



MATHS

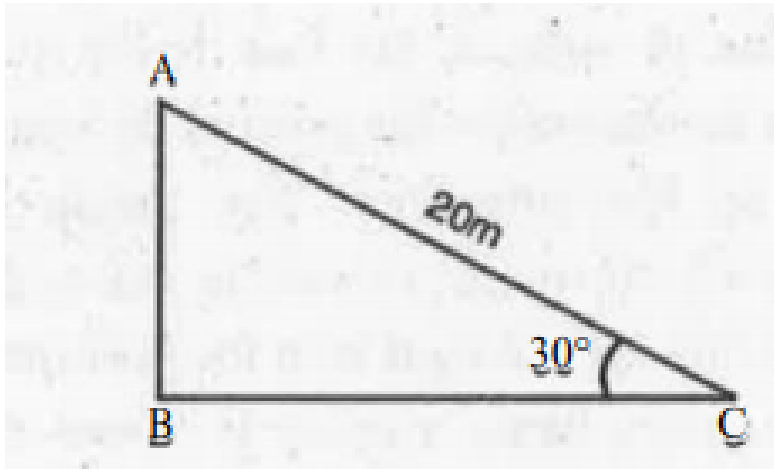
BOOKS - MBD

Some Applications Of Trigonometry

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1. A circus artist is climbing a 20m 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° (see fig.).



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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 8 m. Find the height of the tree.



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1. 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 3 m, 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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2. The angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of the tower, is 30° . Find the height of the tower.



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1. 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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2. A 1.5 m tall boy is standing at some distance from a 30 m 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.



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1. From a point on the ground, the angles of elevation of the bottom and 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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1. 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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1. 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.



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2. 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.

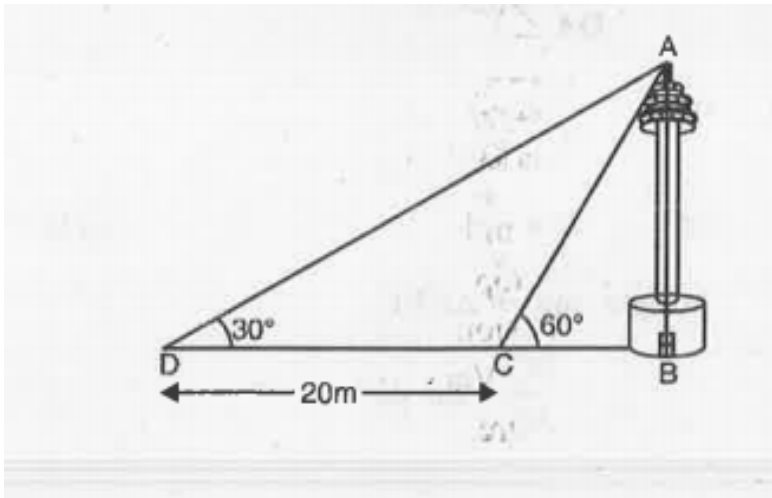


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1. A TV tower stands vertically on a bank of a canal. From a point on the other bank directly

opposite the tower, the angle of elevation of the top of the tower is 60° . From a point 20m away from this point on the same bank, the angle of elevation of the top of the tower is 30° (see fig.). Find the height of the tower and the width of the canal.



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1. From the top of a 7m 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.



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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.

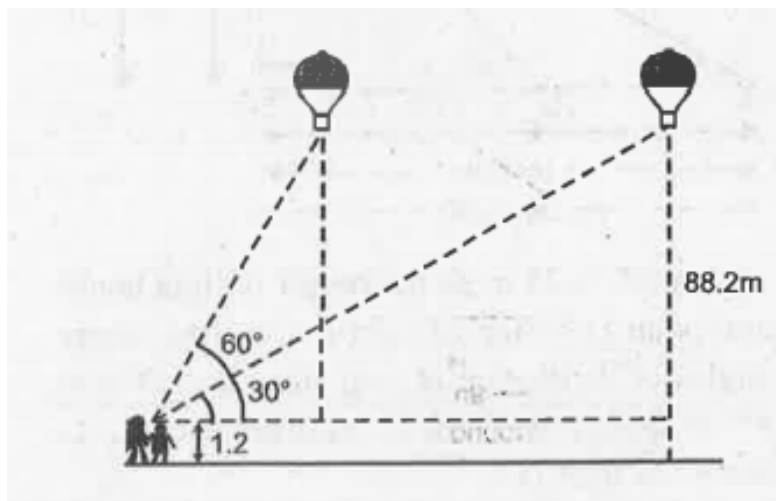


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1. A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any

instant is 60° . After some time, the angle of elevation reduces to 30° (see fig.). Find the distance travelled by the balloon during the interval.



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1. 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 further time taken by the car to reach the foot of the tower.



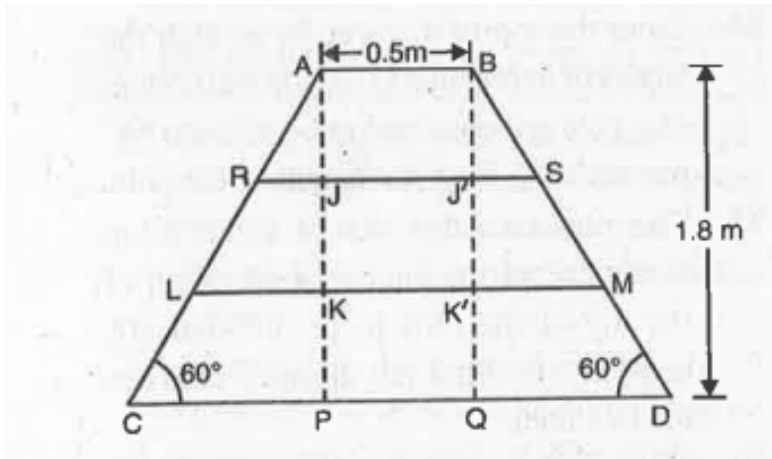
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2. The angles of elevation of the top of a tower from two points at a distance of 4 m and 9m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6 m.



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1. In the given figure, ABCD is a trapezium in which $AB \parallel CD$. Line-segments RS and LM are drawn parallel to AB such that $AJ = JK = KP$. If $AB = 0.5$ m and $AP = BQ = 1.8$ m, find the length of AC, BD, RS and LM.



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2. A man is standing on the deck of a ship, which is 8 m above water level. He 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 distance of the hill, from the ship and the height of the hill.



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3. 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 $1500\sqrt{3}m$, find the speed of the jet plane.



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4. A person standing on the bank of a river observes that the angle of elevation of the top of a tree standing on the opposite bank is 60° . When he moves 40 m away from the bank, he finds the angle of elevation to be 30° . Find the height of the tree and the width of the river.



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5. Determine the height of a mountain if the elevation of its top at an unknown distance from the base is 30° and at a distance 10 km further off from the mountain, along the same line, the angle of elevation is 15° . (Use $\tan 15^\circ = 0.27$).



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6. The angle of elevation of the top Q of a vertical tower PQ from a point X on the ground is 60° . At a point Y , 40 m vertically above X , the angle of elevation is 45° . Find the height of the tower PQ and the distance XQ .



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7. A man on the deck of a ship is 16 m above water level. He observes that the angle of elevation of the top of a cliff is 45° and the

angle of depression of the base is 30° .

Calculate the distance of the cliff from the ship and the height of the cliff.



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8. From a window (h metres high above the ground) of a house in a street, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are θ and ϕ respectively. Show that

the height of the opposite house is $h(1 + \tan \theta \cot \phi)$.



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1. An aeroplane, when 3000 m high, passes vertically above another aeroplane at an instant when the angles of elevation of the two aeroplanes from the same point on the

ground are 60° and 45° respectively. Find the vertical distance between the two aeroplanes.



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2. A man on the deck of a ship is 12 m above water level. He observes that the angle of elevation of the top of a cliff is 45° , and the angle of depression of the base is 30° . Calculate the distance of the cliff from the ship and the height of the cliff.



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3. A pole 5 m high is fixed on the top of a tower. The angle of elevation of the top of the pole observed from a point 'A' on the ground is 60° and the angle of depression of the point 'A' from the top of the tower is 45° . Find the height of the tower



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4. From the top of a tower, the angles of depression of two objects on the same side of

the tower are found to be α and β ($\alpha > \beta$). If the distance between the objects is 'p' metres, show that the height 'h' of the tower is given

$$\text{by } h = \frac{p \tan \alpha \tan \beta}{\tan \alpha - \tan \beta}$$

also determine the height of the tower, if $p=50$ m, $\alpha = 60^\circ$, $\beta = 30^\circ$



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5. The angle of elevation of the top of a tower from a point A on the ground is 30° . On moving a distance of 20 metres towards the

foot of the tower to a point B, the angle of elevation increases to 60° . Find the height of the tower and distance of the tower from the point A.



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6. From the top of a building 15 m high, the angle of elevation of the top of a tower is found to be 30° . From the bottom of the same building, the angle of elevation of the top of the tower is found to be 60° . Find the

height of the tower and the distance between the tower and the building.



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7. 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 $1500\sqrt{3}m$, find the speed of the jet plane.



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8. The angle of elevation θ , of a vertical tower from a point on ground is such that its tangent is $\frac{5}{12}$. On walking 192 metres towards the tower in the same straight line, the tangent of the angle of elevation ϕ is found to be $\frac{3}{4}$. Find the height of the tower



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9. The angle of elevation θ of the top of a light house, as seen by a person on the ground, is

such that $\tan \theta = \frac{5}{2}$, When the person moves a distance of 240 m. towards the light house, the angle of elevation becomes ϕ such that $\tan \theta = \frac{3}{4}$.

Find the height of the light house.



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10. The angles of elevation and depression of the top and bottom of a light-house from the top of a building 60 m high are 30° and 60°

respectively. Find the difference between the heights of the light-house and the building



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11. The angles of elevation and depression of the top and bottom of a light-house from the top of a building 60 m high are 30° and 60° respectively. Find difference between the light-house and the building.



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12. From a point on the ground 40 m away from the foot of a tower, the angle of elevation of the top of the tower is 30° . The angle of elevation to the top of a water tank (On the top of the tower) is 45° . Find the height of the tower and the depth of the tank.



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13. A tree stands vertically on the bank of a river. From a point on the other bank directly opposite the tree, the angle of elevation of the

top of the tree is 60° . From a point 20 m behind this point on the same bank, the angle of elevation of the top of the tree is 30° . Find the height of the tree and the width of the river.



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14. As observed from the top of a light house, 100 m high above sea level, the angle of depression of a ship, sailing directly towards it, changes from 30° to 45° . Determine the

distance travelled by the ship during the period of observation.



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15. The angle of elevation of a cloud from a point 200 m above the lake is 30° and the angle of depression of the reflection of the cloud in the lake is 60° . Find the height of the cloud.



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16. On a horizontal plane there is a vertical tower with a flag on the top of the tower. At a point 9 metres away from the foot of the tower the angle of elevation of the top and bottom of the flag pole are 60° and 30° respectively. Find the height of the tower and flag pole mounted on it.



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17. From a building 60 metres high the angle of depression of the top and bottom of

lamppost are 30° and 60° respectively. Find the distance between lamp post and building. Also find the difference of height between building and lamp post.



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18. Two pillars of equal height stand on either side of a roadway which is 150 m wide. From a point on the roadway between the pillars, the elevations of the top of the pillars are 60° and

30° . Find the height of the pillars and the position of the point



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19. From the top of a hill 200 m high, the angles of depression of the top and the bottom of a pillar are 30° and 60° respectively. Find the height of the pillar and its distance from the hill.



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20. 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.



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