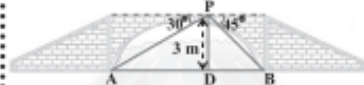


CHAPTER : 9 HEIGHTS AND DISTANCES

MIND MAPS LEARNING MADE SIMPLE

Distance

Determine width AB



From figure, $AB = AD + DB$

In right $\triangle APD$ $\angle A = 30^\circ$, $\angle D = 90^\circ$

$$\tan 30^\circ = \frac{PD}{AD} \text{ i.e., } AD = 3\sqrt{3} \text{ m}$$

In right $\triangle BPD$ $\angle B = 45^\circ$, $\angle D = 90^\circ$

$$\tan 45^\circ = \frac{PD}{BD} \text{ i.e., } BD = 3$$

$$\therefore AB = (3\sqrt{3} + 3)\text{m} = 3(\sqrt{3} + 1)\text{m}$$

Examples

Object Height

Determine height of object AB



In $\triangle ABC$ $\angle B = 90^\circ$, $\angle C = 60^\circ$

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

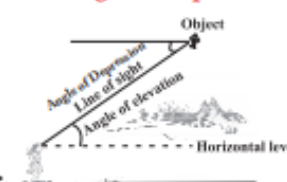
$$\sqrt{3} = \frac{AB}{15}$$

$$\text{i.e., } AB = 15\sqrt{3}\text{m}$$

Heights and Distances

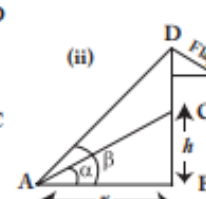
Measuring Angles

Angle of Elevation is equal to Angle of Depression



height / length of an object

(I) BD is a tree
AC = DC
if CD is broken



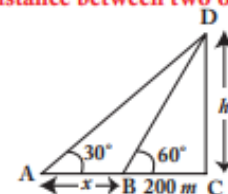
Find flag length

$$\tan \alpha = \frac{h}{x} \dots (i)$$

$$\tan \beta = \frac{h+DC}{x} \dots (ii)$$

Application-Trigonometric Ratios (To determine)

Distance between two objects



Find x and h

$$\tan 30^\circ = \frac{h}{200} \dots (i)$$

$$\tan 60^\circ = \frac{h}{x+200} \dots (ii)$$