



MATHS

NCERT - NCERT MATHS (GUJARATI ENGLISH)

APPLICATIONS OF TRIGONOMETRY

Example

1. The top of a clock tower is observed at angle of elevation of α° and the feet of the tower at

is the distance of d meters from the observer.

Draw the diagram for this data.



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2. Rinky observes a flower on the ground from the balcony of the first floor of a building at an angle of depression β° . The height of the first floor of the building is x meters. Draw the diagram for this data.



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3. A large balloon has been tied with a rope and it is floating in the air. A person has observed the balloon from the top of a building at angle of elevation of θ_1 and foot of the rope at an angle of depression of θ_2 . The height of the building is h feet. Draw the diagram for this data.



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4. A boy observed the top of an electric pole at an angle of elevation of 60° when the

observation point is 8 meters away from the foot of the pole. Find the height of the pole.



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5. Rajender observes a person standing on the ground from a helicopter at an angle of depression 45° . If the helicopter flies at a height of 500 meters from the ground, what is the distance of the person from Rajender?



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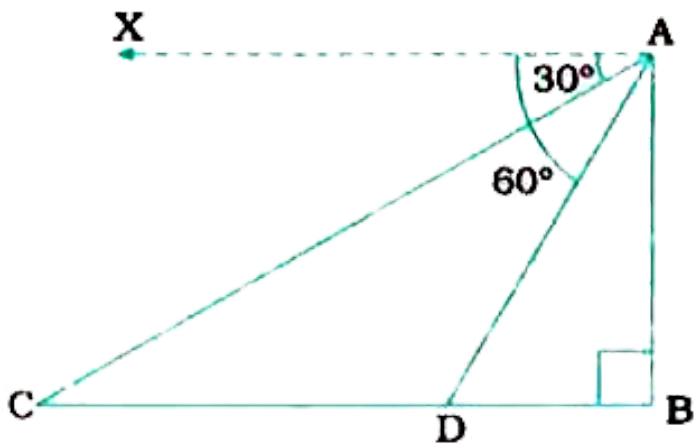
6. Two men on either side of a temple of 30 meter height observe its top at the angles of elevation 30° and 60° respectively. Find the distance between the two men.



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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,

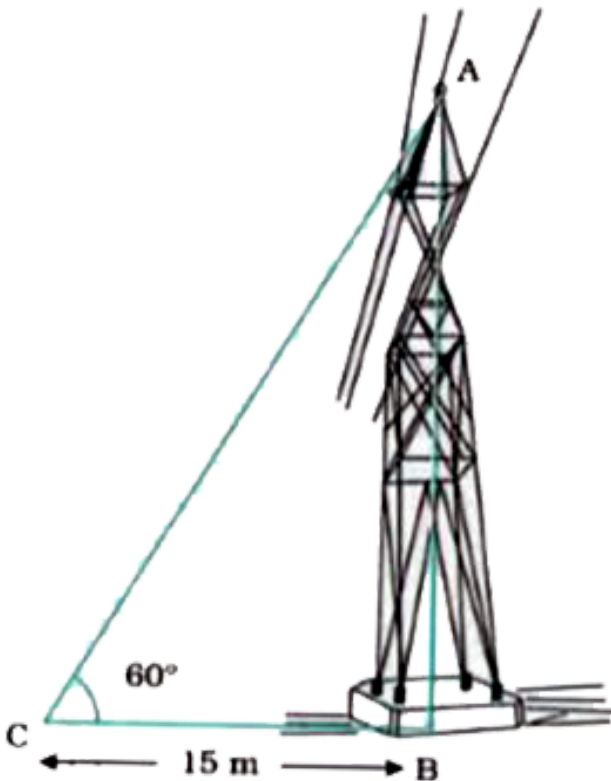
the angle of depression of the car is found to be 60° . Find the time taken by the car to reach the foot of the tower from this point.



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Exercise 12 1

1. 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.

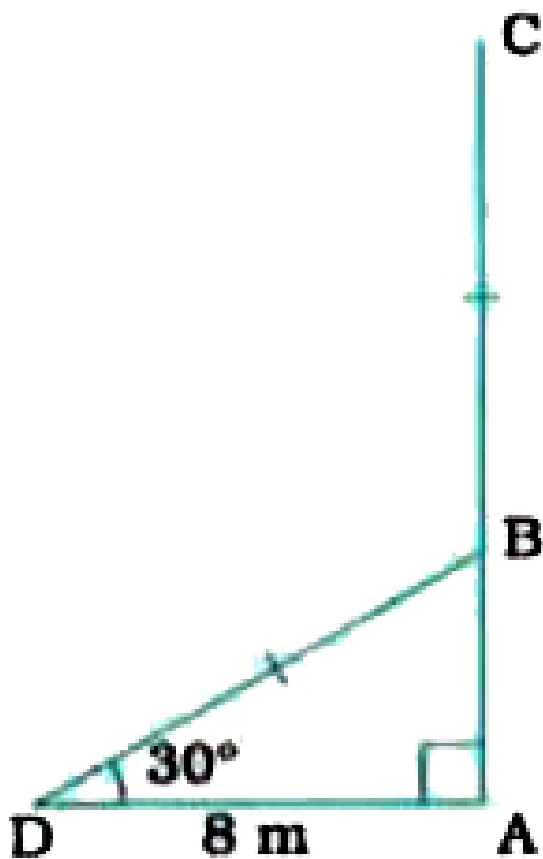




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2. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle 30° with it. The distance between the foot of the tree to the point where the top touches the ground is 8m.

Find the height of the tree.



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3. A contractor wants to set up a slide for the children to play in the park. He wants to set it up at the height of 2 m and by making an angle of 30° with the ground. What should be the length of the slide?



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4. Length of the shadow of a 15 meter high pole is $5\sqrt{3}$ meters at 8 O'clock in the morning.

Then, what is the angle of elevation of the Sun rays with the ground at the time?



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5. You want to erect a pole of height 10 m with the support of three ropes. Each rope has to make an angle 30° with the pole. What should be the length of the rope?



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6. Suppose you are shooting an arrow from the top of a building at an height of 6 m to a target on the ground at an angle of depression of 60° . What is the distance between you and the object?



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7. An electrician wants to repair an electric connection on a pole of height 9 m. He needs to reach 1.8 m below the top of the pole to do

repair work. What should be the length of the ladder which he should use, when he climbs it at an angle of 60° with the ground? What will be the distance between foot of the ladder and foot of the pole?



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8. A boat has to cross a river. It crosses the river by making an angle of 60° with the bank of the river due to the stream of the river and travels a distance of 600m to reach the

another side of the river. What is the width of the river?



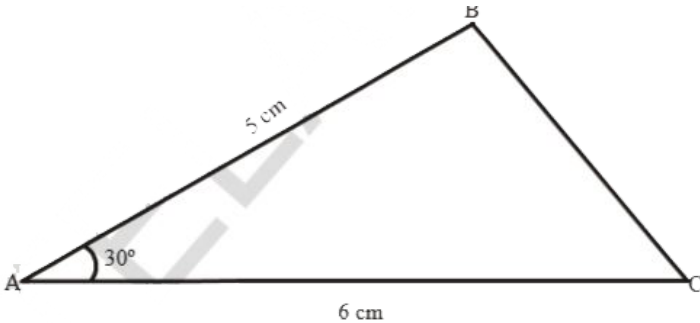
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9. An observer of height 1.8 m is 13.2 m away from a palm tree. The angle of elevation of the top of the tree from his eyes is 45° . What is the height of the palm tree?



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10. In the adjacent figure. $AC = 6$ cm, $AB = 5$ cm and $\angle BAC = 30^\circ$. Find the area of the triangle.

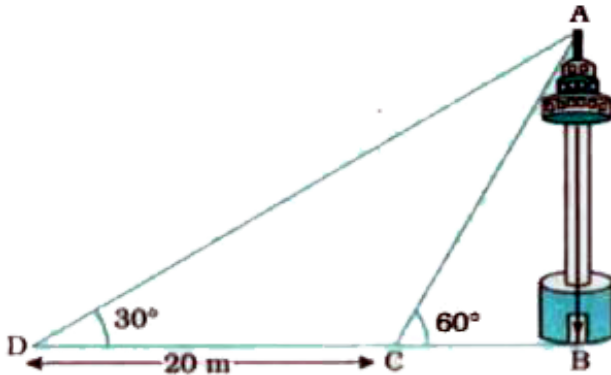


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Exercise 12 2

1. 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 20m 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° (see the given figure). Find the height of

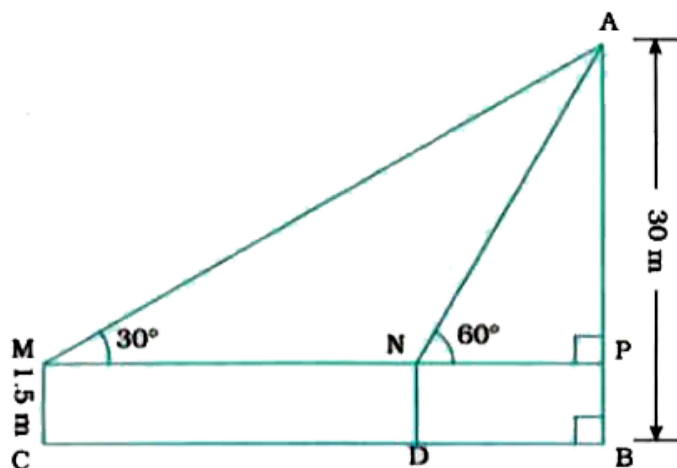
the tower and the width of the canal.



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2. 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 increase from 30° to 60° as he

walks towards the building. Find the distance he walked towards the building.



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3. A statue stands on the top of a 2 m tall 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 statue.



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4. From the top of a building, the angle of elevation of the top of a cell tower is 60° and the angle of depression to its foot is 45° . If distance of the building from the tower is 7m, then find the height of the tower.



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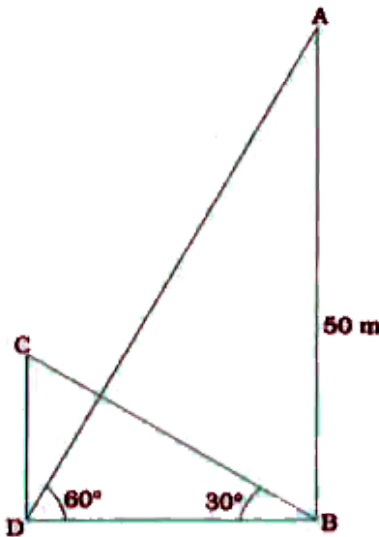
5. A wire of length 18 m had been tied with electric pole at an angle of elevation 30° with the ground. Because it was covering a long distance, it was cut and tied at an angle of elevation 60° with the ground. How much length of the wire was cut?



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6. 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 50m high, find the height of the building.



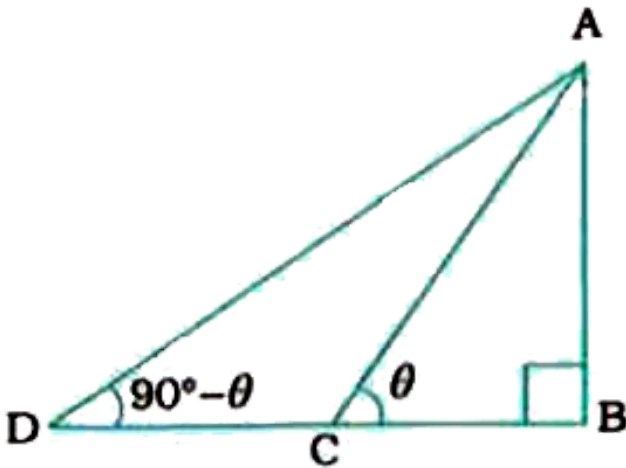
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7. Two poles of equal heights are standing opposite to each other on either side of the road, which is 120 feet wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° respectively. Find the height of the poles and the distances of the point from the poles.



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8. The angles of elevation of the top of a tower from two points at a distance of 4m and 9m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6m.



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9. The angle of elevation of a jet plane from a point A on the ground is 60° . After a flight of 15 seconds, the angle of elevation changes to 30° . If the jet plane is flying at a constant height of $1500\sqrt{13}$ meter, find the speed of the jet plane. ($\sqrt{3} = 1.732$)



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10. The angle of elevation of the top of a tower from the foot of the building is 30° and the angle of elevation of the top of the building

from the foot of the tower is 60° . What is the ratio of heights of tower and building.

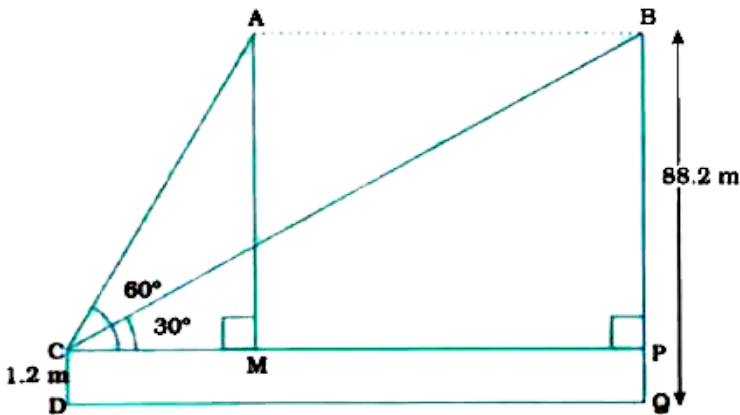


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Optional Exercise For Extensive Learning

1. A 1.2m 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° (see the given figure). Find the distance travelled by the balloon during the interval.



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2. Inner part of a cupboard is in the cuboidal shape with its length, breadth and height in

the ratio $1 : \sqrt{2} : 1$. What is the angle made by the longest stick which can be inserted cupboard with its base inside.



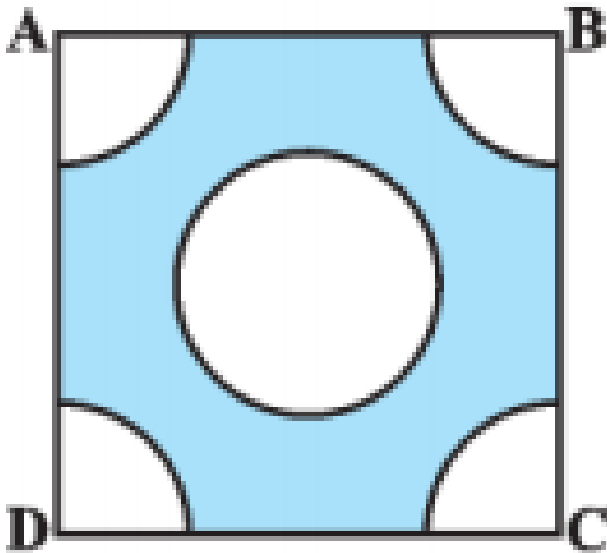
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3. An iron sperical ball of volume $232848cm^3$ has been melted and converted into a cone with the vertical angle of 120° . What are its height and base?



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4. Show that the area of an Isosceles triangle is $A = a^2 \theta \sin \theta \cos \theta$ where a is the length of one of the two equal sides and θ is the measure of one of two equal angles



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Think And Discuss

1. A ladder of length x meter is leaning against a wall making angle θ with the ground. Which trigonometric ratio would you like to consider to find the height of the point on the wall at which the ladder is touching



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Do This

1. A ladder of length x meter is leaning against a wall making angle θ with the ground. Which trigonometric ratio would you like to consider to find the height of the point on the wall at which the ladder is touching



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