

# UPDAAN



## 2025

### Some Application of Trigonometry

Mathematics

Lecture – 01

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# Topics

*to be covered*



1 Introduction

2 Some basic terms (horizontal line, line of sight, angle of elevation, angle of depression)

3 Questions



# TRIGONOMETRY

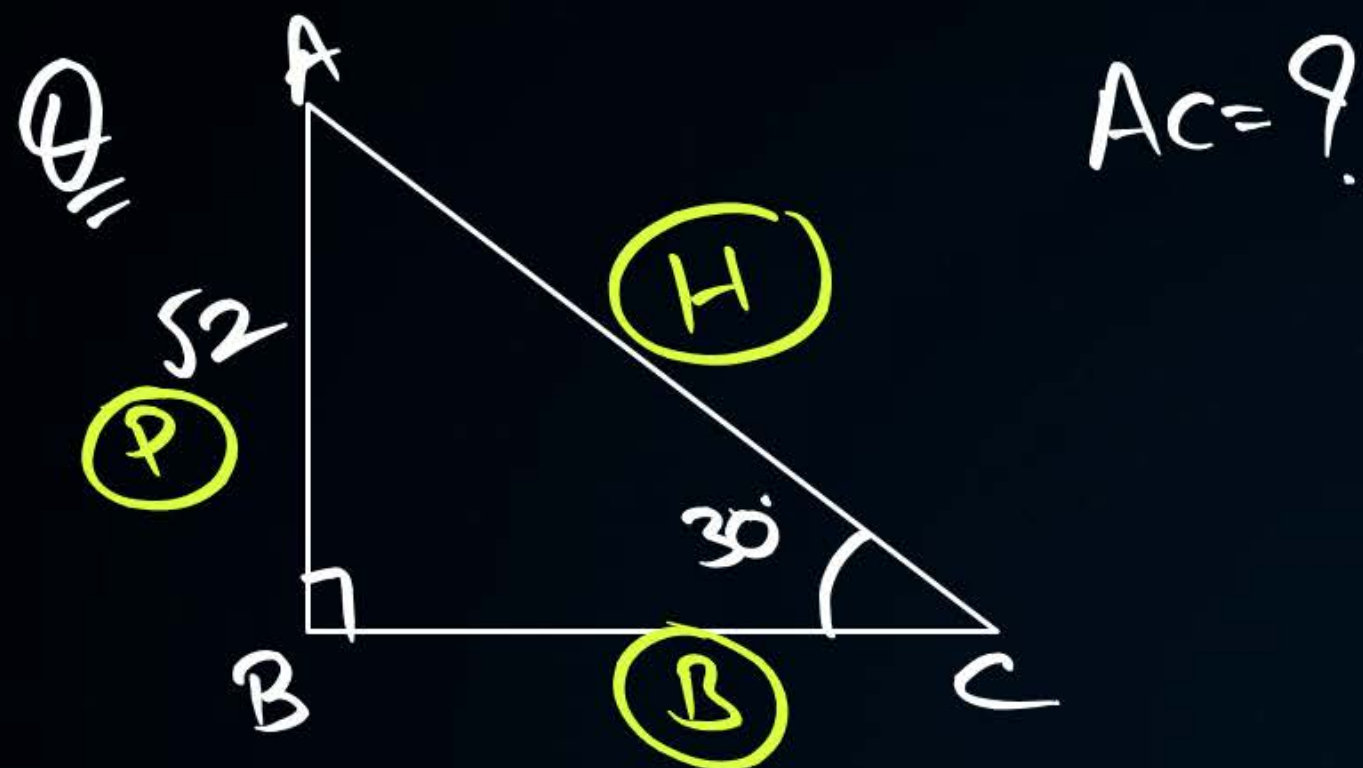
- (13%) A) Lectures + DPP's + Practice sheet done.
- (38%) B) only Lectures.
- (13%) C) Lectures + practice sheet.
- (22%) D) Backlogs.
- (12%) E) Lecture + DPP's.





**WORK HARD**  
**DREAM BIG**  
**NEVER GIVE UP !!**



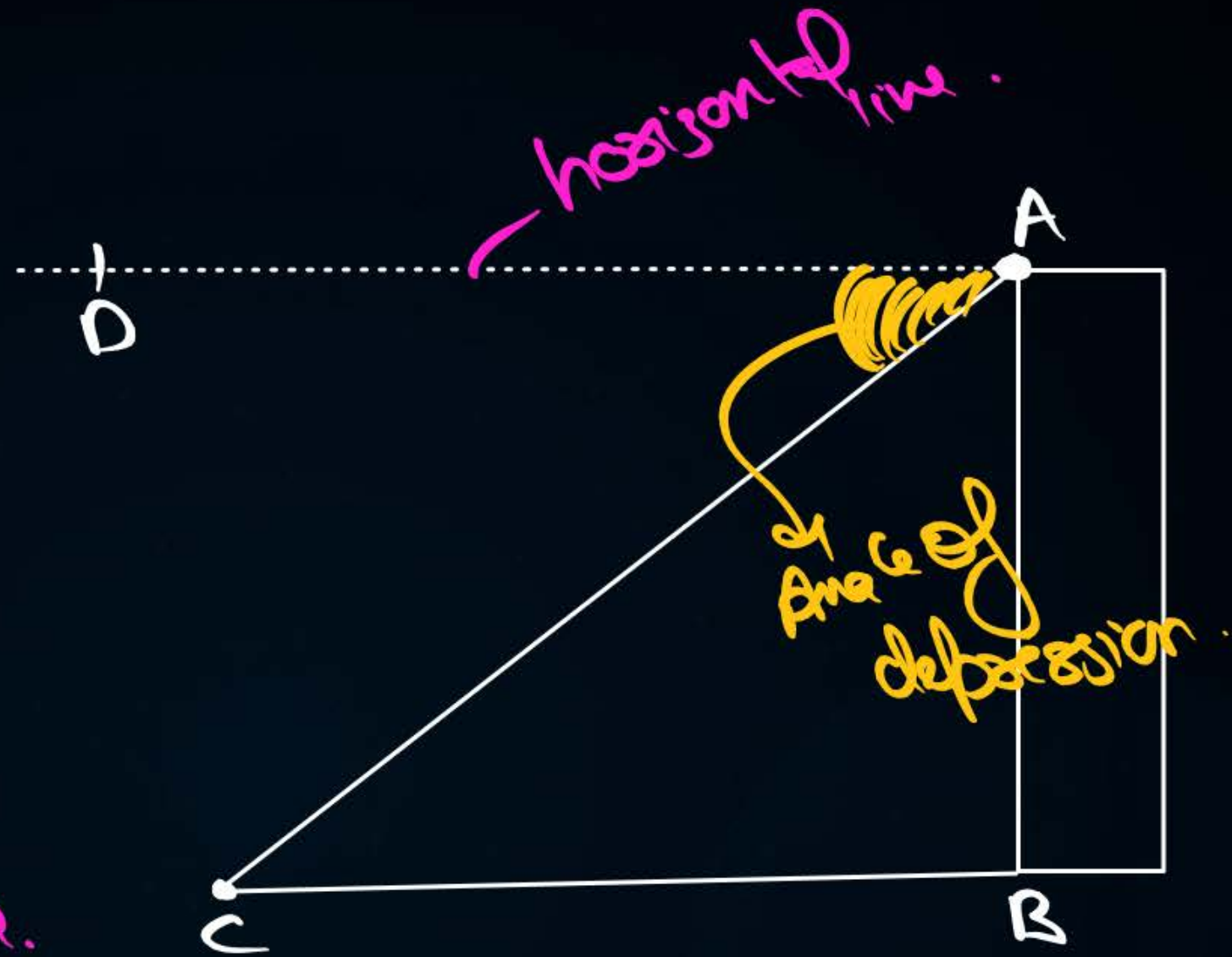
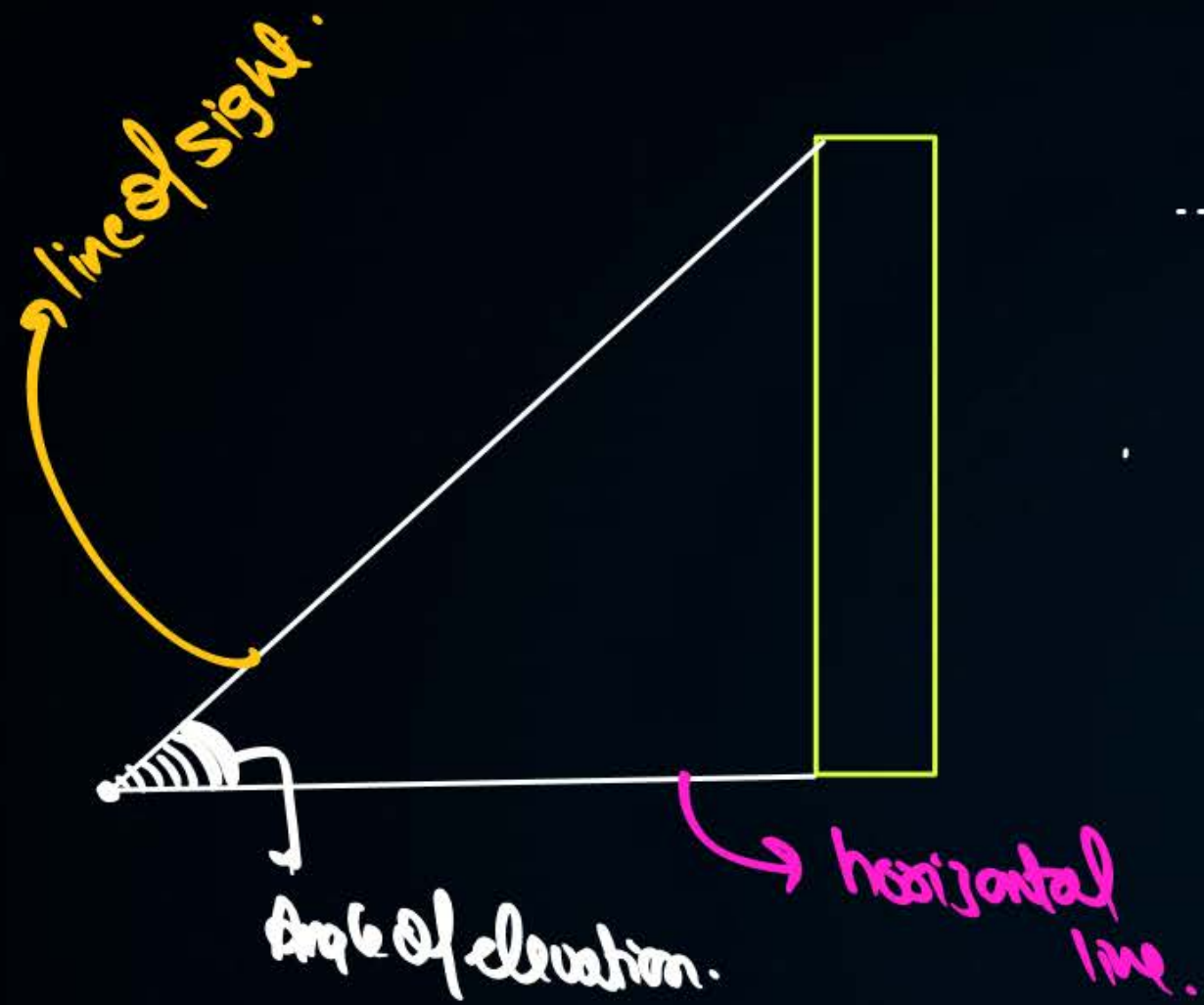


$$\sin \theta = \frac{P}{H}, \cos \theta = \frac{H}{P}$$

$$\sin 30^\circ = \frac{52}{AC}$$

$$\frac{1}{2} = \frac{52}{AC}$$

$$AC = 2 \times 52 = 104 \text{ units.}$$





- ❑ The **line of sight** is the line drawn from the eye of an observer to the point on the object viewed by the observer.



- ❑ The **angle of elevation** of a point on the object being viewed is the angle formed by the line of sight with the horizontal when it is above the horizontal level, i.e. the case when we raise our head to look at a point on the object.
- ❑ The **angle of depression** of a point on the object being viewed is the angle formed by the line of sight with the horizontal when it is below the horizontal level, i.e. the case when we lower our head to look at a point on the object.

Point to be noted My load!

- A) Aaram say 'O' Read kroo.
- B) Diagram banao.
- C) triangle dekhkar trigono. lagado.
- D) unit ka dhyan Rakho.



## Topic : Application



#Q. A tower is  $100\sqrt{3}$  meters high. Find the angle of elevation of its top from a point 100 meters away from its foot.

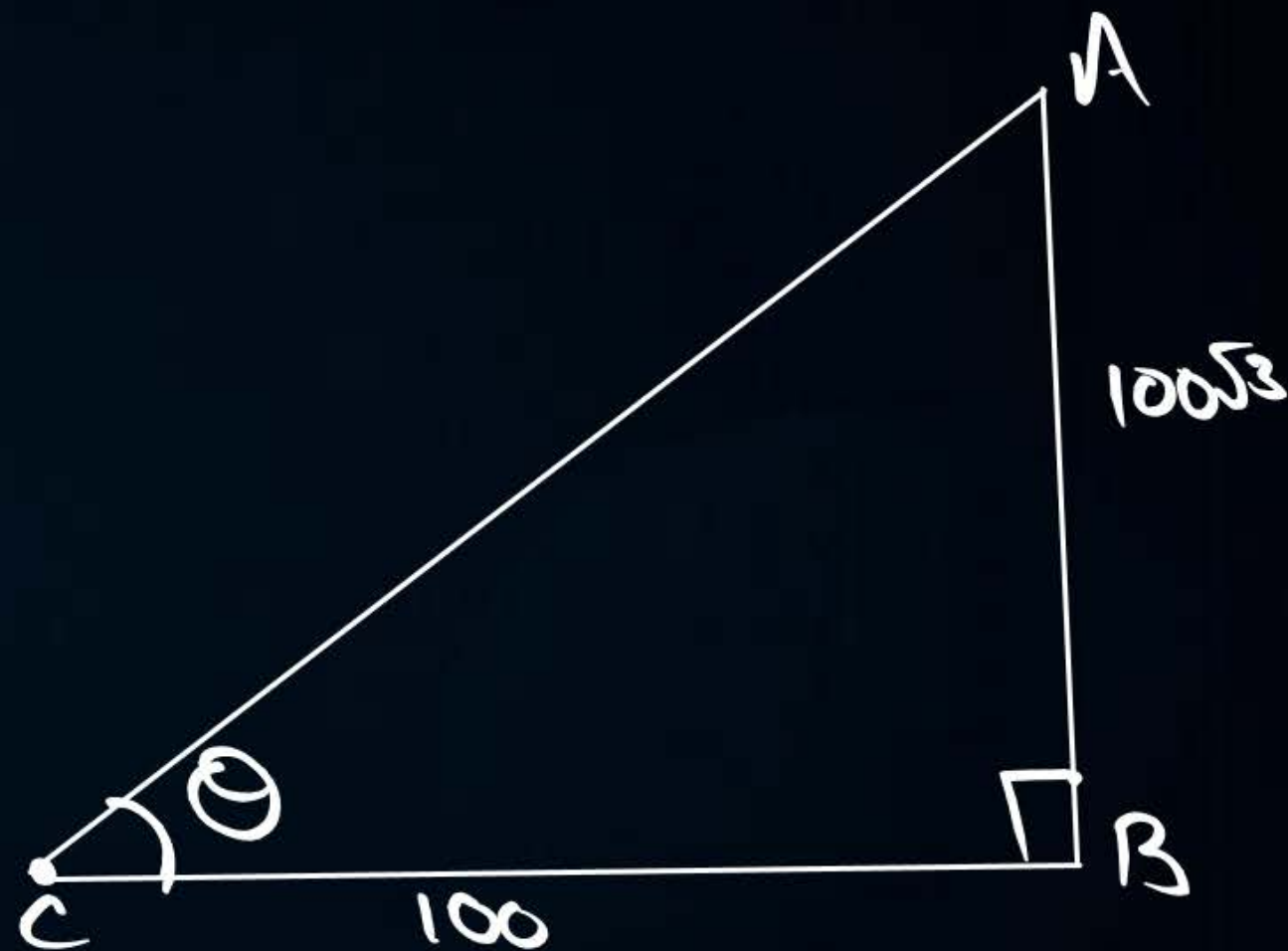
$$\tan \theta = \frac{P}{B}$$

$$\tan \theta = \frac{100\sqrt{3}}{100}$$

$$\tan \theta = \sqrt{3}$$

$$\tan \theta = \tan 60^\circ$$

$$\theta = 60^\circ$$



## Topic : Application



#Q. The angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of the tower is  $30^\circ$ . Find the height of the tower. [NCERT]

$$\tan \theta = \frac{P}{B}$$

$$\tan 30^\circ = \frac{PO}{RO}$$

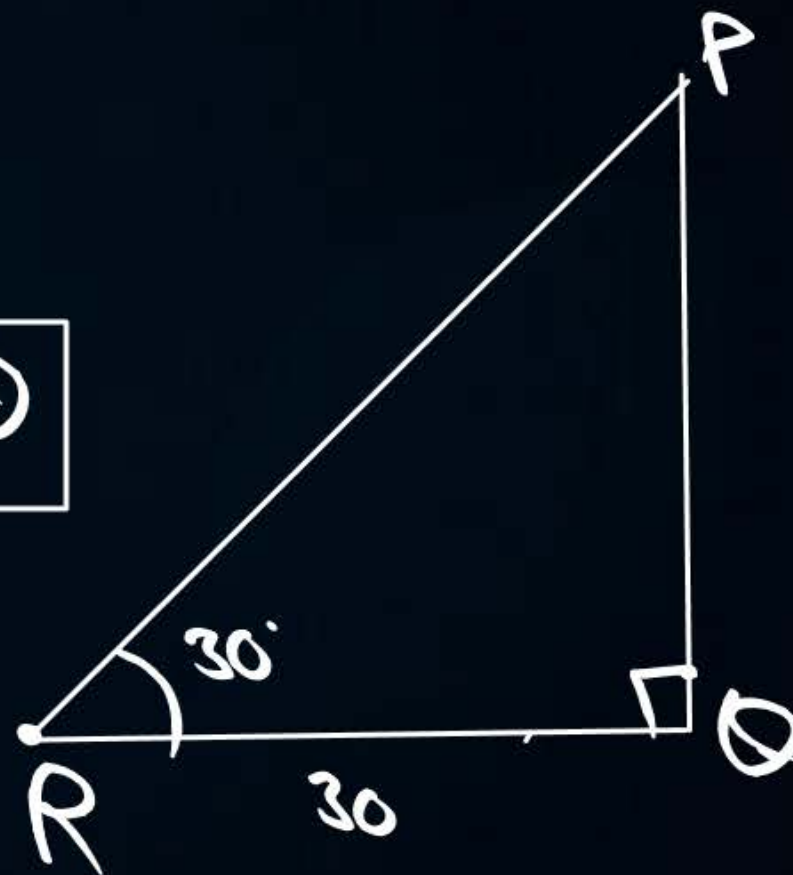
$$\frac{1}{\sqrt{3}} = \frac{PO}{30}$$

$$\frac{30}{\sqrt{3}} = PO$$

$$\frac{30 \times \sqrt{3}}{\sqrt{3}} = PO$$

$$\frac{30\sqrt{3}}{\cancel{\sqrt{3}}} = PO$$

$$10\sqrt{3} \text{ m} = PO$$





#Q. A kite is flying at a height of 60 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is  $60^\circ$ . Find the length of the string assuming that there is no slack in the string.

$$\sin \theta = \frac{P}{H}$$

$$\sin 60^\circ = \frac{60}{AC}$$

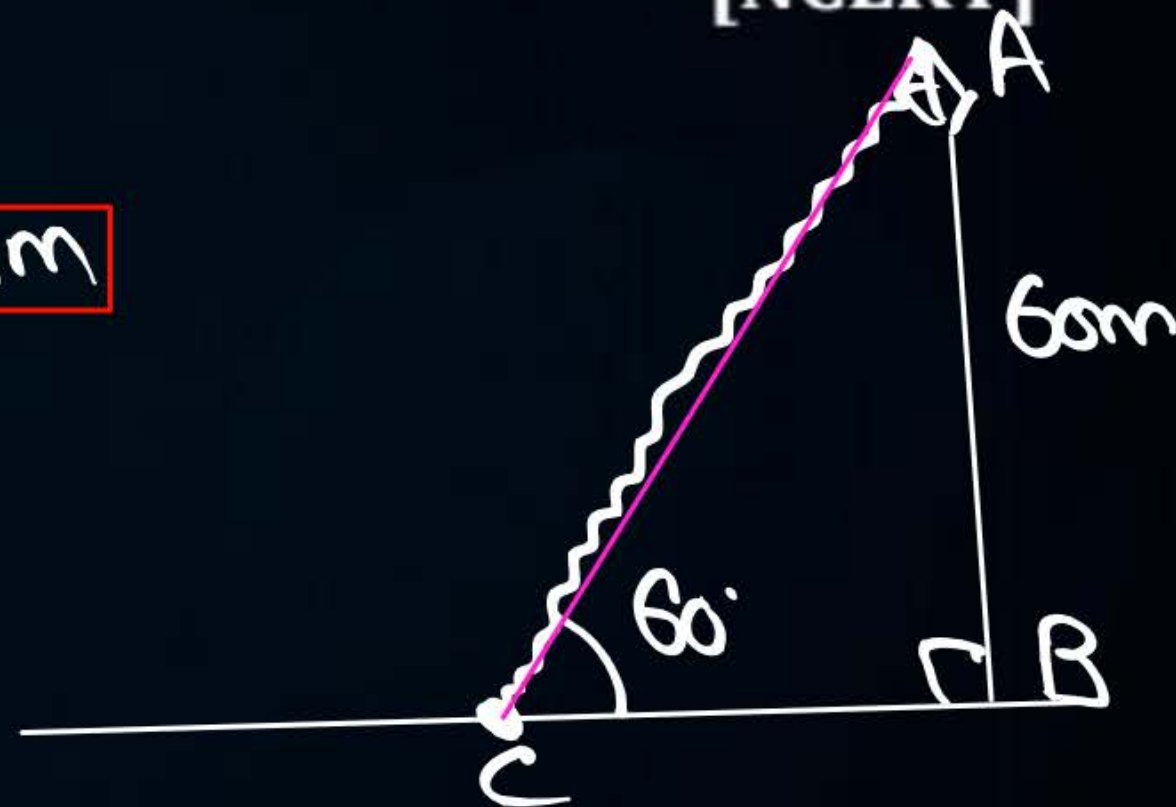
$$\frac{\sqrt{3}}{2} = \frac{60}{AC}$$

$$AC = \frac{120}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$$

$$AC = \frac{120\sqrt{3}}{3}$$

$$AC = 40\sqrt{3} \text{ m}$$

[NCERT]



## Topic : Application



#Q. An observer 1.5 m tall is 28.5 m away from a tower. The angle of elevation of the top of the tower from her eyes is  $45^\circ$ . What is the height of the tower? [NCERT]

To Find: AB

In  $\triangle ADE$

$$\tan 45^\circ = \frac{AE}{DE}$$

$$1 = \frac{AE}{28.5}$$

$$28.5 = AE$$

$$AB = AE + EB$$

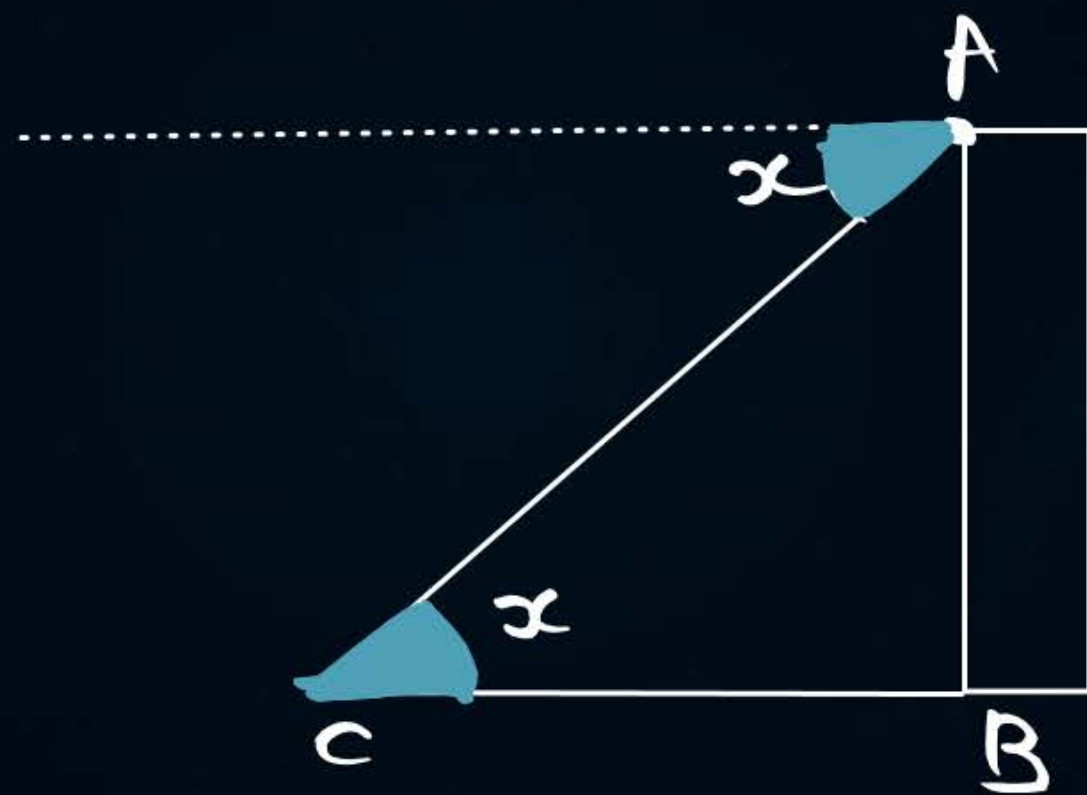
$$AB = 28.5 + 1.5$$

$$AB = 30\text{m}$$





Angle of depression  $\rightarrow$  Angle of elevation.



**Topic : Application**



#Q. The angle of depression of a car, standing on the ground, from the top of a 75 m high tower, is  $30^\circ$ . The distance of the car from the base of the tower (in m.) is:

**A**  $25\sqrt{3}$

**B**  $50\sqrt{3}$

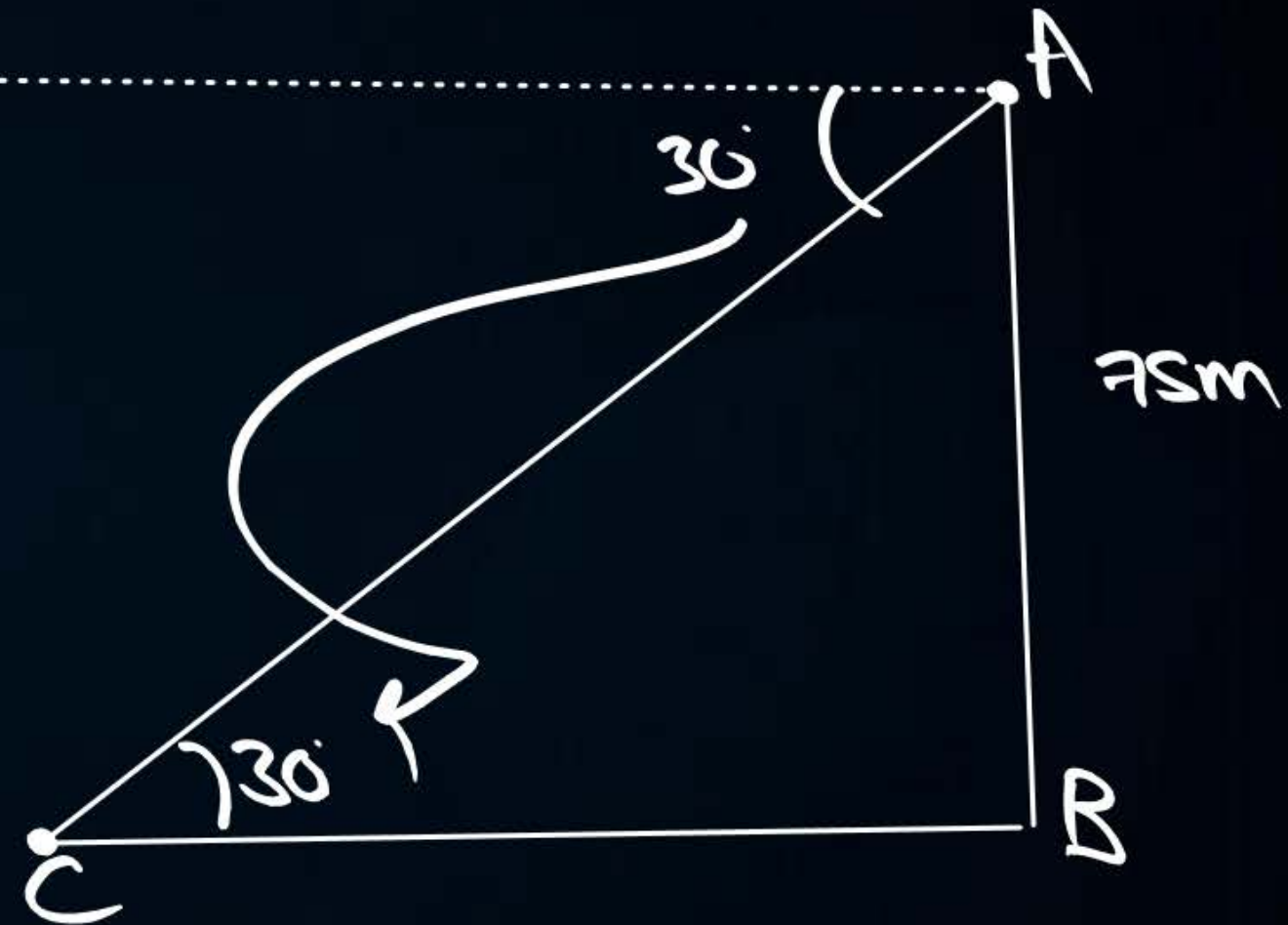
**C**  $75\sqrt{3}$

**D** 150

$$\tan 30^\circ = \frac{P}{B}$$

$$\frac{1}{\sqrt{3}} = \frac{75}{BC}$$

$$BC = 75\sqrt{3} \text{ m}$$





## Topic : Application



#Q. From a point on the ground 40 m away from the foot of a tower, the angle of elevation of the top of the tower is  $30^\circ$ . The angle of elevation of the top of a water tank (on the top of the tower) is  $45^\circ$ . Find the [NCERT]

- (i) height of the tower  $\textcircled{BC}$   
(ii) the depth of the tank.  $\textcircled{AB}$

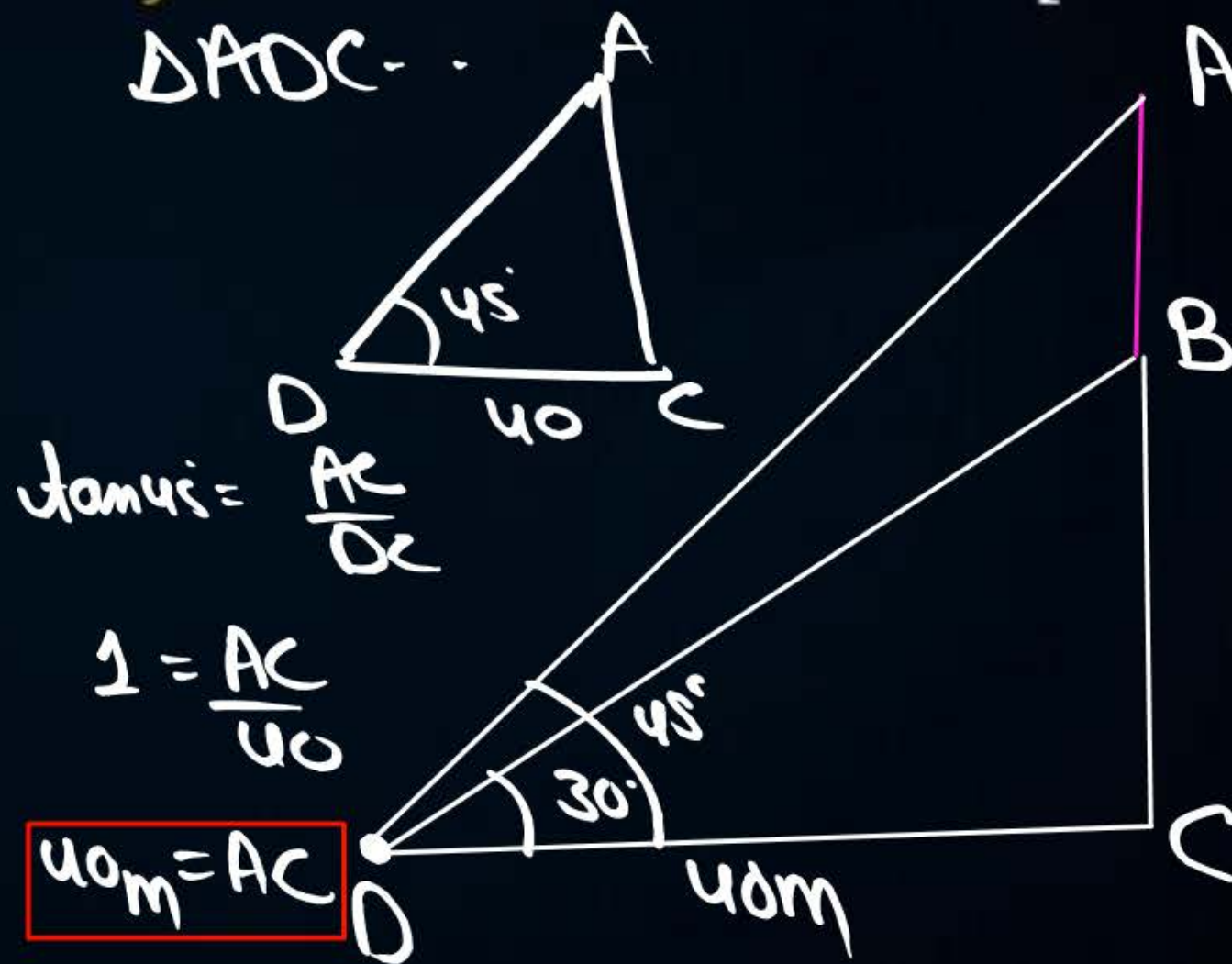
$\triangle BCD$

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

$$\frac{1}{\sqrt{3}} = \frac{BC}{40}$$

$$\frac{40}{\sqrt{3}} = BC$$

$$\frac{40\sqrt{3}}{3} = BC$$



$$AC = 40$$

$$AB + BC = 40$$

$$AB + \frac{40\sqrt{3}}{3} = 40$$

$$AB = \frac{40}{1} - \frac{40\sqrt{3}}{3}$$

$$AB = \frac{120 - 40\sqrt{3}}{3}$$

$$AB = \frac{40(3 - \sqrt{3})}{3} \text{ m}$$

$$\sqrt{3} \approx 1.73$$



## Topic : Application



#Q. From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are  $45^\circ$  and  $60^\circ$  respectively. Find the height of the tower. [CBSE 2005]

$\triangle BCD$

$$\tan 45^\circ = \frac{BC}{DC}$$

$$1 = \frac{20}{DC}$$

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

$\triangle ACD$

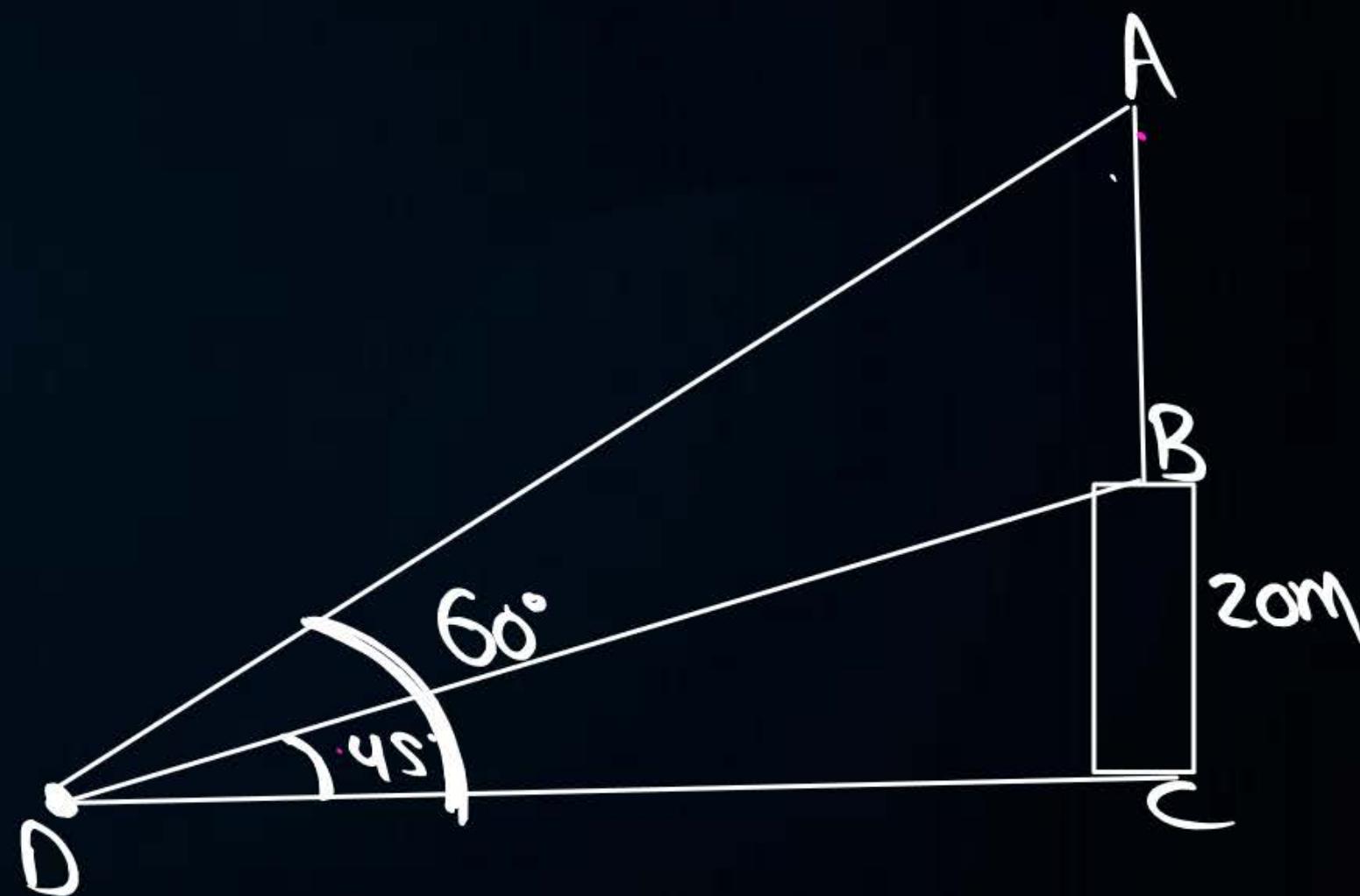
$$\tan 60^\circ = \frac{AC}{DC}$$

$$\sqrt{3} = \frac{AB + BC}{20}$$

$$20\sqrt{3} = AB + 20$$

$$20\sqrt{3} - 20 = AB$$

$$20(\sqrt{3} - 1)\text{m} = AB$$



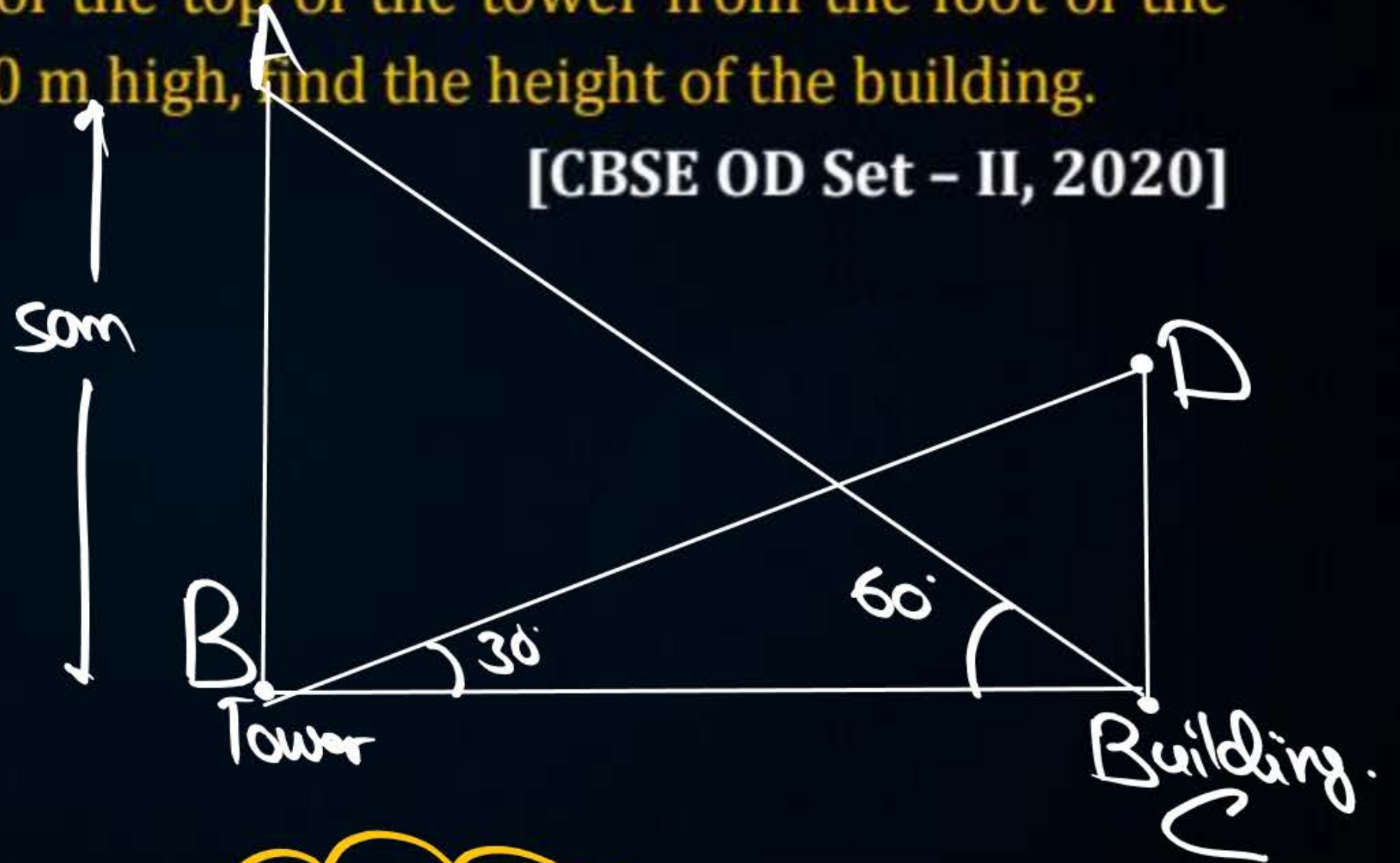


## Topic : Application



#Q. The angle of elevation of the top of a building from the foot of the tower is  $30^\circ$  and the angle of elevation of the top of the tower from the foot of the building is  $60^\circ$ . If the tower is 50 m high, find the height of the building.

[CBSE OD Set - II, 2020]



$\triangle ABC$

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

$$\sqrt{3} = \frac{50}{BC}$$

$$BC = \frac{50 \times \sqrt{3}}{\sqrt{3}}$$

$$BC = \frac{50\sqrt{3}}{3}$$

$\triangle DCB$

$$\tan 30 = \frac{DC}{BC}$$

$$\frac{1}{\sqrt{3}} = \frac{DC}{BC}$$

$$BC = DC\sqrt{3}$$

$$\frac{50\sqrt{3}}{3} = DC\sqrt{3}$$

$$\frac{50}{3} = DC$$

$$16.66\text{m} = DC$$





# Homework

DPP-01





THANK  
YOU

