# MATHEMATICS

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| Board – | Class – | Topic – |

1. The tops of two towers of height x and y, standing on level ground, subtend angles of 30° and 60° respectively at the centre of the line joining their feet, then find x:y

   **Ans: - 1:3**

2. A man standing on the bank of a river observes that the angle of elevation of the top of a tree standing on the opposite bank is 60°. When he moves 40 metres away from the bank, he finds the angle of elevation to be 30°. Find the height of the tree.

   **Ans: $20\sqrt{3}$ m**

3. Two men on either side of a 75 m high building and in line with base of building observe the angles of elevation of the top of the building as 30° and 60°. Find the distance between the two men **Ans:- 155.7 m**

4. The angle of elevation of an aeroplane from a point A on the ground is 60°. After a flight of 15 seconds, the angle of elevation changes to 30°. If the aeroplane is flying at a constant height of 1500/3 m, find the speed of the plane in km/hr.

   **Ans:- 720 km/hr**

5. The angle of elevation of an aeroplane from a point on the ground is 60°. After a flight of 30 seconds the angle of elevation becomes 30°. If the aeroplane is flying at a constant height of 3000√3 m, find the speed of the aeroplane. **Ans:- 720 km/hr**

6. Two ships are approaching a lighthouse from opposite directions. The angles of depression of the two ships from the top of the lighthouse are 30° and 45°. If the distance between the two ships is 100 m, find the height of the lighthouse. **Ans:- 36.6 m**

7. The horizontal distance between two poles is 15 m. The angle of depression of the top of first pole as seen from the top of second pole is 30°. If the height of the second pole is 24 m, find the height of the first pole **Ans:- 15.34 m**

8. As observed from the top of a 60 m high lighthouse from the sea-level, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships.

   **Ans:- 43.92 m**

9. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 60 m high, find the height of the building. **Ans:- 20 m**

10. Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° respectively. Find the height of the poles and the distances of the point from the poles. **Ans:- 20 m, 60 m**

11. The angle of elevation of a cloud from a point 60 m above a lake is 30° and the angle of depression of the reflection of the cloud in the lake is 60°. Find the height of the cloud from the surface of the lake. **Ans: 120 m**

12. The shadow of a tower standing on a level ground is found to be 20 m longer when the sun's altitude is 45° than when it is 60°. Find the height of the tower.

   **Ans:- 47.31 m**

13. From the top of a tower 50 m high, the angle of depression of the top of a pole is 45° and from the foot of the pole, the angle of elevation of the top of the tower is 60°. Find the height of the pole if the pole and tower stand on the same plane

   **Ans:- 21.16 m**

14. A vertical pedestal stands on the ground and is surmounted by a vertical flagstaff of height 5 m. At a point on the ground, the angles of elevation of the bottom and the top of the flagstaff are 30° and 60° respectively. Find the height of the pedestal.

   **Ans : 2.5 m**

15. From a window (9 m above the ground) of a house in a street, the angles of elevation and depression of the top and foot of another house on the opposite side of the street are 30° and 60° respectively. Find the height of the opposite house and the width of the street

   **Ans:- height- 12 m and width – 5.196 m**

16. A man on the deck of a ship, 12 m above water level, observes that the angle of elevation of the top of a cliff is 60° and the angle of depression of the base of the cliff is 30°. Find the distance of the cliff from the ship and the height of the cliff.

   **Ans:- distance- 20.784m and height- 48m**

17. From the top of a 7 m high building, the angle of elevation of the top of a tower is 60° and the angle of depression of the foot of the tower is 30°. Find the height of the tower

   **Ans:- 28 m**

18. From a point on the ground, the angles of elevation of the bottom and top of a transmission tower fixed at the top of a 10 m high building are 30° and 60° respectively. Find the height of the tower.                                                                    **Ans:- 30 m**

19. From the top of a 15 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 30°. Determine the height of the tower.

    **Ans:- 60 m**

20. The angle of elevation of the top of a vertical tower from a point on the ground is 60°.From another point 10 m vertically above the first, its angle of elevation is 30. Find the height of the tower.                                                                    **Ans:- 15m**

21. The angles 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

    a)   the difference between the heights of the lighthouse and the building.
    b)   the distance between the lighthouse and the building          **Ans:- (a) 20m (b) $20\sqrt{3}$ m**

22. A bird is sitting on the top of a 80 m high tree. From a point on the ground, the angle of elevation of the bird is 45°. The bird flies away horizontally in such a way that it remained at a constant height from the ground. After 2 seconds, the angle of elevation of the bird from the same point is 30°. Find the speed of flying of the bird.

    **Ans:- 29.28 m/s**

23. The angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are 60° and 30° respectively. Find the height of the tower.                                                       **Ans:- $4\sqrt{3}$**

24. The angle of elevation of the top Q of a vertical tower PQ from a point X on the ground is 60°. From a point Y, 40 m vertically above X, the angle of elevation of the top Q of tower is 45°. Find the height of the tower PQ and the distance PX.

    **Ans:- height- 94.6 m and distance- 54.6 m**

25. From a point on the ground, the angle of elevation of the top of a tower is observed to be 60°. From a point 40 m vertically above the first point of observation, the angle of elevation of the top of the tower is 30°. Find the height of the tower and its horizontal distance from the point of observation.                                                       **Ans:- 34.641 m**

26. An observer 1.5m tall is 20.5 meters away from a tower 22m high. Determine the angle of elevation of the top of the tower from the eye of the observer. **Ans:- 45°**

27. A ladder 15m long just reaches the top of vertical wall. If the ladder makes an angle 600 with the wall, find the height of the wall **Ans:- 15/2 m**

28. Find the angle of elevation of the sun's altitude when the height of the shadow of a vertical pole is equal to its height: **Ans:- 450**

29. A ladder 50m long just reaches the top of a vertical wall. If the ladder makes an angle of 600 with the wall, find the height of the wall. **Ans:- 25 m**

30. A circus artist is climbing a 20m long rope, which is tightly stretched and tied from the top of a vertical pole to the ground. Find the height of the pole, if the angle made by the rope with the ground level is 30°. **Ans:- 10 m**

31. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle 30 with it. The distance between the foot of the tree to the point where the top touches the ground is 8m. Find the height of the tree.

**Ans:-8√3 m**

32. The shadow of a tower standing on a level plane is found to be 50m longer when sun's elevation is 30°.then when it is 60°. Find the height of the tower. **Ans:-25√3 m**

33. The angle of depression of the top and bottom of a tower as seen from the top of a 100m high cliff are 30° and 60° respectively. Find the height of the tower.

**Ans:-.66.67m**

34. From the top of a hill, the angle of depression of two consecutive kilometer stones due east are found to be 30° and 45°. Find the height of the hill. **Ans:- 1.37 km**

35. Two poles of equal heights are standing opposite each other on either side of the road, which is 80m wide. From a point between them on the road the angles of elevation of the top of the poles are 60∘ and 30∘. Find the heights of pole and the distance of the point from the poles. **Ans:-h=34. 64m; 20m, 60m.**

36. The angle of elevation of a jet fighter from a point A on the ground is 60°. After a flight of 15 seconds, the angle of elevation changes to 30°. If the jet is flying at a speed of 720km/ hr, find the constant height at which the jet is flying. **Ans:-1500m**

37. A window in a building is at a height of 10m above the ground. The angle of depression of a point P on the ground from the window is 30°. The angle of elevation of the top of the building from the point P is 60°. Find the height of the building. **Ans:- 30m**

38. A man on the deck on a ship 14m above water level, observes that the angle of elevation of the top of a cliff is 60°and the angle of depression of the base of the cliff is 30°. Calculate the distance of the cliff from the ship and the height of the cliff.

**Ans:-h= 56m, distance 24.25m**

39.A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30°, which is approaching the foot of tower with a uniform speed Six minutes later, the angle of depression of the car is found to be 60°. Find the time taken by the car to reach the foot of the tower. **Ans:-3 minutes**