



MATHS

BOOKS - RD SHARMA MATHS (ENGLISH)

SOME APPLICATIONS OF TRIGONOMETRY



1. A man sitting at a height of 20m on a tall tree on a small island in the middle of a river observes two poles directly opposite to each other on the two banks of the river and in line with the foot of 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 $60^0 and 30^0$ respectively. Find the width of the river.

Watch Video Solution

2. The angle of elevation of a cloud from a point h metre above a lake is θ . The angle depression of its reflection in the lake is 45° . The height of the cloud is



Watch Video Solution

3. Two boats approach a light house in mid-sea from opposite directions. The angles of elevation of the top of the light house from two boats are $30^0 and 45^0$ respectively. If the distance between two boats is 100m, find the

height of the light house.



4. A ladder rests against a vertical wall at inclination α to the horizontal. Its foot is pulled away from the wall through a distance p so that it's upper end slides q down the wall and then ladder make an angle β to the horizontal show that $\frac{p}{q} = \frac{\cos \beta - \cos \alpha}{\sin \alpha - \sin \beta}$.

Watch Video Solution

5. A ladder makes an angle of 60^{0} with the ground when placed against a wall. If the foot of the ladder is 2m away from the wall, then the length of the ladder (in metres) is (a) $\frac{4}{\sqrt{3}}$ (b) $\frac{4}{\sqrt{3}}$ (c) $2\sqrt{2}$ (d) 4

Watch Video Solution

6. The length of shadow of a tower on the plane ground is $\sqrt{3}$ times the height of the

tower. The angle of elevation of sun is 45^0 (b)

 30^0 (c) 60^0 (d) 90^0



7. The angle of elevation of the top of a tower at a point on the ground 50m away from the foot of the tower is 45° . Then the height of the tower (in metres) is $50\sqrt{3}$ (b) 50 (c) $\frac{50}{\sqrt{2}}$ (d) $\frac{50}{\sqrt{3}}$



8. From a light house the angles of depression of two ships on opposite sides of the light house are observed to be 30° and 45° If the height of the light house is h metres, the distance between the ships is

Watch Video Solution

9. From a window 15 metres high above the ground 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

 $30^0 and 45^0$ respectively show that the height of the opposite house is 23.66 metres $\left(take\sqrt{3}=1.~732
ight)$

Watch Video Solution

10. A man standing on the deck of a ship, which is 10m above water level. He observes the angle of elevation of the top of a hill as 60^0 and the angle of depression of the base of the hill as 30^0 . Calculate the distance of the hill from the ship and the height of the hill.



11. An aeroplane at an altitude of 200 metres observes the angles of depression of opposite points on the two banks of a river to be $45^0 and 60^0$. Find the width of the river.

Watch Video Solution

12. The angle of elevation of the top of a vertical tower PQ from a point X on the ground is 60o. At a point Y, 40m vertically

above X , the angle of elevation of the top is

45o . Calculate the height of the tower.



13. A man on the top of a vertical tower observes a car moving at a uniform speed coming directly towards it. If it takes 12 minutes for the angle of depression to change from $30^0 \rightarrow 45^0$, how soon after this will the car reach the tower? Give your answer to the nearest second.



14. The shadow of a flag-staff is three times as long as the shadow of the flag-staff when the sun rays meet the ground at an angle of 60. Find the angle between the sun rays and the ground at the time of longer shadow.

Watch Video Solution

15. 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 move 40 metres 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.

Watch Video Solution

16. Two stations due south of a leaning tower which leans towards the north are at distances *aandb* from its foot. If $\alpha\beta$ be the elevations of the top of the tower from these



17. From an aeroplane vertically above a straight horizontal road, the angles of depression of two consecutive mile stones on opposite sides of the aeroplane are observed to be $\alpha and\beta$. Show that the height in miles of

aeroplane above the road is give by

 $\tan \alpha \tan \beta$

 $\tan lpha + \tan eta$

Watch Video Solution

18. A ladder rests against a wall at an angle α to the horizontal. Its foot is pulled away from the wall through a distance 'a' so that it slides a distance 'b' down the wall making an angle β with the horizontal. Show that: $a = b \tan\left(\frac{1}{2}(\alpha + \beta)\right).$

Watch Video Solution

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

Watch Video Solution

20. The horizontal distance between two towers is 140m. The angle of elevation of the

top of the first tower when seen from the top of the second tower is 30^{0} . If the height of the second tower is 60m, find the height of the first tower.



21. 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.



22. The length of shadow of a tower on the plane ground is $\sqrt{3}$ times the height of the tower. The angle of elevation of sun is 45^0 (b) 30^0 (c) 60^0 (d) 90^0



23. Two poles are a metres apart and the height of one is double of the other. If from the middle point of the line joining their feet

an observer finds the angular elevations of their tops to be complementary, then the height of the smaller is $(a)\sqrt{2}ametres$ $(b)\frac{a}{2\sqrt{2}}metres (c)\frac{a}{\sqrt{2}}metres (d)2ametres$

Watch Video Solution

24. The angle of elevation of a tower from a point on the same level as the foot of the tower is 30^{0} . On advancing 150 metres towards the foot of the tower, the angle of elevation of the tower becomes 60^{0} . Show that the height

of the tower is 129.9 metres (Use $\sqrt{3}=1.732$

).



25. On a horizontal plane there is a vertical tower with a flag pole 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 $60^0 and 30^0$ respectively. Find the height of the tower and the flag pole mounted on it.



26. The angle of elevation of the top of a tower as observed from a point in a horizontal plane through the foot of the tower is 32^{0} . When the observer moves towards the tower a distance of 100m, he finds the angle of elevation of the top to be 63^{0} . Find the height of the tower and the distance of the first position from the [Take tower.

 $an 32^0 = 06248 and tan 63^0 = 1.9626
brace$

Watch Video Solution

27. 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 ttower and the distance of the tower from the point A.



28. The angle of elevation of the top of a tower standing on a horizontal plane from a point Ais lpha . After walking a distance d towards the foot of the tower the angle of elevation is found to be β . The height of the tower is (a) dd $\overline{\cotlpha + \coteta}_{d}$ (b) $\frac{\alpha}{\cot lpha - \cot eta}$ (c) $rac{d}{ aneta+ aneta}$ $rac{-\pi}{ aneta-tanlpha}$ (d) Watch Video Solution

29. A ladder 15 m long just reaches the top of a vertical wall. If the ladder makes an angle of 60^0 with the wall, then the height of the wall is $(a)15\sqrt{3}m$ (b) $\frac{15\sqrt{3}}{2}m$ (c) $\frac{15}{2}m$ (d) 15m **Watch Video Solution**

30. From the top of a building 15m high the angle of elevation of the top of tower is found to be 30° . From the bottom of 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 tower and building .

Watch Video Solution

31. A vertical tower stand on a horizontal plane and is surmounted by a vertical flag-staff of height 5 metres. At a point on the plane, the angles of elevation of the bottom and the top of the flag-staff are respectively 30^{0} and 60^{0} . Find the height of the tower.



32. A vertical tower stands on a horizontal plane and is surmounted by a vertical flag staff of height h. At a point on the plane, the angles of Elevation of the bottom and the top of the flag staff are α and β respectively. Prove that the height of the tower is $\frac{h \tan \alpha}{\tan \beta - \tan \alpha}$

Watch Video Solution

33. The length of a string between a kite and a point on the ground is 90 metres. If the string makes an angle θ with the ground level such that $\tan \theta = \frac{15}{8}$, how high is the kite? Assume that there is no slack in the string.

Watch Video Solution

34. 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.

Watch Video Solution

35. 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°.Find the distance travelled by the ballon during the interval

Watch Video Solution

36. The elevation of a tower at a station A due north of it is α and at a station B due west of A is β . Prove that the height of the tower is $\underline{AB \sin \alpha \sin \beta}$

$$\sqrt{\sin^2lpha-\sin^2eta}$$

Watch Video Solution

37. The angle of elevation of the top of a tower from a point *A* due south of the tower is α and from *B* due east of tower is β . If AB = d, show that the height of the tower is $\frac{d}{\sqrt{\cot^2 \alpha + \cot^2 \beta}}$.

Watch Video Solution

38. At the foot of a mountain the elevation of its summit is 45° , after ascending 1000m towards the mountain up a slope of 30°

inclination, the elevation is found to be $60^{\,\circ}$

Find the height of the mountain.



39. The angle of elevation of a cliff from a fixed point is θ . After going up a distance of k meters towards the the top the cliff at an angle of ϕ , it is found that the angle of elevation is α . Show that the height of cliff is $k \frac{\cos \phi - \sin \phi \cot \alpha}{\cot \theta - \cot \alpha}$

Watch Video Solution

40. A round balloon of radius r subtends an angle at the eye of the observer while the angle of elevation of its centre is β . Prove that the height of the centre of the balloon is $r\sin\beta\cos ec\frac{\alpha}{2}$.



41. A tree 12m high, a broken by the wind in such a way that its top touches the ground and makes an angle 60^0 with the ground. At

what height from the bottom the tree is

broken by the wind?



42. A vertical tower sands on a horizontal plane and is surmounted by a vertical flag staff of height h. At a point on the plane, the angles of elevation of the bottom and the top of the flagstaff are α and β . Prove that the height of the tower $\frac{h \tan \alpha}{\tan \beta - \tan \alpha}$



43. The angles of elevation of the top of a tower from two points at a distances a meter and b metres from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is \sqrt{ab} metres.

Watch Video Solution

44. 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.

Watch Video Solution

45. A circus artists 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^{0} .



46. A tree standing on horizontal plane is leaning towards east. At two points situated at distances a and b exactly due west on it, angles of elevation of the top are respectively α and β . Prove that height of the top from the ground is $\frac{(b-a) \cdot \tan \alpha \cdot \tan \beta}{\tan \alpha - \tan \beta}$



47. A person, standing on the bank of a river, observes that the angle subtended by a tree on the opposite bank is 60° . When he retreates 20m from the bank, he finds the angle to be 30° . Find the height of the tree and the breadth of the river.

Watch Video Solution

48. A bridge across a river makes an angles of 45^0 with the river bank as shown in Figure. If
the lengthof the bridge across the river is

150m, what is the width of the river?



49. From the top of a light house, the angles of depression of two ships on the opposite sides of its are observed to be $\alpha and\beta$. If the height of the light house be h metres and the line joining the ships passes through the foot of the light house, show that the distance between the ship is $h \frac{ an lpha + an eta}{ an lpha an eta}$



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

Watch Video Solution

51. From the top of a hill, the angles of depression of two consecutive kilometre

stones due east are found to be $30^0 and 45^0$.

Find the height of the hill.



52. The shadow of a vertical tower on level ground increases by 10 metres, when the altitude of the sun changes from angle of elevatin $45^0 \rightarrow 30^0$. Find the height of the tower, correct to one place of decimal. $(Take\sqrt{3} = 1.73)$

Watch Video Solution

53. A tower is $100\sqrt{3}$ metres high. Find the angle of elevation if its top from a point 100 metres away from its foot.

Watch Video Solution

54. 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.

Watch Video Solution

55. A kite is flying at a height of 60m 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.



56. The string of a kite is 100 metres long and it makes an angle of 60*o* with the horizontal. Find the height of the kite, assuming that there is no slack in the string.

Watch Video Solution

57. A circus artist is climbing from the ground along a rope stretched from the top of a vertical pole and tied at the ground. The height of the pole is 12 m and the angle made by the rope with ground level is 30° . Calculate the distance covered by the artist in climbing to the top of the pole.

Watch Video Solution

58. 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?

Watch Video Solution

59. An electrician has to repair an electric fault on a pole of height 4m. He 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 he should use which when inclined at an angle of $60^{\,\circ}$ to the horizontal would enable him to reach the required position?



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



61. At a point on level ground, the angle of elevation of a vertical tower is found to be

such that its tangent is 5/12. On walking 192 metres towards the tower, the tangent of the angle of elevation is 3/4. Find the height of the tower.



62. 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 10km further off from the mountain, along the same

line, the angle of elevation is 15° . (Use

 $an 15^\circ\,=0.\,27$)

Watch Video Solution

63. An aeroplane at an altitude of 1200 metres finds that two ships are sailing towards it in the same direction. The angles of depression of the ships as observed from the aeroplane are 60° and 30° respectively. Find the distance between the two ships. **64.** Two pillars of equal height and on either side of a road, which is 100m wide. The angles of elevation of the top of the pillars are 60° and 30° at a point on the road between the pillars. Find the position of the point between the pillars and the height of each pillar.

Watch Video Solution

65. As observed from the top of a light house, 100m above sea level, the angle of depression

of a ship, sailing directly towards it, changes from 30o to 45o. Determine the distance travelled by the ship during the period of observation.



66. From the top of a building 60m high the angles of depression of the top and the bottom of a tower are observed to be 30o and 60o. Find the height of the tower.



67. The angle of elevation of a jet plane from a point A on the ground is 60o. After a flight of 30 seconds, the angle of elevation changes to 30o. If the jet plane is flying at a constant height of $3600\sqrt{3}m$, find the speed of the jet plane.

Watch Video Solution

68. The angle of elevation of a cloud from a point 60m above a lake is 30o and the angle of

depression of the reflection of cloud in the

lake is 60*o* . Find the height of the cloud.



69. There is a small island in the middle of a 100m wide river and a tall tree stands on the island. P and Q are points directly opposite to each other on two banks and in line with the tree. If the angles of elevation of the top of the tree from P and Q are respectively 30o and 45o, find the height of the tree.



70. A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at angle of depression of 30° , which is approaching to the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be $60^{\,\circ}\,$. Find the further time taken by the car to reach the foot of the tower.



71. An aeroplane when flying at a height of 4000m from the ground passes vertically above another aeroplane at an instant when the angles of the elevation of the two planes from the same point on the ground are 60° and 45° respectively. Find the vertical distance between the aeroplanes at that instant.

> Watch Video Solution

72. A tower stands vertically on the ground. From a point on the ground, 20m away from the foot of the tower, the angle of elevation of the top of the tower is 60° . What is the height of the tower?

Watch Video Solution

73. The angle of elevation of a ladder leaning against a wall is 60° and the foot of the ladder is 9.5m away from the wall. Find the length of the ladder.



74. A ladder is placed along a wall of a house such that its upper end is touching the top of the wall. The foot of the ladder is 2m away from the wall and the ladder is making an angle of 60° with the level of the ground. Determine the height of the wall.



Watch Video Solution

75. An electric pole is 10m high. A steel wire tied to top of the pole is affixed at a point on the ground to keep the pole up right. If the

wire makes an angle of 45° with the horizontal through the foot of the pole, find the length of the wire.

Watch Video Solution

76. A kite is flying at a height of 75 metres from the ground level, attached to a string inclined at 60° to the horizontal. Find the length of the string to the nearest metre.

Watch Video Solution

77. A vertically straight tree, 15m high, is broken by the wind in such a way that its top just touches the ground and makes an angle of 60° with the ground. At what height from the ground did the tree break?

Watch Video Solution

78. A person observed the angle of elevation of the top of a tower as 30° . He walked 50m towards the foot of the tower along level ground and found the angle of elevation of the top of the tower as 60° . Find the height

of the tower.



79. The shadow of a tower, when the angle of elevation of the sun is 45o, is found to be 10m. longer than when it was 60o. Find the height of the tower.

Watch Video Solution

80. A parachutist is descending vertically and makes angles of elevation of 45° and 60° at two observing points 100m apart from each other on the left side of himself. Find the maximum height from which he falls and the distance of the point where he falls on the ground from the just observation point.

> Watch Video Solution

81. On the same side of a tower, two objects are located. When observed from the top of the tower, their angles of depression are 45o and 60o. If the height of the tower is 150m, find the distance between the objects.

Watch Video Solution

82. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle of 30° with the

ground. 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.

Watch Video Solution

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

and the distance of the building from the point P . (Take $\sqrt{3}=1.~732ig)$.

Watch Video Solution

84. A 1.6m tall girl stands at a distance of 3.2m from a lamp-post and casts a shadow of 4.8m on the ground. Find the height of the lamp-post by using (i) trigonometric ratios (ii) property of similar triangles.



85. 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.



Watch Video Solution

86. The shadow of a tower standing on a level

ground is found to be 40m longer when Suns

altitude is 30o than when it was 60o . Find the

height of the tower.



87. From a point on the ground the angles of elevation of the bottom and top of a transmission tower fixed at the top of 20m high building are 45*o* and 60*o* respectively. Find the height of the transmission tower.



88. The angles of depression of the top and bottom of 8m tall building from the top of a multistoried building are 30*o* and 45*o* respectively. Find the height of the multistoried building and the distance between the two buildings.

Watch Video Solution

89. A statue 1.6m tall stands on the top of 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.

Watch Video Solution

90. A T.V. Tower stands vertically on a bank of a river. From a point on the other bank directly opposite to the tower, the angle of elevation of the top of the tower is 60 degrees. From a point 20m away this point on the same bank, the angle of elevation of the top of the tower

is 30o . Find the height of the tower and the

width of the river.



91. From the top of a 7m high building, the angle of elevation of the top of a cable tower is 60o and the angle of depression of its foot is 45o. Determine the height of the tower.

Watch Video Solution

92. As observed from the top of a 75m tall light house, 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 light house, find the distance between the two ships.

Watch Video Solution

93. The angle of elevation of the top of the building from the foot of the tower is 30^o and

the angle 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.

Watch Video Solution

94. From a point on a bridge across a river the angles of depression of the banks on opposite side of the river are 30° and 45° respectively. If bridge is at the height of 30m from the banks, find the width of the river.



95. Two poles of equal heights are standing opposite to 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.

Watch Video Solution

96. A vertical tower stands on a horizontal plane and is surmounted by a flag-staff of height 7m. From a point on the plane, the angle of elevation of the bottom of the flag-staff is 30*o* and that of the top of the flag-staff is 45*o*. Find the height of the tower.



97. The length of the shadow of a tower standing on level plane is found to be 2x

metres longer when the suns altitude is 30o than when it was 45o . Prove that the height of tower is $x\left(\sqrt{3}+1
ight)$ metres.

Watch Video Solution

98. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle of 30*o* with the ground. The distance between the foot of the tree to the point where the top touches the ground is 10m. Find the height of the tree.


99. A balloon is connected to a meteorological ground station by a cable of length 215m inclined at 60*o* to the horizontal. Determine the height of the balloon from the ground. Assume that there is no slack in the cable.

Watch Video Solution

100. Two men on either side of the cliff 80m high observes the angles of elevation of the

top of the cliff to be 30o and 60o respectively.

Find the distance between the two men.



101. Find the angle of elevation of the sun (sun's altitude) when the length of the shadow

of a vertical pole is equal to its height.



102. A fire in a building B is reported on telephone to two fire stations P and Q , 20km apart from each other on a straight road. Pobserves that the fire is at an angle of 60o to the road and Q observes that it is at an angle of 450 to the road. Which station should send its team and how much will this team have to travel?



103. A man on the deck of a ship is 10m above the water level. He observes that the angle of elevation of the top of a cliff is 45*o* and the angle of depression of the base is 30*o*. Calculate the distance of the cliff from the ship and the height of the cliff.

Watch Video Solution

104. A man standing on the deck of a ship, which is 8m above water level. He observes the

angle of elevation of the top of a hill as 60oand the angle of depression of the base of the hill as 30o. Calculate the distance of the hill from the ship and the height of the hill.



Watch Video Solution

105. There are two temples, one on each bank of a river, just opposite to each other. One temple is 50m high. From the top of this temple, the angles of depression of the top and the foot of the other temple are 30*o* and 60o respectively. Find the width of the river

and the height of the other temple.



106. The angle of elevation of an aeroplane from a point on the ground is 45° . After a flight of 15 seconds, the elevation changes to 30° . If the aeroplane is flying at a height of 3000 metres, find the speed of the aeroplane.



107. An aeroplane flying horizontally 1 km above the ground is observed at an elevation of 60o . After 10 seconds, its elevation is observed to be 30o . Find the speed of the aeroplane in km/hr.

Watch Video Solution

108. From the top of a 50 m high tower, the angles of depression of the top and bottom of a pole are observed to be 45o and 60o respectively. Find the height of the pole.

109. The horizontal distance between two trees of different heights is 60m. The angle of depression of the top of the first tree when seen from the top of the second tree is 45° . If the height of the second tree is 80m, find the height of the first tree.

110. The angle of elevation of the top of a vertical tower PQ from a point X on the ground is 60o. At a point Y, 40m vertically above X, the angle of elevation of the top is 45o. Calculate the height of the tower.



111. The angle of elevation of a stationery cloud from a point 2500 m above a lake is 15o and the angle of depression of its reflection in

the lake is 45o . What is the height of the cloud above the lake level? (Use $an 15o = 0.\ 268$)

Watch Video Solution

112. PQ is a post of given height a, and AB is a tower at some distance. If α and β are the angles of elevation of B, the top of the tower, at P and Q respectively. Find the height of the tower and its distance from the post.



113. A tower subtends an angle α at a point Ain the plane of its base and the angle of depression of the foot of the tower at a point b metres just above A is β . Prove that the height of the tower is $b \tan \alpha \cot \beta$.



114. An observer, 1.5m tall, is 28.5 m away from

a tower 30m high. Determine the angle of elevation of the top of the tower from his eye.

115. A carpenter makes stools for electricians with a square top of side 0.5m and at a height of 1.5 m above the ground. Also, each leg is inclined at an angle of 60° to the ground. Find the length of each leg and also the lengths of two steps to be put at equal distances.



116. A boy is standing on the ground and flying a kite with 100m of string at an elevation of 30o . Another boy is standing on the roof of a 10 m high building and is flying his kite at an elevation of 45o . Both the boys are on opposite sides of both the kites. Find the length of the string that the second boy must have so that the two kites meet.



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

Watch Video Solution

118. From the top of a building AB, 60 m high, the angles of depression of the top and bottom of a vertical lamp post CD are observed to be 30o and 60o respectively. Find

the horizontal distance between AB and CD



119. From the top of a building AB, 60 m high, the angles of depression of the top and bottom of a vertical lamp post CD are observed to be 30*o* and 60*o* respectively. Find the height of the lamp post.



120. From the top of a building AB, 60 m high, the angles of depression of the top and bottom of a vertical lamp post CD are observed to be 30o and 60o respectively. Find the difference between the heights of the building and the lamp post.



121. A straight highway leads to the foot of a tower of height 50 m. From the top of the tower, the angles of depression of two cars

standing on the highway are 30° and 60° respectively. What is the distance between the two cars and how far is each car from the tower?



122. The angles of elevation of the top of a rock from the top and foot of a 100 m high tower are respectively 30° and 45° . Find the height of the rock.

123. As observed from the top of a 150 m tall light house, the angles of depression of two ships approaching it are 30° and 45° . If one ship is directly behind the other, find the distance between the two ships.



124. A flag-staff stands on the top of a 5 m high tower. From a point on the ground, the angle of elevation of the top of the flag-staff is

 60° and from the same point, the angle of elevation of the top of the tower is 45° . Find the height of the flag-staff.

Watch Video Solution

125. 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 6m.



126. The angles of depression of two ships from the top of a light house and on the same side of it are found to be 45° and 30° respectively. If the ships are 200m apart, find the height of the light house.



127. The horizontal distance between two poles is 15m. The angle of depression of the top of the first pole as seen from the top of

the second pole is 30° . If the height of the second pole is 24 m, find the height of the first pole. $\left(\sqrt{3}=1.~732
ight)$

Watch Video Solution

128. Two ships are there in the sea on either side of a light house in such a way that the ships and the light house are in the same straight line. The angles of depression of two ships are observed from the top of the light house are 60° and 45° respectively. If the

height of the light house is 200 m, find the distance between the two ships. $ig(Use~\sqrt{3}=1.~73ig)$

Watch Video Solution

129. The angle of elevation of the top of a chimney from the top of a tower is 60° and t he angle of depression of the foot of the chimney from the top of the tower is 30° . If the height of the tower is 40 m, find the height of the chimney. According to pollution

control norms, the minimum height of a smoke emitting chimney should be 100 m. State if the height of the above mentioned chimney meets the pollution norms. What value is discussed in this question?

Watch Video Solution

130. An aeroplane is flying at a height of 210 m. Flying at this height at some instant the angles of depression of two points in a line in opposite directions on both the banks of the river are 45° and 60° . Find the width of the

river. $\left(Use~\sqrt{3}=1.~73
ight)$



131. The height of a tower is 10 m. What is the

length of its shadow when Suns altitude is 45o

?



132. If the ratio of height of a tower and the length of its shadow on the ground is $\sqrt{3}$: 1, then the angle of elevation of the sun is.....



133. What is the angle of elevation of the Sun

when the length of the shadow of a vertical

pole is equal to its height?



134. From a point on the ground, 20m away from the foot of a vertical tower, the angle of elevation of the top of the tower is 60° , what is the length of the tower?

Watch Video Solution

135. If 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, find the height of the tower.



136. In Fig. 12.58, what are the angles of depression from the observing positions O_1 and O_2 of the object at A ? (FIGURE)



137. The tops of two towers of height x and y, standing on level ground, subtend angles of

 30° and 60° respectively at the centre of the

line joining their feet, then find x : y.



138. The angle of elevation of the top of a tower at a point on the ground is 30° . What will be the angle of elevation, if the height of the tower is tripled?

139. The ratio of the length of a rod and its shadow is $1:\sqrt{3}$. The angle of elevation of the sun is (a)30°

(b) 45°

(c) 60°

(d) 90°

140. If the angle of elevation of a tower from a distance of 100 metres from its foot is 60° , then the height of the tower is

(a) $100\sqrt{3}m$ (b) $\frac{100}{\sqrt{3}}m$ (c) $50\sqrt{3}m$ (d) $\frac{200}{\sqrt{3}}m$

141. If the altitude of the sun is at 60° , then the height of the vertical tower that will cast a shadow of length 30m is

(a) $30\sqrt{3}m$

- (b) 15m
- (c) $\frac{30}{\sqrt{3}}m$
- (d) $15\sqrt{2}m$

142. If the angles of elevation of a tower from two points distant a and b (a > b) from its foot and in the same straight line with it are 30° and 60° , then the height of the tower is $(a)\sqrt{a+b}$ (b) \sqrt{ab} (c) $\sqrt{a-b}$ (d) $\sqrt{\frac{a}{b}}$

Watch Video Solution

143. If the angles of elevation of a tower from two points distant a and b from the base and in the same straight line with it are

complementary, then the height of the tower

is

(a)*ab*

(b) \sqrt{ab}

(c)
$$\frac{a}{b}$$

(d) $\sqrt{\frac{a}{b}}$



144. The tops of two poles of height 20 m and 14 m are connected by a wire. If the wire makes an angle of 30° with horizontal, then the

length of the wire is

(a) 12 m

(b) 10 m

(c) 8 m

(d) 6 m

Watch Video Solution

145. From the top of a cliff 25 m high the angle of elevation of a tower is found to be equal to the angle of depression of the foot of the

tower. The height of the tower is (a) 25 m

(b) 50 m (c) 75 m (d) 100 m



146. The angles of depression of two ships from the top of a light house are 45° and 30° towards east. If the ships are 100 m apart, the height of the light house is

(a)
$$rac{50}{\sqrt{3}+1}m$$

(b) $rac{50}{\sqrt{3}-1}m$

(c) $50(\sqrt{3}-1)m$

(d) $50 ig(\sqrt{3}+1ig) m$

Watch Video Solution

147. If the angle of elevation of a cloud from a point 200 m above a lake is 30° and the angle of depression of its reflection in the lake is 60° , then the height of the cloud above the lake, is (a) 200 m (b) 500 m (c) 30 m (d) 400 m


148. The height of a tower is 100 metres. When the angle of elevation of the sun changes from 30^o to 45^o , the shadow of the tower becomes x metres less. The value of x is :

A. (a) 100 m

B. (b) $100\sqrt{3}m$

C. (c)
$$100ig(\sqrt{3}-1ig)m$$

D. (d)
$$rac{100}{\sqrt{3}}m$$

Answer: null

149. Two persons are 'a' metres apart and the height of one is double that of the other. If from the middle point of the line joining their feet, an observer finds the angular elevation of their tops to be complementary, then the height of the shorter post is (a) $\frac{a}{4}$ (b) $\frac{a}{\sqrt{2}}$ (c) $a\sqrt{2}$ (d) $rac{a}{2\sqrt{2}}$

150. A tower subtends an angle of 30° at a point on the same level as its foot. At a second point h metres above the first, the depression of the foot of the tower is 60° . The height of the tower is

A. (a)
$$\frac{h}{2}m$$

B. (b) $\sqrt{3}h m$
C. (c) $\frac{h}{3}m$
D. (d) $\frac{h}{\sqrt{3}}m$

Answer: null

151. It is found that on walking x metres towards a chimney in a horizontal line through its base, the elevation of its top changes from 30o to 60o. The height of the chimney is $3\sqrt{2}x$ (b) $2\sqrt{3}x$ (c) $\frac{\sqrt{3}}{2}x$ (d) $\frac{2}{\sqrt{3}}x$

152. The length of the shadow of a tower standing on level ground is found to be 2x metres longer when the suns elevation is 30o than when it was 45o. The height of the tower in metres is $(\sqrt{3}+1)x$ (b) $(\sqrt{3}-1)x$ (c) $2\sqrt{3}x$ (d) $3\sqrt{2}x$

Watch Video Solution

153. The tops of two poles of height 16 m and

10 m are connected by a wire of length l

metres. If the wire makes an angle of $30^\circ\,$ with

the horizontal, then l =

(a) 26

- (b) 16
- (c) 12
- (d) 10



154. If a 1.5 m tall girl stands at a distance of 3 m from a lamp-post and casts a shadow of length of 4.5 m on the ground, then the

height of the lamp-post is

(a) 1.5 m (b) 2 m (c) 2.5 m (d) 2.8 m