

CLASS: X

SUB: Mathematics

TOPIC: Heights and Distances

1. A 1.6 m tall girl stands at a distance of 3.2m from a lamp post and casts a shadow of 4.8 m on the ground. Find the height of the lamp post (2.6m)
2. A man standing on the deck of a ship, which is 10 m above water level, observes the angle of elevation of the top of a hill is 60° and the angle of depression of the base of the hill is 30° . Calculate the distance of the hill from the ship and the height of the hill (10 $\sqrt{3}$ m, 40m)
3. The angle of elevation of a cloud from a point 60m above a lake is 30° and angle of depression of the reflection of cloud in the Lake is 60° . Find the height of the cloud. (120 m)
4. The angle of elevation of a jet plane from a point A on the ground is 60° . After a flight of 15 sec the angle of elevation changes to 30° . If the jet plane is flying at a constant height of 1500 $\sqrt{3}$ m, then find the speed of jet plane. (720 km /hr)
5. A vertical tower stands on a horizontal plane and is surmounted by a vertical flagstaff of height h. At a point on the plane, the angles of elevation at the bottom and the top of the flagstaff are α and β respectively. Prove that the height of the tower is $h \tan \alpha / \tan \beta - \tan \alpha$
6. The angle of elevation of the top of a tower from two points at distances a and b metres from the base and in the same straight line with it are complementary. Prove that height of the tower is $\sqrt{ab}$ metres.
7. The angles of elevation of the top of a rock from the top and foot of a 100 m high tower are 30° and 45° respectively. Find the height of the rock. (236.5 m)
8. A boy is standing on the ground and is flying a kite with 100m of string at an elevation of 30° . Another boy is standing on the roof of a 10m high building and is flying his kite at an elevation of 45° . Both the boys are on opposite sides of the kite's. Find the length of the string that the Second boy must have so that two kites meet. (40 $\sqrt{2}$ m)
9. the shadow of a tower standing on a level ground is found to be 40 m longer when the sun's altitude is 30° than when it is 60° . Find the height of the tower. (20 $\sqrt{3}$ m)
- 10) The angle of elevation θ of a vertical tower from a point on ground is such that its tangent is $5/12$. On walking 192m towards the tower in the same straight line, the tangent of the angle of elevation is found to be $3/4$. Find the height of the tower (180 m)
- 11) A bird is sitting on the top of a tree, which is 80m high. The angle of elevation of the bird, from a point on the ground is 45° . The bird flies away from the point of observation horizontally and remains at a Constant height. After 2 sec, the angle of Elevation of the bird from the point of observation becomes 30° . Find the speed of flying of the bird (29.28m/sec)
- 12) An aero plane at an altitude of 200m observes the angles of depression of opposite points on the two banks of a river to be 45° and 60° . Find the width of the river (315.4m)
- 13) Two men on either side of a cliff, 60m high, observe the angles of elevation of the top of the cliff to be 45° and 60° respectively. Find the distance between two men (94.6m)
