Class – X	CHAPTER – APPLICATION OF TRIGONOMETRY	SUBJECT – MATHEMATICS

1. The top of two poles of height 16 m and 10 m are connected by a wire. If the wire makes an angle of 30° with the horizontal, then find the length of the length of the wire.
2. The ratio of the length of a rod and its shadow is 1 : $\sqrt{3}$. Find the angle of elevation of the sun.
3. If the shadow of a tower is 30 m long, when the sun's elevation is 30°, what is the length of the shadow when sun's elevation is 60°.
4. The length of a string between a kite and a point on the ground is 93.5 m. If the string makes an angle of θ with the level of ground such that tan θ = $\frac{15}{8}$,then find how high is the kite.
5. A man who is $1\frac{3}{4}$ m tall sees that angle of elevation of the top of a temple is 30°. If the distance between the man and temple is 15 m, find the height of the temple.
6. The horizontal distance between two poles is 15 m. The angle of depression of the top of the first pole as seen from the top of the second pole is 30°. If the height of the second pole is 24 m, find the height of the first pole.
7. From a point P on the ground, the angles of elevation of a 10 m tall building and of helicopter, hovering at some height over the top of the bulding, are 30° and 60°, respectively. Find the height of the helicopter above the ground.
8. The angle of elevation of the top of a tower from a certain point is 3°0. If the observer moves 20 m towards the tower, the angle of elevation of the top increases by 15°. Find the height of the tower.
9. A boy standing on a horizontal plane finds a bird flying at a distance of 100 m from him at an elevation of 30°. A girl standing on the roof of 20 m high building finds the angle of elevation of the same bird to be 45°. Both the boy and the girl are on opposite sides of the bird. Find the distance of the bird from the girl.
10. A man sitting at a height of 20 m on a tall tree on a small island in the middle of the river observes two poles directly opposite each other on the two banks of the river and in line with the foot of the tree. If the angle of depression of the feet of the poles from a point at which the man is sitting on the tree on either side of the river are 60° and 30° respectively, find the width of the river.
11. A boy, who's eye level is 1.3 m from the ground, spots a balloon moving with the wind in a horizontal line at some height from the ground. The angle of elevation of the the balloon from the eyes of the boy at any instant is 60°. After 12 seconds, the angle of elevation reduces to 30°. If the speed of the wind at that moment is $29\sqrt{3}$ m/s, then find the height of the balloon from the ground.
12. Two hoardings on cleanliness are put on two poles of equal height stands on either side of a roadway which is 150 m wide. From a point on the roadway between the poles, the

elevations of the top of the poles are 60° and 30°. Find the height of the poles and the position of the point.

How can we spread awareness for cleanliness in a society?

13. The angle of elevation and depression of the top and bottom of a lighthouse from the top of a 60 m high building are 30° and 60° respectively. Find :
    (i) The difference between the heights of the lighthouse and the building.
    (ii) The distance between the lighthouse and the building.
14. A man standing on the deck of a ship, which is 16 m above the water level, observes the angle of elevation of the top of a cliff as 60° and the angle of depression of the base of the cliff as 30°. Calculate the distance of the cliff from the ship and the height of the cliff.
15. From a window h metres high above the ground the angle of elevation and depression of the top and the foot of another house on the opposite of the street are θ and $\emptyset$ respectively. Show that the height of the opposite house is $h(1 + \tan\theta \cot\emptyset)$.
16. An aeroplane, when 3000 m high, passes vertically above another plane at an instant when the angle of elevation of the two aeroplanes from the same point on the ground are 60° and 45° respectively. Find the vertical distance between the two aeroplanes.
17. The angle of elevation of the top of a tower 30 m high from the foot of another tower in the same plane is 60° and the angle of elevation of the top of the second tower from the foot of the first tower is 30°. Find the distance between the two towers and also the height of the other tower.
18. From a point 100 m above a lake, the angle of elevation of a stationary helicopter is 30° and the angle of depression of reflection of the helicopter in the lake is 60°. Find the height of the helicopter.
19. The lower window of a house is 2 m above the ground and its upper window is 4 m vertically above the lower window. At a certain instant, the angle of elevation of a balloon from these windows are observed to be 60° and 30° respectively. Find the height of the balloon above the ground.
20. At the foot of a mountain the elevation of its summit is 45°, after ascending 1000 m towards the mountain up a slope of 30° inclination, the elevation is found to be 60°. Find the height of the mountain.

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