

Maths Assignment, Class X  
Chapter - Applications of Trigonometry

Q.1 MCQ's

1. If a pole 6m high casts a shadow  $2\sqrt{3}$  m long on the ground, then the Sun's elevation is : -  
 (a)  $60^\circ$       (b)  $45^\circ$       (c)  $30^\circ$       (d)  $90^\circ$
2. If the angle of elevation of a tower from a distance of 100m from its foot is  $60^\circ$ , then the height of the tower is  
 (a)  $100\sqrt{3}$  m      (b)  $\frac{100}{\sqrt{3}}$  m      (c)  $50\sqrt{3}$  m      (d)  $\frac{50}{\sqrt{3}}$  m
3. If the angles of elevation of a tower from two distant points a & b ( $a > b$ ) from its foot and in the same straight line from it are  $30^\circ$  &  $60^\circ$ , then the height of the tower is  
 (a)  $\sqrt{a+b}$       (b)  $\sqrt{ab}$       (c)  $\sqrt{a-b}$       (d)  $\sqrt{\frac{a}{b}}$
4. The length of the shadow of a tree 8m high, when the Sun's elevation is  $45^\circ$ , is  
 (a)  $\frac{8}{\sqrt{3}}$  m      (b)  $8\sqrt{3}$  m      (c) 8 m      (d)  $16\sqrt{3}$  m
5. A ladder 15m long leans against a wall making an angle of  $60^\circ$  with the wall. The height of the point where the ladder touches the wall is  
 (a)  $15\sqrt{3}$  m      (b)  $\frac{15\sqrt{3}}{2}$  m      (c)  $30\sqrt{3}$  m      (d) 30 m
6. If the angles of elevation of the top of a tower from two points distant a & b from the base and in the same straight line with it are complementary, then the height of the tower is  
 (a) ab      (b)  $\sqrt{ab}$       (c)  $\frac{a}{b}$       (d)  $\sqrt{\frac{a}{b}}$
7. A ladder reaches a point on a wall which is 20m above the ground and its foot is  $20\sqrt{3}$  m away from the ground. The angle made by the ladder with the wall is  
 (a)  $90^\circ$       (b)  $60^\circ$       (c)  $45^\circ$       (d)  $30^\circ$

- Q.2 The angle of elevation of the top of a tower from two points distant a & b from its foot are complementary. Prove that the height of the tower is  $\sqrt{ab}$ .

Q.3 At a point, the angle of elevation of a tower is such that its tangent is  $\frac{5}{12}$ . On walking 240 m ~~near~~ nearer to the tower, the tangent of the angle of elevation becomes  $\frac{3}{4}$ . Find the height of the tower.

Q.4 A ladder rests against a vertical wall at an inclination  $\alpha$  to the horizontal. Its foot is pulled away from the wall through a distance  $b$  so that its upper end slides a distance  $q$  down the wall and then the ladder makes an angle  $\beta$  to the horizontal. Show that  $\frac{b}{q} = \frac{\cos\beta - \cos\alpha}{\sin\alpha - \sin\beta}$

Q.5 The lower window of a house is at a height of 2m above the ground and its upper window is 4m vertically above the lower window. At certain instant, the angles of elevation of a balloon from these windows are observed to be  $60^\circ$  &  $30^\circ$  respectively. Find the height of the balloon above the ground.

Q.6 The angle of elevation of a jet plane from a point A on the ground is  $60^\circ$ . After a flight of 30 seconds, the angle of elevation changes to  $30^\circ$ . If the jet plane is flying at a constant height of  $3600\sqrt{3}$ m, find the speed of the jet plane.

Q.7 - An aeroplane when flying at a height of 4000m from the ground passes vertically above another aeroplane at an instant when the angles of elevation of the two planes from the same point on the ground are  $60^\circ$  and  $45^\circ$  respectively. Find the vertical distance b/w the aeroplanes at that instant.

Q.8 - From a balloon vertically above a straight road, the angle of depression of two cars at an instant are found to be  $45^\circ$  and  $60^\circ$ . If the cars are 100 m apart, find the height of the balloon.

Q.9 If the angle of elevation of a cloud from a point  $h$  metres above a lake is  $\alpha$  and angle of depression of its reflection in the lake be  $\beta$ , prove that the distance of the cloud from the point of observation is  $\frac{2h \sec\alpha}{\tan\beta - \tan\alpha}$ .

Q.10 The angle of elevation of a jet plane from a point A on the ground is  $60^\circ$ . After a flight of 15 seconds, the angle of elevation changes to  $30^\circ$ . If the jet plane is flying at a constant height of  $1500\sqrt{3}$  m, find

Q.11 From a window ( $h$  metres high above the ground) of a house in a street, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are  $\theta$  and  $\phi$  respectively. Show that the height of the opposite house is  $h \frac{(1 + \tan \theta)}{\cot \phi}$

Q.12 The shadow of a flagstaff is three times as long as the shadow of the flagstaff when the Sun rays meet the ground at an angle of  $60^\circ$ . Find the angle between the Sun rays and the ground at the time of longer shadow.

Q.13 If the angle of elevation of a cloud from a point  $h$  metres above a lake is  $\alpha$  and the angle of depression of its reflection in the lake is  $\beta$ , prove that the height of the cloud is  $\frac{h(\tan \beta + \tan \alpha)}{\tan \beta - \tan \alpha}$

Q.14 The angle of elevation of a cliff from a fixed point is  $\theta$ . After going up a distance of  $k$  metres towards the top of the cliff at an angle of  $\phi$ , it is found that the angle of elevation is  $\alpha$ . Show that the height of the cliff is  $\frac{k(\cos \phi - \sin \phi \cot \alpha)}{\cot \theta - \cot \alpha}$  metres

Q.15 From an aeroplane vertically above a straight horizontal plane, the angles of depression of two consecutive kilometres stones on the opposite sides of the aeroplane are found to be  $\alpha$  and  $\beta$ . Show that the height of the aeroplane is  $\frac{\tan \alpha \cdot \tan \beta}{\tan \alpha + \tan \beta}$