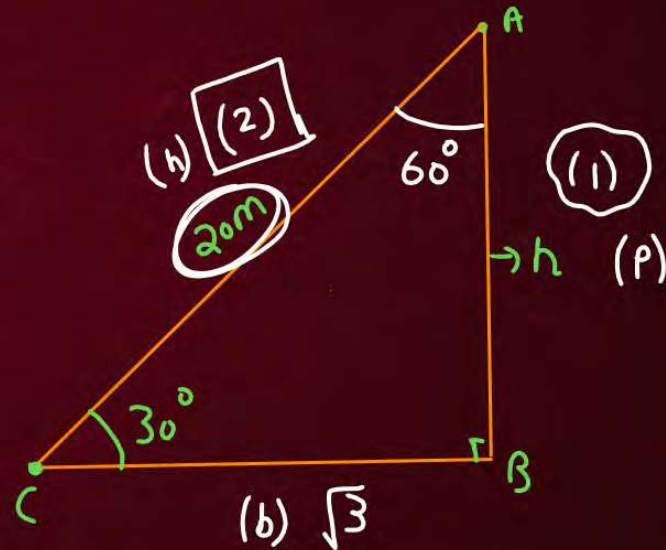
$$\frac{AB}{AC} = \sin 30^\circ$$

$$\frac{h}{20} = \frac{1}{2}$$

$$2h = 20$$

$$h = \frac{20}{2} = 10\text{m}$$

$$\frac{20}{2} \times 1 \Rightarrow 10\text{m}$$

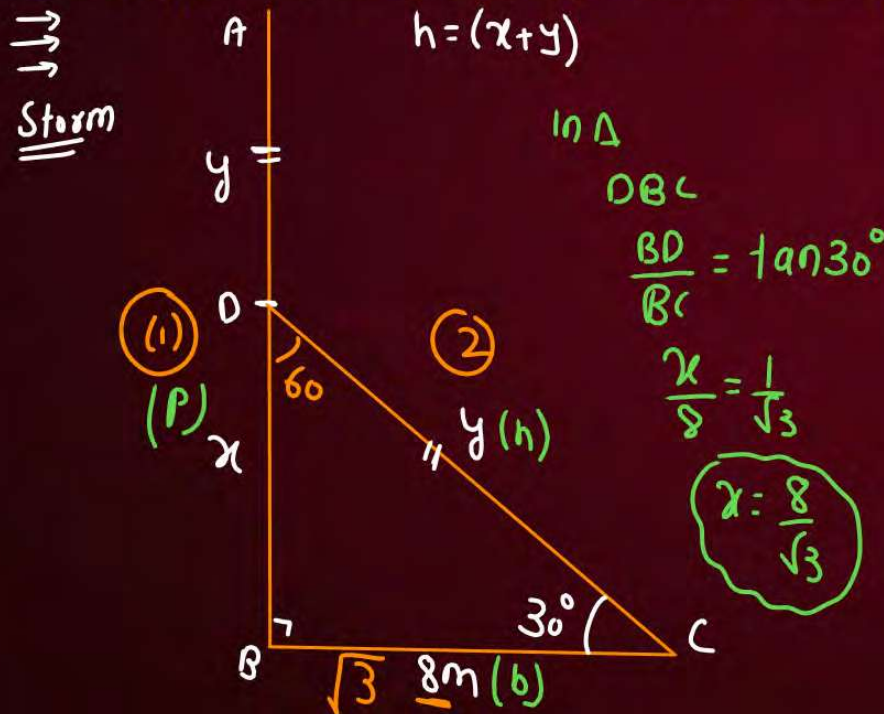




## QUESTION



A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle  $30^\circ$  with it. The distance between the foot of the tree to the point where the top touches the ground is 8 m. Find the height of the tree



In  $\Delta BOC$

$$\frac{BC}{OC} = \cos 30^\circ$$

$$\frac{8}{y} = \frac{\sqrt{3}}{2}$$

$$y\sqrt{3} = 16$$

$$y = \frac{16}{\sqrt{3}}$$

$$h = x + y = \frac{8}{\sqrt{3}} + \frac{16}{\sqrt{3}} = \frac{24}{\sqrt{3}}$$

$$h = \frac{24}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{24\sqrt{3}}{3} = 8\sqrt{3}\text{m}$$

$$\frac{8}{\sqrt{3}} \times \sqrt{3}$$

$$8\sqrt{3}\text{m}$$

In  $\Delta$

$BOC$

$$\frac{BD}{BC} = \tan 30^\circ$$

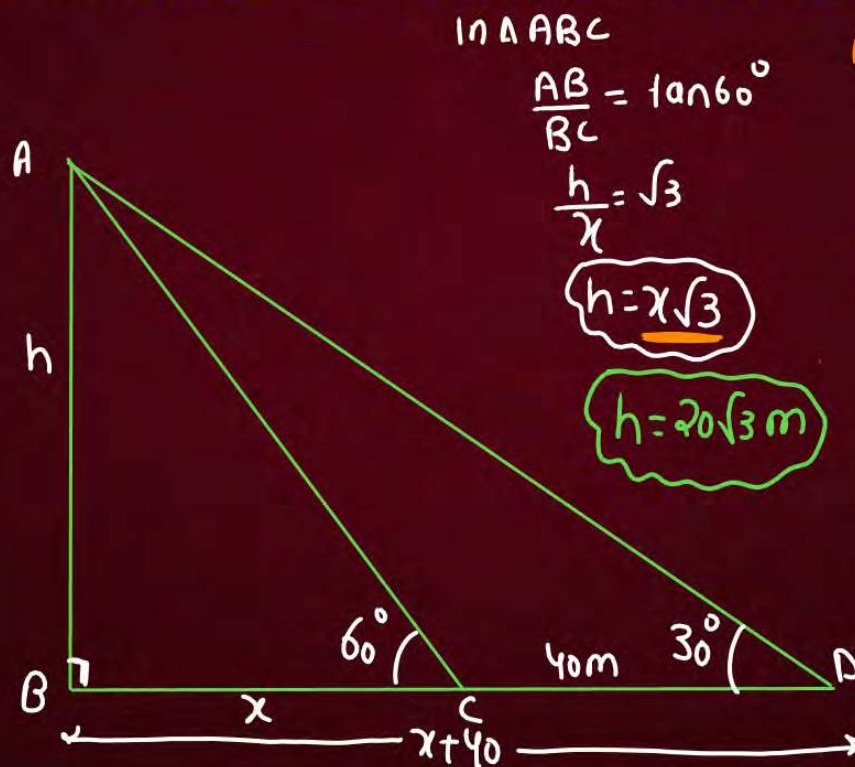
$$\frac{x}{8} = \frac{1}{\sqrt{3}}$$

$$x = \frac{8}{\sqrt{3}}$$

## QUESTION



The shadow of a tower standing on a level ground is found to be 40 m longer when the Sun's altitude is  $30^\circ$  than when it is  $60^\circ$ . Find the height of the tower



In  $\triangle ABC$

$$\frac{AB}{BC} = \tan 60^\circ$$

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

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

$$h = 20\sqrt{3} \text{ m}$$

In  $\triangle ABD$

$$\frac{AB}{BD} = \tan 30^\circ$$

$$\frac{h}{x+40} = \frac{1}{\sqrt{3}}$$

$$x+40 = h\sqrt{3}$$

$$x+40 = x\sqrt{3} \times \sqrt{3}$$

$$x+40 = 3x$$

$$2x = 40$$

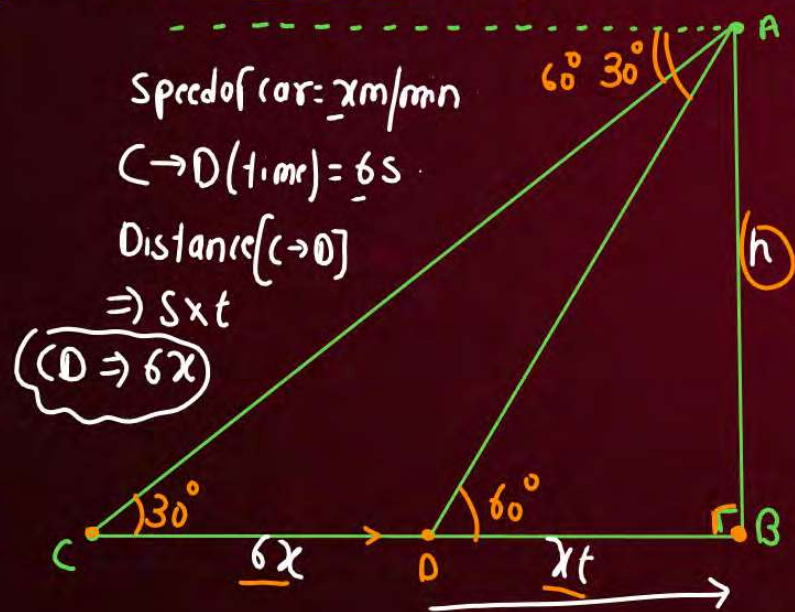
$$x = 20 \text{ m}$$



## QUESTION



A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of  $30^\circ$ , which is approaching the foot of tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be  $60^\circ$ . Find the time taken by the car to reach the foot of the tower from this point.



H  
 $(D \rightarrow B)$  time =  $t$  s  
 $BD = S \times t$   
 $= x \times t$   
 $(BD = xt)$

$3t - t = 6$   
 $2t = 6$   
 $t = 3 \text{ sec}$

In  $\triangle ABD$   
 $\frac{AB}{BD} = \tan 60^\circ$   
 $\frac{h}{xt} = \sqrt{3}$   
 $h = xt\sqrt{3}$

$xt\sqrt{3} \times \sqrt{3} = x(6+t)$   
 $3t = 6+t$

In  $\triangle ABC$   
 $\frac{AB}{BC} = \tan 30^\circ$   
 $\frac{h}{6x+xt} = \frac{1}{\sqrt{3}}$   
 $h\sqrt{3} = 6x+xt$

**QUESTION (CBSE Board 2023)**



If a pole 6 m high casts a shadow  $2\sqrt{3}$  m long on the ground, then sun's elevation is:

- A**  $30^\circ$
- B**  $60^\circ$
- C**  $45^\circ$
- D**  $90^\circ$

Comment