

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 ϕ 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)
14. From the top of a tower the angle of depression of an object on the horizontal ground is found to be 60° . On descending 20m Vertically downwards from the top of the tower, the angle of depression of the object is found to be 30° . Find the height of the Tower. (30 m)
15. A pole 6 m high casts a shadow $2\sqrt{3}$ m long on the ground, then the sun 's elevation is
a) 60° b) 45° c) 30° d) 90°
16. If $AB = 4$ m and $AC= 8$ m , then angle of observation of A as observed from C is
a) 60° b) 30° c) 45° d) cannot be determined
17. When the sun is 30° above the horizontal, the length of shadow cast by 50 m building is
a) $50/\sqrt{3}$ m b) $50\sqrt{3}$ m c) $25\sqrt{3}$ m d) none of these
18. When the height of the shadow of a pole is equal to the height of the pole then the elevation of source of light is
a) 30° b) $20\sqrt{3}$ c) 60° d) 45°
19. The angle formed by the line of sight with the horizontal, when the point being viewed is above the horizontal level is called
a) Vertical angle b) angle of depression c) angle of elevation d) obtuse angle

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