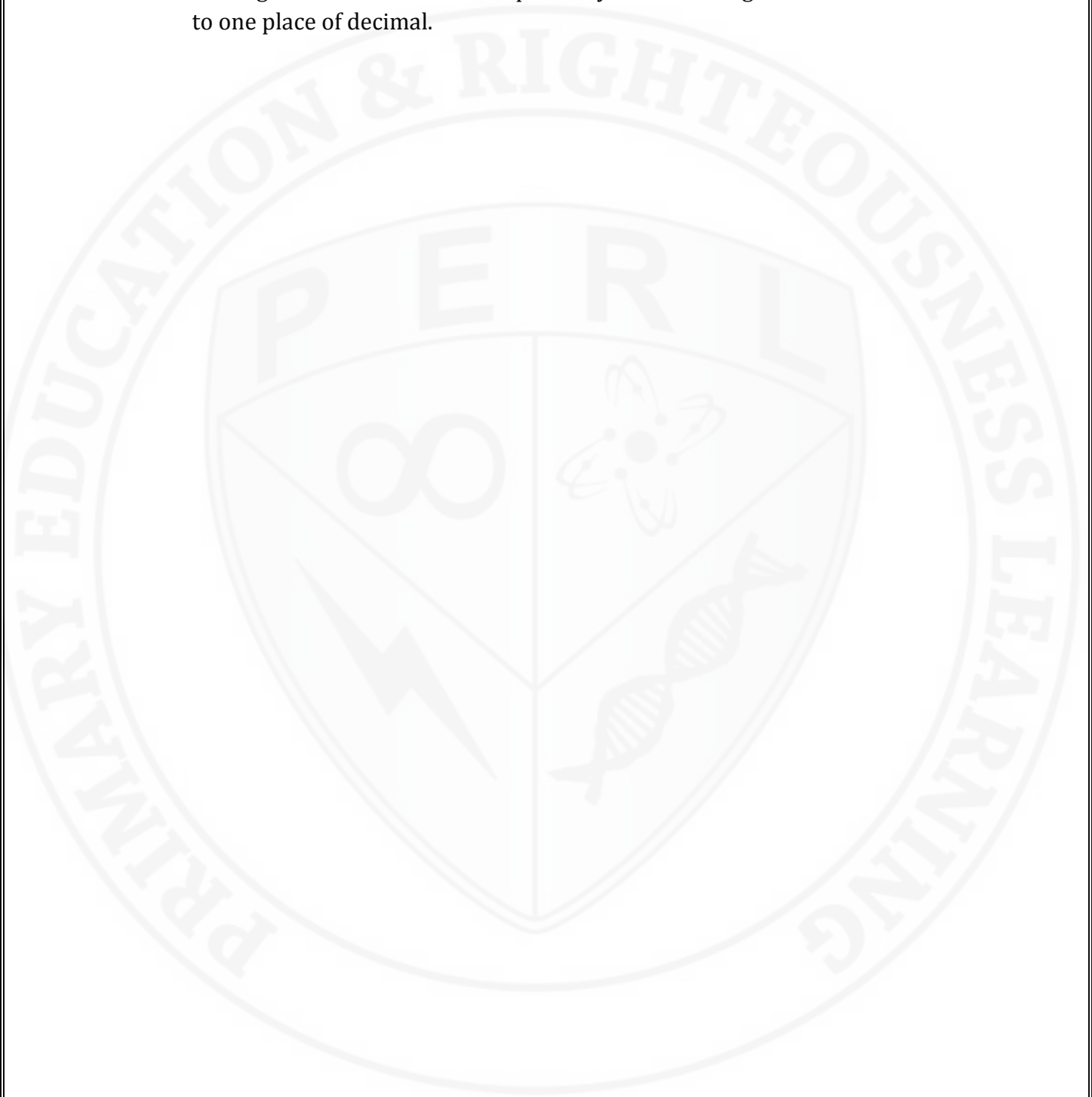


- 1) The angle of elevation of the top of a tower at a distance of 150 metres from its foot on a horizontal plane is found to be  $30^\circ$ . Find the height of the tower correct to one place of decimal.
- 2) What is the angle of elevation of the sun when the length of the shadow of a pole is  $\sqrt{3}$  times the height of the pole.
- 3) A circus artist is climbing a rope stretched from the top of a pole and fixed at the ground. The height of the pole is 15 m and the angle, made by the rope with ground level is  $38^\circ 20'$ . Calculate the distance covered by the artist in climbing to the top of the pole.
- 4) An observer 1.5 m tall is 20m away from a tower 30m high. Determine the angle of elevation from his eye to the top of the tower.
- 5) The angle of depression of a boat B from the top K of cliff HK, 300 metres high, is  $40^\circ$ . Find the distance of the boat from the foot H of the cliff.
- 6) From a light house the angles of depression of two ships on opposite side of the light house are observed to be  $30^\circ$  and  $45^\circ$ . If the height of light house be 300 metres, find the distance between the ships if the line joining them passes through the foot of the light house.
- 7) A man sitting in an aeroplane observes that the angles of depression of two temples 2 km apart are  $60^\circ$ . If the plane is exactly above the middle point of the line joining the temples, calculate its height.
- 8) The angle of depression of a 37 m high building from the top of a tower 117 m high is  $30^\circ$ . Calculate the distance between the building and the tower.
- 9) The angular elevation of a tower from a point is  $30^\circ$ , at a point in a horizontal line to the foot of the tower and 100 metres nearer it is  $60^\circ$ , find the height of the tower. Find also the distance of the first point from the tower.
- 10) From the top of a cliff, 200 metres high, the angle of depression of the top and bottom of a tower are observed to be  $30^\circ$  and  $60^\circ$ , find the height of the tower.
- 11) A man on the roof of a house, which is 10 m high, observes the angle of elevation of the building as  $42^\circ$  and angle of depression of the base of the building as  $40^\circ$ . Find the height of the building and its distance from the house.
- 12) The angle of elevation of a jet plane from a point A on the ground is  $60^\circ$ . After a flight of 15 seconds, the angle of elevation changes to  $30^\circ$ . If the jet plane is flying at a constant height of  $1500\sqrt{3}$  m, find the speed of the jet plane.
- 13) Two pillars are of equal height and on either sides of a road, which is 100m wide. The angles of elevation of the top of the pillars are  $60^\circ$  and  $30^\circ$  at a point on the road between the pillars. Find the position of the point between the pillars and the height of each pillar.
- 14) A man on a cliff observes a boat at an angle of depression of  $30^\circ$  which is approaching the shore to the point immediately beneath the observer with a

uniform speed. Six minutes later, the angle of depression of the boat is found to be  $60^\circ$ . Find the time taken by the boat to reach the shore.

- 15) A 7 metres long flagstaff is fixed on the top of a tower on the horizontal plane. From a point on the ground the angles of elevation of the top and bottom of the flagstaff are  $45^\circ$  and  $36^\circ$  respectively. Find the height of the tower correct to one place of decimal.



1. The length of the shadow of a vertical tower is  $\sqrt{3}$  times its height. Find the angle of elevation of the sun.
2. The angle of elevation of the top of a tower at a distance of 120 m from its foot on a horizontal plane is found to be  $30^\circ$ . Find the height of the tower.
3. A guard observes an enemy boat, from an observation tower at a height of 180 m above sea level, to be at an angle of depression of  $29^\circ$ 
  - i. Calculate, to the nearest metre, the distance of the boat from the foot of the observation tower.
  - ii. After some time, it is observed that the boat is 200m from the foot of the observation tower. Calculate the new angle of depression.
4. Two people standing on the same side of a tower in a straight line with it. Measure the angles of elevation of the top of the tower as  $25^\circ$  and  $50^\circ$  respectively. If the height of the tower is 70m, find the distance between the two people.
5. The length of the shadow of a vertical tower on level ground increases by 10m, when the altitude of the sun changes from  $45^\circ$  to  $30^\circ$ . Calculate the height of the tower, correct to two decimal places.
6. An observer on the top of cliff; 200m above the sea-level, observes the angles of depression of the two ships to be  $45^\circ$  to  $30^\circ$  respectively. Find the distance between the ships. If the ships are:
  - i. On the same side of the cliff,
  - ii. On the opposite sides of the cliff.
7. A man on the top of a vertical observation tower observes a car moving at a uniform speed coming directly towards it. If it takes 12 minutes for the angle of depression to change from  $30^\circ$  to  $45^\circ$ , how soon after this will the car reach the observation tower?
8. The angle of elevation of a stationary cloud from a point 25m above a lake is  $30^\circ$  and the angle of depression of its reflection in the lake is  $60^\circ$ . What is the height of the cloud above that lake-level?
9. From a point on the ground, the angle of elevation of the tip of a vertical tower is found to be such that its tangent is  $\frac{3}{5}$ . On walking 50 m towards the tower the tangent

of the new angle of elevation of the top of the tower is found to be  $\frac{4}{5}$ . Find the height of the tower.

- 10.** A vertical pole and a vertical tower are on the same level ground. From the top of the pole the angle of elevation of the top of the tower is  $60^\circ$  and the angle of depression of the foot of the tower is  $30^\circ$ . Find the height of the tower if the height of the pole is 20m.