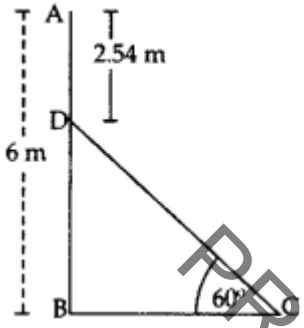
SOME APPLICATIONS OF TRIGNOMETRY-PRACTICE WORKSHEET

(3 MARKS QUESTIONS)

1. In the figure, AB is a 6 m high pole and CD is a ladder inclined at an angle of 60° to the horizontal and reaches up to a point D of pole. If AD = 2.54 m. Find the length of the ladder. (Use $\sqrt{3} = 1.73$



2. 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.

3. The angles of depression of two ships from the top of a light house and on the same side of it are found to be 45° and 30°. If the ships are 200 m apart, find the height of the light house.

4. The angle of elevation of the top of the tower from two points at the distance of 4m and 9m from the base of the tower and in the same straight line with it are complementary. Find height of tower?

5. An observer 1.5m tall is 28.5m away from a chimney . The angle of elevation of the top of the chimney from her eyes is 45^0. What is the height of the chimney. ?

6. If a tower 30 m high, casts a shadow $10\sqrt{3}$ m long on the ground, then what is the angle of elevation of the sun?

7. A tree is break due to storm and the broken part bends so that the top of the tree touches the ground making an angle 30^0 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.
8. As observed from the top of a 60 m high light house 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 light-house, find the distance between the two ships. (Use $\sqrt{3} = 1.732$]

9. The shadow of a tower standing on 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.

10. The angle of elevation of the top of a tower from two points distant a and b from its foot are complementary. Prove that the height of the tower is √ab

11. The angle of elevation of the top of a hill at the foot of a tower is 60° and the angle of elevation of the top of the tower from the foot of the hill is 30°. If the tower is 50 m high, what is the height of the hill?

12. 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

13. 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. The inclination of the string with the ground is 60°. Find the length of the string, assuming that there is no slack in the string.

14. From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45° respectively. If the bridge is at a height of 3 m from the banks, find the width of the river.

15. A man standing on the deck of a ship, which is 10 m above the water level, observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of the hill as 30°. Calculate the height of the hill.

Long answer question (4 marks)

1 . The angles of elevation and depression of the top and bottom of a lighthouse from the top of a building, 60 m high, are 30° and 60° respectively. Find
(i) the difference between the heights of the lighthouse and the building.
(ii) distance between the lighthouse and the building.

2. A vertical tower stands on a horizontal plane and is surmounted by a flagstaff of height 5 m. From a point on the ground the angles of elevation of the top and bottom of the flagstaff are 60° and 30° respectively. Find

(1). The height of the tower .

(2) The distance of the point from the tower. (Take √3 = 1.732)

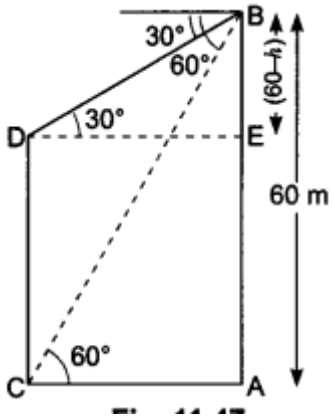
3. The angles of depression of the top and the bottom of a 8 m tall building from the top of a multi-storied building are 30° and 45°, respectively. Find

(1)The height of the multi-storied building

(2) The distance between the two buildings.

4. In Figure , from the top of a building AB, 60 meters high, the angles of depression of the top and bottom of a vertical lamp post CD height h meter are observed to be 30° and 60°, respectively. Find

(i) the horizontal distance between AB and CD.
(ii) the height of the lamp post.



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.

6. A TV tower stands vertically on bank of a canal. From a point on the other bank directly opposite the tower, the angle of elevation of the top of tower is 60^0. From another point 20m away from this point on the line joining this point to the foot of the tower, the angle of elevation of the tower is 30^0. Find

1.The height of the tower
2.The width of the canal.

7. 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 of the bottom and top of the flagstaff are α and β respectively. Prove that the height of the tower is $\frac{h\tan\alpha}{\tan\beta-\tan\alpha}$

8. A spherical balloon of radius r subtends an angle α at the eye of an observer. If the angle of elevation of its center is β find the height of centre of the balloon.

9. A man on the deck of a ship, which is 10 m above water level, observes the angle of elevation of the top of a cliff as 60^0 and the angle of depression of the base of the cliff as 30^0. Calculate

1. The distance of the cliff from the ship
2. The height of the cliff.

10. At a point, the angle of elevation of a tower is such that its tangent is 5/12 On walking 240 m to the tower, the tangent of the angle of elevation becomes 3/4. Find the height of the tower.

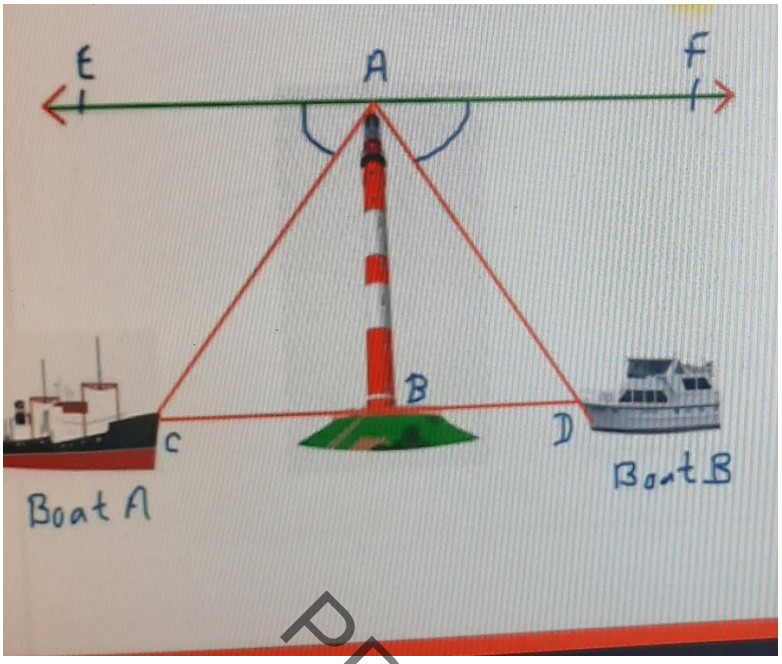
11. A group of students of class X visited India gate on an education trip the teacher and students had interested in history as well. the narrate the India gate. Official name Delhi Memorial originally called All- India War Memorial, monumental sand stone arch in new Delhi dedicated to the troops of British India who died in wars fought between 1914 and 1919. The teacher also said that india gate, which is located at the eastern end of the Rajpath (formerly called the Kingsway) is about 138 feet (42 metres) in height.

(i) if the altitude of the sun is at 60^0. then the height of the vertical tower that will cast a shadow of length 20 m is?

(ii) The ratio of the length of a Rod and its shadow is 1:1. The angle of elevation of the sun is?

12. Mr. Ram observing from the top of light house finds that Boat A and Boat B are approaching to light house from opposite direction he finds that the angle of depression of boat A is 45^0 and angle

of depression of Boat B is 30^0.He also is aware of the height of the light house is 100m

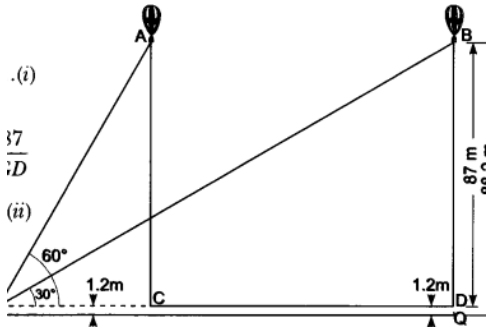


Answer the following question.

1 find length of BC

2 Find length BD

Q 13. A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60°. After some time, the angle of elevation reduces to 30° (given fFig.). Find the distance travelled by the balloon during the interval.



Q 14. 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 50 m high, find the height of the building.

Q. 15. If the angle of elevation of a cloud from a point h metres above a lake is a and the angle of depression of its reflection in the lake is B, prove that the height of the cloud is h(tanß−tanα)/tanß–tanα

Answers

(3 MARKS)

Que (1.) 4m, Que (2.) 1:3, Que (3.) 273m, Que (4) 6m ,
Que (5) 30m , Que (6) 60^0 Que (8) $8\sqrt{3}$ m Que (9) $30\sqrt{3}$,
Que (10) $\sqrt{ab}$, Que (11)150m , Que (12) 155.7m Que (13) $40\sqrt{3}$m
Que (14) $3(\sqrt{3}+1)$m , Que (15) 40m

(4 MARKS)

Ans1. (i) difference between two light house = 20m

(ii) distance between light house and building = 34.64 m

Ans 2. (i) Height of the tower = 2.5 m

(ii) Distance of point of the point of the tower = 4.33 m

Ans 3. (i) The height of the building = $4(3+\sqrt{3})$ m

(ii) Distance between two building $4\sqrt{3}(3+\sqrt{3})$

Ans 4. (i) Horizontal between AB and CD = $20\sqrt{3}$ m = 34.64m

(ii) Height of lamppost = 40m

Ans 5. 200m/s OR 720km/h

Ans 6. (i) Height of the tower = $10\sqrt{3}$m

(ii) width of the river = 10m

Ans 7. H = $\frac{h \tan \alpha}{\tan \beta - \tan \alpha}$

Ans 8 height h = r sinβ. cosec α/2

Ans 9. (i) Distance of the cliff from the ship = 17.32 m

Ans 10 Height of the tower = 225 m

Ans 11. (i) $20\sqrt{3}$m (ii) 45^0

Ans 12. (i) 100m (ii) $100\sqrt{3}$m

Ans 13. Balloon travel $58\sqrt{3}$ m

Ans 14. Height of the building = 50/3 m

Ans 15 Height of the cloud is h(tanß−tanα)/tanß–tanα