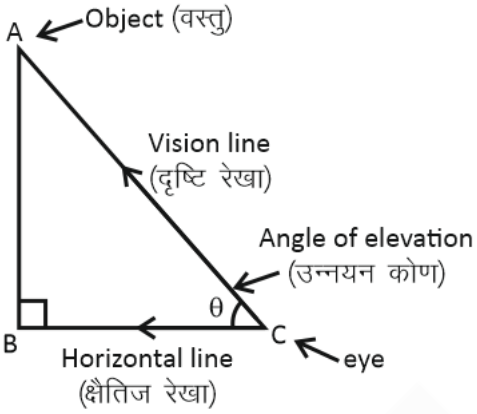
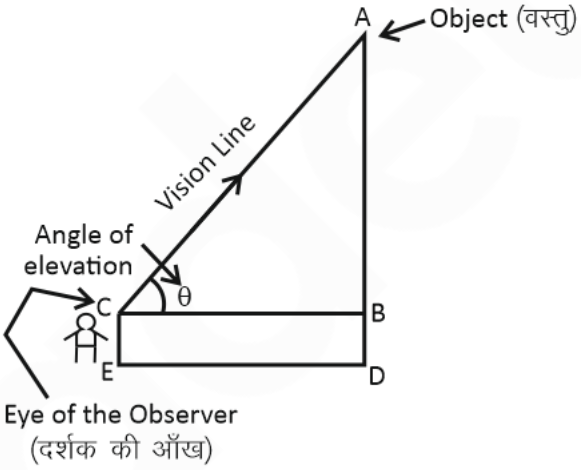
Height & Distance

Height and Distance

Vision Line: A vision line is the line drawn from the eye of an observer to the point where the object viewed by the observer is.

Angle of Elevation: Let AB be a tower/pillar/shell/minar/pole etc.) standing at any point C on the level ground is viewing at A.

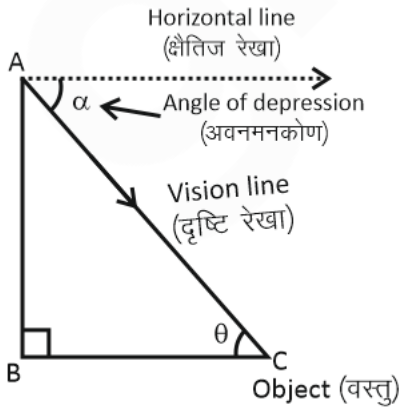




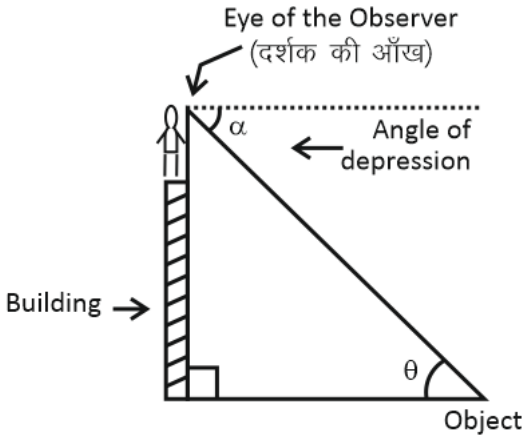
Angle of Depression:

Note: Numerically angle of elevation is equal to the angle of depression.

If observer is at A and is viewing an object C on the ground, then angle between AC and BC is the angle of depression. So, angle ACB is angle of depression.



Both the angles are measured with the horizontal.



Important Trigonometric values at different angles:

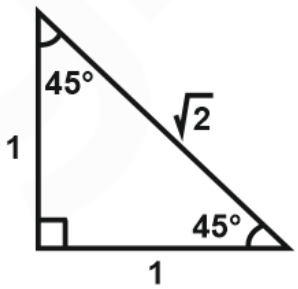
θ	0°	30°	45°	60°	90°
sin θ	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
cos θ	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
tan θ	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	∞
cot θ	∞	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0
sec θ	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	∞
cosec θ	∞	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1

Important values to remember:

- $\sqrt{2} = 1.414$
- $\sqrt{3} = 1.732$
- $\sqrt{5} = 2.236$

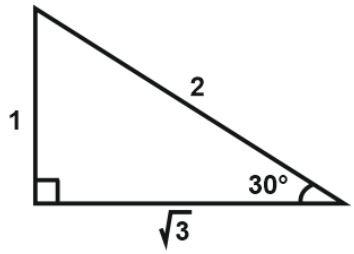
Important Height-Distance ratios to remember:

(i)

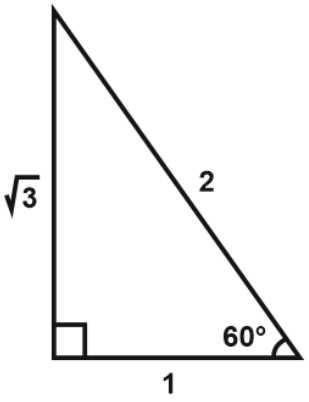


(ii)

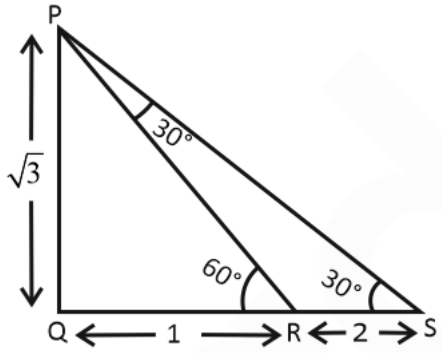
(iii)



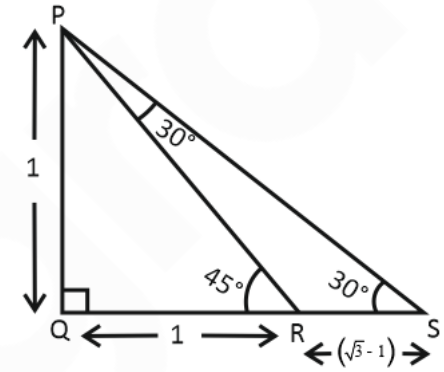
(iv)

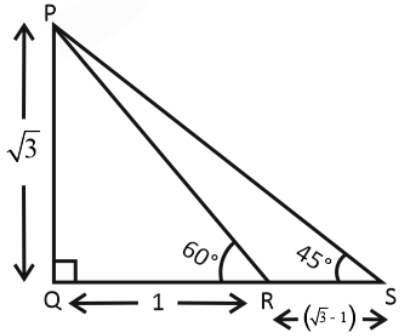


(v)

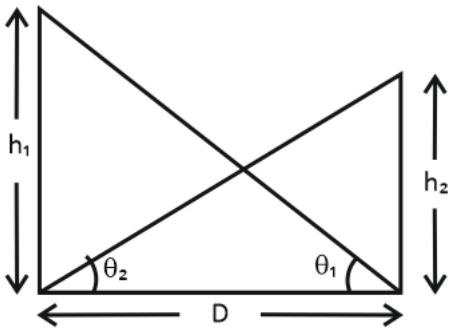


(vi)



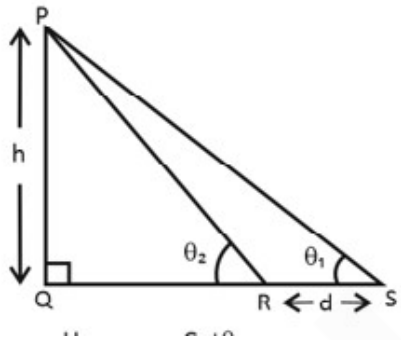


(vii)



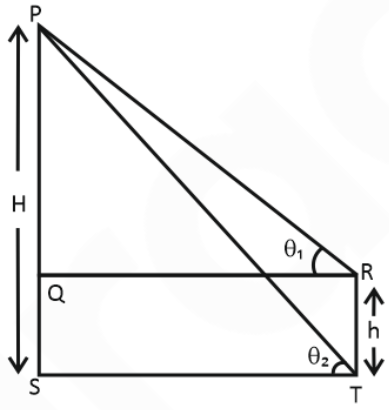
Here, If $\theta_1 + \theta_2 = 90°$ then $D = \sqrt{h_1 \times h_2}$

(viii)



$\text{Here, } d = h(\text{Cot}\theta_1 + \text{Cot}\theta_2)$

(ix)



Here, $\frac{H}{h} = \frac{\text{Cot}\theta_1}{\text{Cot}\theta_1 - \text{Cot}\theta_2}$