Class 10 Maths Worksheets

🎀 **Chapter 9: Application of trigonometry**

🔴 **Section A: MCQs**(1 mark each)

1. The angle of elevation of the top of a tower from a point 20 m away from its base is 45°. The height of the tower is:
   a) 10 m
   b) 20 m
   c) 30 m
   d) 40 m

2. If the length of the shadow of a pole is equal to its height, the angle of elevation of the Sun is:
   a) 30°
   b) 45°
   c) 60°
   d) 90°

3. A ladder 15 m long leans against a wall making an angle of 60° with the ground. How far is the foot of the ladder from the wall?
   a) 7.5 m
   b) (15√3)/2 m
   c) 15√3 m
   d) 5√3 m

4. From the top of a 30 m high tower, the angle of depression of an object on the ground is 30°. The distance of the object from the tower is:
   a) 10√3 m
   b) 30√3 m
   c) 20√3 m
   d) 15√3 m

5. The angle of elevation of a cloud from a point *h* meters above a lake is 30°, and the angle of depression of its reflection is 60°. The height of the cloud is:
   a) h m
   b) 2h m
   c) (h√3)/2 m
   d) 3h/2 m

🟢 **Section B: Competency based questions**(2 marks each)

6. A kite is flying at a height of 60 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. If the inclination of the string with the ground is 60°, find the length of the string.

7. Two poles of heights 10 m and 15 m stand vertically on a plane ground. If the distance between their feet is 5 m, find the distance between their tops.

8. A moving boat is observed from the top of a 100 m high cliff. The angle of depression changes from 30° to 45° in 2 minutes. Find the speed of the boat in m/s.

🔵Section C: Short Answer type(3 marks each)

9. The angle of elevation of the top of a building from the foot of a 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 50 m high, find the height of the building.

10. A statue 3 m tall stands on a pedestal such that its foot is at the same level as an observer's eye level. If the angle of elevation of the top of the statue is 45° and that of the pedestal is 30°, find the height of the pedestal.

11. 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 20 m high building are 45° and 60° respectively. Find the height of the tower.

🟡Section D: Long answer type(5 marks each)**
12. A man standing on the deck of a ship, 10 m above the water level, observes that 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.

13. Two ships are sailing in the sea on either side of a lighthouse. The angles of depression of the two ships as observed from the top of the lighthouse are 45° and 30°. If the lighthouse is 200 m high, find the distance between the two ships. (Use √3 = 1.732)

14. A vertical tower stands on a horizontal plane and is surmounted by a vertical flagstaff of height 6 m. At a point on the plane, the angles of elevation of the bottom and top of the flagstaff are 30° and 45° respectively. Find the height of the tower.

✅Answer key (Brief Solutions)**
1. **b) 20 m** (tan 45° = 1 ⇒ height = distance)
2. **b) 45°** (since tan θ = height/shadow = 1 ⇒ θ = 45°)
3. **a) 7.5 m** (cos 60° = distance/15 ⇒ distance = 15 × ½ = 7.5 m)
4. **b) 30√3 m** (tan 30° = 30/distance ⇒ distance = 30√3 m)
5. **b) 2h m** (Solve using trigonometric relations for cloud height)