



MATHS

BOOKS - KALYANI MATHS (ASSAMESE ENGLISH)

Height and distance

Example

1. The altitude of the sun(the angle of depression) is 60° . If a vertical tower casts a

shadow of length 30 m then find the height of the tower.



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2. The shadow of a tower standing on a level ground is found to be 40m longer when the sun altitude is 30° , then when it is 60° . Find the height of the tower.



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3. From a window 60m high above the ground of a house in a street, angles of elevation and depression of the top and the foot of another house on the opposite side of the street are 60° and 45° respectively. Show that the height of the opposite house is $60(1 + \sqrt{3})m$



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Exercise

1. The height of a tower is 10m. What is the length of its shadow when sun's elevation is 45° ?



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2. The angle of elevation of the top of a hill at the foot of the tower is 60° and the angle of elevation of the top of a tower from the foot of the hill is 30° . If the tower is 50m high, find the height of the hill.





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3. 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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4. A vertical post of height $5\sqrt{3}$ m above the horizontal ground casts a shadow of length 15 m on the ground. Find the angle of elevation of the sun.



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5. The angle of elevation of the top of a tower at a point on a level ground is 30° . After walking a distance of 100m towards the foot of the tower along the horizontal line through

the foot of the tower on the same level ground, the angle of elevation of the top of the tower is 60° . Find the height of the tower.



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6. As observed from the top of a light house, 100m high above sea level, the angle of depression of a ship sailing directly towards it, changing from 30° to 60° . Determine the distance travelled by the ship during the period.



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7. The angle of elevation of the top of a tower as observed from a point on the ground is α and on moving 'a' metres towards the tower the angle of elevation is β . Prove that the height of the tower is $(a \tan \alpha \tan \beta) / (\tan \beta - \tan \alpha)$



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8. A man in a boat moving away from a light house 100m high takes 2 minutes to change the angle of elevation of the top of light house from 60° to 30° , find the speed of the boat.



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9. A man sitting at a height of 20m in a tall tree on a small island in the middle of the river observes two poles directly opposite each

other on the two banks of river and in line with the foot of the tree. If the angles of depression of the feet of the poles from a point at which the man is sitting on the tree on either side of the river are 60° and 30° respectively. Find the width of the river.



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10. A boy standing on a horizontal plane find a bird flying at a distance of 100m from him at an elevation of 30° . A girls standing on the

roof of 20 m high building finds the angle of elevation of the same bird to be 45° . Both the boy and the girl are on opposite sides of the bird. Find the distance of the bird from the girl.



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11. An aeroplane when flying at a height of 3125m from the ground passes vertically below another plane at an instant when the angles of elevation of the two planes from the same point on the ground are 30° and 60°

respectively. Find the distance between the two planes at the instant.



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12. From the top of a building 60m high the angle of depression of the top and the bottom of vertical lamp post are observed 30° and 60° respectively. Find

The horizontal distance between the building and the lamp post.



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13. From the top of a building 60m high the angle of depression of the top and the bottom of vertical lamp post are observed 30° and 60° respectively. Find

The height of the lamp post.



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14. A man is standing on the deck of a ship which is 25m above water level. He observes the angles of elevation of the top of a

lighthouse as 60° and the angle of depression of the base of light house as 45° . Calculate the height of the light house.



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15. A man standing on the deck of a ship which is 10 m above the water level, observes the angle of elevation of the top of a hill as 60° and angle of depression of the base of a hill as 30° . Calculate the distance of the hill from the ship and the height of the hill.



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16. From a window h m high above the ground in a street, the angles of elevation and depression of the top and foot of the other house on the opposite side of the street as α and β respectively show that height of the opposite house is $h(1 + \tan \alpha \cos \beta)m$.



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17. If the angle of elevation of a cloud from a point h metre above the lake is α and the angle of depression of its reflection in the lake is β , prove that the height of the cloud above the lake is $\frac{h(\tan \beta + \tan \alpha)}{\tan \beta - \tan \alpha}$



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18. The angle of elevation of a jet plane from a point P on the ground is 60° . After a flight of 15 second the angle of elevation changes to 30° .

If the jet plane is flying at a constant height of $1500\sqrt{3}$, find the speed of the jet plane in km/hr.



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19. There are two poles on each on either bank of a river just opposite to each other. One pole is 60m high. From the top of this pole the angles of depression of the top and the foot of the other pole are 30° and 60° respectively.

Find the width of the river and the height of the other pole.



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20. From the top of a building 100m high ,the angle of depression of the top and bottom of a tower observed to be 45° and 60° respectively. Find the height of the tower. Also find the distance between the foot of the building.



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21. An aeroplane flying horizontally at a height of 1.5 km above the ground is observed at a certain point on the earth to subtend an angle 60° . After 15 second its angle of elevation is observed to be 30° . Calculate the speed of aeroplane in Km/h.



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22. Two poles of equal heights are standing opposite to each other on either side of the

road which is 80m 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 .



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23. the distance between two vertical poles is 100m and the height of one of them is double the other. The angle of elevation of their tops at the middle point of the line joining their feet are complimentary. Find the height.



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24. Two pillars of equal height stand on either side of a road which is 150m wide. At a point on the road between the pillars the angle of elevation of the top of the pillars are 60° and 30° . Find the height of each pillar and the position of the point on the road.



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