



MATHS

NCERT - NCERT

MATHEMATICS(HINGLISH)

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

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

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

D. None

Answer: A



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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.



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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.



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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.



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6. A 1.2 m tall girl spots a balloon 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. $\frac{10}{3}$

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

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

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

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.



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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.



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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.



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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.



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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?



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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.



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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.



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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.



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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



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4. The shadow of a tower standing on a 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.



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5. An electrician has to repair an electric fault on a pole of height 5 m. She needs to reach a point 1.3m 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



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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 45° . What is the height of the chimney?



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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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