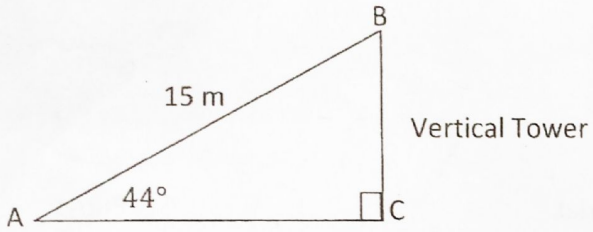
Grade 9 – Angles of Elevation and Depression

SOLVE THE FOLOWING. DRAW AND LABEL A DIAGRAM FOR EACH QUESTON.

1. A sailor sights the top of a cliff at an angle of elevation of 12°. He knows that the height of the cliff is about 90 m above sea level. Find his distance from the base of the cliff to the nearest metre.

2. 

The diagram above shows a vertical tower BC situated on level ground AC. Given that $AB = 15\ m$ and the angle of elevation $BAC = 44°$,

(a) the height of the tower, BC

(b) the distance A from the base of the tower, AC

3. From a point on the ground which is 100 m from the foot of a church tower, the angle of elevation of the top of the tower is 50°. Find the height of the tower.

4. From a point P on the ground which is 100 m from the foot of a church tower, the angle of elevation of the top of the tower is 50°. Find the height of the tower.

5. A girl 1.2 m tall is 25 m away from a tower 18 m high. What is the angle of elevation of the top of the tower from her eyes?

6. A woman 1.7 m tall observes the angle of elevation of a tree to be 24°. If she is standing 15 m from the tree, find the height of the tree.

7. From a point P on the ground level which is 100 m from the foot of a church tower, the angle of elevation of the top of the tower is 35°. What is the height of the tower?

8. An aircraft flying at height of $400m$ measures the angle of depression of the end of the runway as 25°. Find the horizontal distance of the aircraft from the runway.

9. A Man 1.5 m tall standing on top of a vertical building 42 m high sees a truck some distance away where the angle of depression is 53.5°. How far away is the truck from the base of the building?

10. From a coastal lookout point P, $100m$ above sealevel, a sailor sights a boat when the angle of depression is 27°. Calculate the horizontal distance of the boat from the sailor.

11. A woman standing 20 m away from a tower observes the angles of elevation to the top and bottom of a flag-staff standing on the tower as 73° and 70° respectively. Calculate the height of the flag-staff.

12. A surveyor stands 100 m from the base of a tower on which an aerial stands. He measures the angles of elevation to the top and bottom of the aerial as 52° and 49° respectively. Find the height of the aerial.

13. A surveyor stands 100 m from the base of a tower on which an aerial stands. He measures the angles of elevation to the top and bottom of the aerial as 56°and 49°. Find the height of the aerial.

14. A surveyor stands 100 m from the base of a tower on which an aerial stands. He measures the angles of elevation to the top and bottom of the aerial as 63° and 58° respectively. Find the height of the aerial.

15. From a coastal lookout point A, $100\ m$ above the sea, a sailor sights two boats B and C in the same direction. The angles of depression of the two boats are $12°$and $26°$ respectively. Find the distance between the two boats.

16. A Man standing on top of a cliff $90\ m$ high is in line with two buoys whose angles of depression are $15°$ and $19°$. Calculate the distance between the buoys.

17. A Woman of height $1.4\ m$ standing on top of a building $34.6\ m$ high views a tree some distance away. She observes that the angle of depression of the bottom of the tree is $35°$, and the angle of depression of the top of the tree is $29°$. Assume that the building and the tree stand on level ground.

    a) Calculate the distance of the woman from the top of the tree measured along her line of sight.

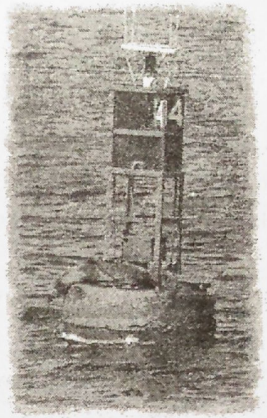
    b) Determine the height of the tree.

18. A Man of height $1.5\ m$ standing on top of a building of height $48.5\ m$ views another building across the square. He observes that the angle of depression of the bottom of the building is $40°$ and the angle of depression of the top of the building is $25°$. Both buildings stand on level ground.

    a) Calculate the distance of the man from the base of the building across the square measured along his line of sight.

    b) Find the height of the building.

Aerial



Buoys

Answers

1. 423 m
2. a) BC = 10.4m
   b) AC =10.8m
3. 119.2m
4. 14.6m
5. 33.9°
6. 8.4m
7. 70m
8. 857.8m
9. 32.2m
10. 196.1m
11. 10.5m
12. 13m
13. 33.3m
14. 36.3m
15. 265.5m
16. 74.5m
17. a) 58.7m
    b) 7.5m
18. a) 77.8m
    b) 22.2m