MATHS

NCERT - NCERT MATHEMATICS(ENGLISH)

SOME APPLICATIONS OF TRIGONOMETRY

Exercise 9 1

1. From the top of a 7 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 45°. Determine the height of the tower.

A. $7(\sqrt{2}+1)m$

B. $7(\sqrt{3}+1)m$

C. $5(\sqrt{3}+1)m$

D. $13(\sqrt{3}+1)m$

Answer: B

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2. As observed from the top of a 75 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.

A. $75\left(\sqrt{3} - 1\right)$m

B. $85\left(\sqrt{3} - 1\right)$m

C. $75\left(\sqrt{3} + 1\right)$m

D. None

Answer: A

3. 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.

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

30°. Find the height of the tower and the width of the canal.

5. 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 complementary. Prove that the height of the tower is 6 m.

6. A 1.2 m tall girl spots a ballon moving with 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 $30°$. Find the distance travelled by the balloon during the interval.

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7. 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 the tower with a uniform speed. Six seconds 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 from this point.

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8. 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.

A. $\dfrac{10}{3}$

B. $\dfrac{20}{3}$

C. $\dfrac{50}{3}$

D. $\dfrac{40}{3}$

Answer: C

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9. A statue, 1.6 m tall, stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is 60° and from the same point the angle of elevation of the top of the pedestal is 45°. Find the height of the pedestal.

10. 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.

11. The angle of elevation of the top of a tower from a point on the ground, which is 30m away from the foot of the tower, is $30°$. Find the height of the tower.

12. From a point on the ground, the angles of elevation of the bottom and the 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.

13. A 1.5m tall boy is standing at some distance from a 30m tall building. The angle of elevation from his eyes to the top of the building increases from $30°$ to $60°$ as he

walks towards the building. Find the distance

he walked towards the building.

A. $13m$

B. $9\sqrt{3}m$

C. $19\sqrt{3}m$

D. None

Answer: C

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14. A circus artist is climbing a 20 m 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 $30°$.

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15. A contractor plans to install two slides for the children to play in a park. For the children below the age of 5 years, she prefers to have a

slide whose top is at a height of 1.5 m, and is inclined at an angle of $30°$ to the ground, whereas for elder children, she wants to have a steep slide at a height of 3m, and inclined at an angle of $60°$ to the ground. What should be the length of the slide in each case?

16. 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 8 m. Find the height of the tree.

Solved Examples

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

storeyed building and the distance between the two buildings.

2. 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.

3. From a point P on the ground the angle of elevation of the top of a 10 m tall building is 30°. A flag is hoisted at the top of the building and the angle of elevation of the top of the flagstaff from P is 45°. Find the length of the flagstaff

A. 5.2m

B. 8.32m

C. 6.2m

D. 7.32m

Answer: D

4. The shadow of a tower standing on a level ground is found to be 40 m longer when the Suns altitude is 30° than when it is 60°. Find the height of the tower.

5. An electrician has to repair an electric fault on a pole of height 5 m. She needs to reach a point 1.3 m below the top of the pole to undertake the repair work. What should be the length of the ladder that she should use which, when inclined at an angle of 60° to the horizontal, would enable her to reach the required position? Also, how far from the foot of the pole should she place the foot of the ladder? (You may take $\sqrt{3}$ = 1.73)

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

7. A tower stands vertically on the ground. From a point on the ground, which is $15m$ away from the foot of the tower, the angle of

elevation of the top of the tower is found to

be $60°$. Find the height of the tower.

A. $12\sqrt{3}$

B. $15\sqrt{3}$

C. $13\sqrt{3}$

D. None

Answer: B

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