MATHS

BOOKS - OBJECTIVE RD SHARMA MATHS VOL I (HINGLISH)

HEIGHTS AND DISTANCES

Section I Solved Mcqs

1. A man from the top of a 100 metres high tower sees a car moving towards the tower at

an angle of depression of $30°$. After some time, the angle of depression becomes $60°$ .The distance (in metres) travelled by the car during this time is

A. $100\sqrt{3}$

B. $\dfrac{200\sqrt{3}}{3}$

C. $\dfrac{100\sqrt{3}}{3}$

D. $200\sqrt{3}$

Answer: B

2. A man is walking towards a vertical pillar in a straight path, at a uniform speed. At a certain point A on the path, he observes that the angle of elevation of the top of the pillar is 30^0. After walking for 10 minutes from A in the same direction, at a point B, he observes that the angle of elevation of the top of the pillar is 60^0. Then the time taken (in minutes) by him, from B to reach the pillar, is : (1) 6 (2) 10 (3) 20 (4) 5

A. 6

B. 10

C. 20

D. 15

Answer: D

3. A pole stands vertically , inside a triangular park △ ABC. If the angle of elevation of the top of the pole from each corner of the park is

same, then in $\triangle$ ABC the foot of the pole is at the

A. centroid

B. circumcentre

C. incentre

D. orthocentre

Answer: B

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4. At a point 15 m away from the base of a 15 m high house, the angle of elevation of the top is

A. $90°$

B. $60°$

C. $30°$

D. $45°$

Answer: D

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5. From the bottom of a pole of height h, the angle of elevation of the top of a tower is α. The pole subtends an angle β at the top of the tower. find the height of the tower.

A. $\dfrac{h \sin \alpha \sin(\alpha - \beta)}{\sin \beta}$

B. $\dfrac{h \sin \alpha \cos(\alpha + \beta)}{\cos \beta}$

C. $\dfrac{h \sin \alpha \cos(\alpha - \beta)}{\sin \beta}$

D. $\dfrac{h \sin \alpha \sin(\alpha + \beta)}{\cos \beta}$

Answer: C

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6. The length of the shadow of a vertical pole of height h, thrown by the suns rays at three different moments are $h, 2h$ and $3h$. Find the sum of the angles of elevation of the rays at these three moments.

A. $\dfrac{\pi}{2}$

B. $\dfrac{\pi}{3}$

C. $\dfrac{\pi}{4}$

D. $\dfrac{\pi}{6}$

Answer: A

7. Let a vertical tower AB have its end A on the level ground. Let C be the mid-point of AB and P be a point on the ground such that AP = 2AB. If $\sqrt{BPC} = \beta$, then $\tan \beta$ is equal to

A. $\dfrac{2}{9}$

B. $\dfrac{4}{9}$

C. $\dfrac{6}{9}$

D. $\dfrac{1}{7}$

Answer: A

8. Three vertical poles of heights h_1, h_2 and h_3 at the vertices A, B and C of a $\angle ABC$ subtend angles α, β and γ respectively at the cicumcentre of triangle. If $\cot\alpha$, $\cot\beta$ and $\cot\gamma$ are in A.P. then $h_1, h_2, h_3,$ are in

A. A.P.

B. G.P.

C. H.P.

D. none of these

Answer: A

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9. The angle of elevation of the top of a tower from the top and bottom of a building of height 'a' are $30°$ and $45°$ respectively. If the

tower and the building stand at the same level

, the height of the tower is

A. $\dfrac{a\left(3 + \sqrt{3}\right)}{2}$

B. $a\left(\sqrt{3} + 1\right)$

C. $\sqrt{3}a$

D. $a\left(\sqrt{3} - 1\right)$

Answer: A

10. A bird is sitting on the top of a vertical pole 20 m high and its elevation from a point O on the ground is $45°$. It flies off horizontally straight away from the point O. After one second, the elevation of the bird from O is reduced to $30°$. Then the speed (in m/s) of the bird is

A. $20\sqrt{2}$

B. $20(\sqrt{3} - 1)$

C. $40(\sqrt{2} - 1)$

D. $40\left(\sqrt{3} - \sqrt{2}\right)$

Answer: B

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11. If the angles of elevation of the top of tower from three collinear points A, B and C, on a line leading to the foot of the tower, are $30°$, $45°$ and $60°$ respectively, then the ratio , $AB : BC$ is

A. $1 : \sqrt{3}$

B. $2:3$

C. $\sqrt{3}:1$

D. $\sqrt{3}:\sqrt{2}$

Answer: C

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12. The angle of elevation of the top of a hill from each of the verticles A,B,C of a horizontal triangle is α. The height of the hill is

A. $b \tan \alpha \operatorname{cosec} \beta$

B. $\dfrac{1}{2} a \tan \alpha \operatorname{cosec} \alpha$

C. $\dfrac{1}{2} c \tan \alpha \cos ec\beta$

D. none of these

Answer: B

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13. The angular elevation of a tower OP at a point A due south of it is $60°$ and at a point B

due west of A, the elevation is $30°$. If AB=3m, the height of the tower is

A. $2\sqrt{3}$m

B. $2\sqrt{6}$m

C. $\dfrac{3\sqrt{3}}{2}$ m

D. $\dfrac{3\sqrt{6}}{4}$ m

Answer: D

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14. A vertical pole PO is standing at the centre O of a square ABCD. If AC subtends an angle of $90°$ at the top , P of the pole, then the angle subtended by a side of the square at P is

   A. $45°$

   B. $30°$

   C. $60°$

   D. none of these

Answer: C

15. Let α be the solution of

$16^{\sin^2\theta} + 16^{\cos^2\theta} = 10$ in $(0, \pi/4)$. If the

shadow of a vertical pole is $\dfrac{1}{\sqrt{3}}$ of its height ,

then the altitude of the sun is

A. α

B. $\dfrac{\alpha}{2}$

C. 2α

D. $\dfrac{\alpha}{3}$

Answer: C

16. A circular ring of radius 3 cm is suspended horizontally from a point 4 cm vertically above the centre by 4 strings attached at equal intervals to its cirumference . If the angle between two consecutive strings be θ, then $\cos(\theta)$-

A. $\dfrac{4}{5}$

B. $\dfrac{4}{25}$

C. $\dfrac{16}{25}$

D. none of these

Answer: C

17. The shadow of a pole of height $(\sqrt{3} + 1)$ metres standing on the ground is found is found to be 2 metres longer when the

elevation is $30°$ than when elevation was α

.Then , α=

A. $75°$

B. $60°$

C. $45°$

D. $30°$

Answer: C

18. A vertical lamp-post of height 9 metres stands at the corner of a rectangular field. The angle of elevation of its top from the farthest corner is $30°$, while from another corner it is $45°$. The area of the field is

    A. $81\sqrt{2}m^2$

    B. $9\sqrt{2}m^2$

    C. $81\sqrt{3}m^2$

    D. $9\sqrt{3}m^2$

Answer: A

19. An isosceles triangle of wood of base 2a and height h is placed with its base on the ground vertex directly above . The triangle faces the sun whose altitude is $30°$. Then the tangent of the angle at the apex of the shadow is

A. $\dfrac{2ah}{\sqrt{3}}$

B. $\dfrac{2\sqrt{3}ah}{3h^2 - a^2}$

C. $\dfrac{a^2 + h^2}{2\sqrt{3}}$

D. $\dfrac{2\sqrt{3}ah}{3h^2 + a^2}$

Answer: B

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20. A tower stands at the centre of a circular park . A and B are two points on the boundary of the park such that AB(=a) subtends an angle of $60°$ at the foot of the tower , and the angle of elevation of the top of the tower from A or B is $30°$. The height of the tower is

A. $\dfrac{a}{\sqrt{3}}$

B. $\sqrt{3}a$

C. $\dfrac{2a}{\sqrt{3}}$

D. $2\sqrt{3}a$

Answer: A

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21. The angle of elevation of the top of a hill from a point is α. After walking b metres towards the top up of a slope inclined at an

angle β to the horizon, the angle of elevation of the top becomes γ. Then , the height of the hill is

A. $\dfrac{b \sin \alpha \sin(\gamma - \beta)}{\sin(\gamma - \alpha)}$

B. $\dfrac{b \sin \alpha \sin(\gamma - \alpha)}{\sin(\gamma - \beta)}$

C. $\dfrac{b \sin(\gamma - \beta)}{\sin(\gamma - \alpha)}$

D. $\dfrac{\sin(\gamma - \beta)}{b \sin \alpha \sin(\gamma - \alpha)}$

Answer: A

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22. AB is a vertical pole with B at the ground level and A at the top. A man finds that the angle of elevation of the point A from a certain point C on the ground is $60o$. He moves away from the pole along the line BC to a point D such that $CD = 7m$. From D the angle of elevation of the point A is $45o$. Then the height of the pole is (1) $\dfrac{7\sqrt{3}}{2}\dfrac{1}{\sqrt{3}-1}m$

(2) $\dfrac{7\sqrt{3}}{2}\sqrt{3}+1m$ (3) $\dfrac{7\sqrt{3}}{2}\sqrt{3}-1m$ (4)

$\dfrac{7\sqrt{3}}{2}\dfrac{1}{\sqrt{3}+1}m$

A. $\dfrac{7\sqrt{3}}{2}\left(\sqrt{3}-1\right)m$

B. $\dfrac{7\sqrt{3}}{2}\left(\dfrac{1}{\sqrt{3}+1}\right)$ m

C. $\dfrac{7\sqrt{3}}{2}\left(\dfrac{1}{\sqrt{3}-1}\right)$ m

D. $\dfrac{7\sqrt{3}}{2}\left(\sqrt{3}+1\right)$ m

Answer: D

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23. A house subtends a right angle at the window of an opposite house and the angle of elevation of the window for the bottom of the first house is $60°$ If the distance between the

two houses be $6m$ then the height of the first house is

A. $8\sqrt{3}m$

B. $6\sqrt{3}m$

C. $4\sqrt{3}m$

D. none of these

Answer: A

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24. The angle of elevation of top of a tower from a point on the ground is $30°$ and it is $60°$ when it is viewed from a point located 40 m away from the initial point towards the tower the height of the tower is

A. $20\sqrt{3}$ m

B. $\dfrac{\sqrt{3}}{20}$ m

C. $10\sqrt{3}$ m

D. $\dfrac{\sqrt{3}}{10}$ m

Answer: A

25. From the top of a hill h metres high the angles of depression of the top and the bottom of a pillar are α and β respectively. The height (in metres) of the pillar is

A. $\dfrac{h(\tan\beta - \tan\alpha)}{\tan\beta}$

B. $\dfrac{h(\tan\alpha - \tan\beta)}{\tan\alpha}$

C. $\dfrac{h(\tan\beta + \tan\alpha)}{\tan\beta}$

D. $\dfrac{h(\tan\beta + \tan\alpha)}{\tan\alpha}$

Answer: A

26. The angle of elevation of the top of a vertical tower from a point A due east of it is $45°$. The angle of elevation of the top of the same tower from a point B due south of A is $30°$. If the distance between A and B is $54\sqrt{2}$ m then the height of the tower (in metres), is

A. 54

B. 108

C. $27\sqrt{2}$

D. $36\sqrt{2}$

Answer: C

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1. The angle of elevation of the top of the tower observed from each of three points A,B ,

C on the ground, forming a triangle is the same angle α. If R is the circum-radius of the triangle ABC, then find the height of the tower R $\tan\alpha$.

A. $R\sin\alpha$

B. $R\cos\alpha$

C. $R\cot\alpha$

D. $R\tan\alpha$

Answer: D

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2. A flag staff of 5m high stands on a building of 25m high. At an observer at a height of 30 m. The flag staff and the building subtend equal angles . The distance of the observer from the top of the flag staff is

A. $\dfrac{5\sqrt{3}}{2}$

B. $5\dfrac{\sqrt{3}}{2}$

C. $5\dfrac{\sqrt{2}}{3}$

D. none of these

Answer: B

3. ABC is a triangular park with AB = AC = 100 m. A block tower is situated at the midpoint of BC.The angles of elevation of the top of the tower at A and B are $\cot^{-1}(3.2)$ and $\cos ec^{-1}(2.6)$ respectively.The height of the tower is:

A. 16 m

B. 25 m

C. 50 m

D. none of these

Answer: B

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4. If a flag-staff of 6 m height placed on the top of a tower throws a shadow of $2\sqrt{3}$ m along the ground, then what is the angle that the sun makes with the ground?

A. 60°

B. 30°

C. 45°

D. none of these

Answer: A

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5. The angle of elevation of the top of an incomplete vertical pillar at a horizontal distance of 50 m from its base is 45°. If the

angle of elevation of the top of the complete pillar the same point is to be $60°$,then the height of the incomplete pillar is to be increased by

A. $50\sqrt{2}m$

B. 100 m

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

D. $100(\sqrt{3}+1)m$

Answer: C

6. The top of a hill observed from the top and bottom of a building of height h is at angles of elevation p and q respectively. The height of the hill is

A. $\dfrac{h \cot q}{\cot q - \cot p}$

B. $\dfrac{h \cot p}{\cot p - \cot q}$

C. $\dfrac{h \tan p}{\tan p - \tan q}$

D. none of these

Answer: B

7. The angles of elevation of a cliff at a point A on the ground and at a point B 100 mt vertically above A are α are β respectively.The height of the cliff in metres is

A. $\dfrac{100 \cot \alpha}{\cot \alpha - \cot \beta}$

B. $\dfrac{100 \cot \beta}{\cot \alpha - \cot \beta}$

C. $\dfrac{100 \cot \beta}{\cot \beta - \cot \alpha}$

D. $\dfrac{100 \cot \beta}{\cot \beta + \cot \alpha}$

Answer: C

8. The angle of elevation of a cloud from a point h mt. above is $\theta°$ and the angle of depression of its reflection in the lake is ϕ. Then, the height is

A. $\dfrac{h\sin(\phi - \theta)}{\sin(\phi + \theta)}$

B. $\dfrac{h\sin(\phi + \theta)}{\sin(\phi - \theta)}$

C. $\dfrac{h\sin(\theta + \phi)}{\sin(\theta - \phi)}$

D. none of these

Answer: B

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9. On the level ground, the angle of elevation of a tower is $30°$. On moving 20 m nearer, the angle of elevation is $60°$. The height of the tower is

A. 10 m

B. 20 m

C. $10\sqrt{3}$m

D. none of these

Answer: C

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10. Each side of a square substends an angle of $60°$ at the top of a tower h metres h metres high standing in the centre of the square . If a is the length of each side of the square , then

A. $2a^2 = h^2$

B. $2h^2 = a^2$

C. $3a^2 = 2h^2$

D. $2h^2 = 3a^2$

Answer: D

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11. The angle of elevation of the top of a tower at any point on the ground is $30°$ and moving

20 metres towards the tower it becomes $60°$.

The height of the tower is

A. 10 m

B. $10\sqrt{3}$ m

C. $\dfrac{10}{\sqrt{3}}$ m

D. none of these

Answer: B

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12. Form the top of a light house 60 m high with its base at the sea-level the angle of depression of a boat is $15°$. Find the distance of the boat from the foot of light house.

A. $\dfrac{\sqrt{3} - 1}{\sqrt{3} + 1}$. 60 metres

B. $\dfrac{\sqrt{3} + 1}{\sqrt{3} - 1}$. 60 metres

C. $\dfrac{\sqrt{3} + 1}{\sqrt{3} - 1}$ metres

D. none of these

Answer: B

13. A person standing on the bank of a river observes that the angle subtended by a tree on the opposite of bank is $60°$. When he retires 40 m.from the bank, he finds the angle to be $30°$. What is the breadth of the river ?

    A. 40 m

    B. 60 m

    C. 20 m

    D. 30 m

Answer: C

14. AB is a vertical pole. The end A is on the level ground .C is the middle point of AB. P is a point on the level ground . The portion BC subtends an angles β at P. If AP = nAB, then tan β=

A. $\dfrac{n}{2n^2 + 1}$

B. $\dfrac{n}{n^2 - 1}$

C. $\dfrac{n}{n^2 + 1}$

D. none of these

Answer: A

15. A tree is broken by wind, its upper part touches the ground at a point 10 metres from the foot of the tree and makes an angle of $45°$ with the ground . The entire length of the tree is

A. 15 metres

B. 20 metres

C. $10(1 + \sqrt{2})$ metres

D. $10\left(1 + \dfrac{\sqrt{3}}{2}\right)$ metres

Answer: C

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16. An aeroplane flying at a height 300 metre above the ground passes vertically above

another plane at an instant when the angles of elevation of the two planes from the same point on the ground are $60°$ and $45°$ respectively. Then the height of the lower plane from the ground in metres is

A. $100\sqrt{3}$

B. $\dfrac{100}{\sqrt{3}}$

C. 50

D. $150(\sqrt{3}+1)$

Answer: A

17. A tower subtends an angle α at a point in the plane of its base and the angle of depression of the foot of the tower at a point b ft. just above A is β. Then , height of the tower is

A. $b \tan \alpha \cot \beta$

B. $b \cot \alpha \tan \beta$

C. $b \tan \alpha \tan \beta$

D. $b \cot \alpha \cot \beta$

Answer: A

18. The angle of elevation of the top of a tower standing on a horizontal plane from a point A is α. 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. $\dfrac{a \sin \alpha \sin \beta}{\sin(\beta - \alpha)}$

B. $\dfrac{a \sin \alpha \sin \beta}{\sin(\alpha - \beta)}$

C. $\dfrac{a\sin(\beta - \alpha)}{\sin\alpha\sin\beta}$

D. $\dfrac{a\sin(\alpha - \beta)}{\sin\alpha\sin\beta}$

Answer: A

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19. From an aeroplane vertically over a straight horizontal road, the angles of depression of two consecutive milestones on opposite sides of the aeroplane are observed to be α and β. The height of the aeroplane above the road is

A. $\dfrac{\tan\alpha + \tan\beta}{\tan\alpha\tan\beta}$

B. $\dfrac{\tan\alpha\tan\beta}{\tan\alpha + \tan\beta}$

C. $\dfrac{\cot\alpha\cot\beta}{\cot\alpha + \cot\beta}$

D. none of these

Answer: B

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20. A vertical tower stands on a declicity which is inclined at $15°$ to the horizon. From the foot of the tower a man ascends the declivity

for 80 feet and then finds that the tower substends an angle of $30°$. The height of the tower is

A. $20(\sqrt{6} - \sqrt{2})$

B. $40(\sqrt{6} - \sqrt{2})$

C. $40(\sqrt{6} + \sqrt{2})$

D. none of these

Answer: B

21. The angle of elevation of an object on a hill from a point on the ground is $30°$. After walking 120 metres the elevation of the object is $60°$. The height of the hill is

    A. 120 m

    B. $60\sqrt{3}$ m

    C. $120\sqrt{3}$ m

    D. 60 m

Answer: B

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22. A tower of x metres height has flag staff at its top. The tower and the flag staff subtend equal angles at a point distant y metres from the foot of the tower. Then, the length of the flag staff in metres is

A. $y\left(\dfrac{x^2 - y^2}{x^2 + y^2}\right)$

B. $x\left(\dfrac{x^2 + y^2}{y^2 - x^2}\right)$

C. $x\left(\dfrac{x^2 + y^2}{x^2 - y^2}\right)$

D. $x\left(\dfrac{x^2 - y^2}{x^2 + y^2}\right)$

Answer: B

23. .A house of height 100 m substends a right angle at the window of an opposite house. If the height of the window is 64 m, then the distance between the two houses is

A. 48 m

B. 36 m

C. 54 m

D. 72 m

Answer: A

24. A tower of height b substends an angle at a point O on the leavel of the foot of the tower and at a distance a from the foot of the tower. If a pole mounted on the lower also subtends an equal angle at O, the height of the pole is

A. $b\left(\dfrac{a^2 - b^2}{a^2 + b^2}\right)$

B. $b\left(\dfrac{a^2 + b^2}{a^2 - b^2}\right)$

C. $a\left(\dfrac{a^2 - b^2}{a^2 + b^2}\right)$

D. $a\left(\dfrac{a^2 + b^2}{a^2 - b^2}\right)$

Answer: B

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25. A man of height 6 ft. observes the top of a

tower and the foot of the tower at angles of

$45°$ and $30°$ of elevation and depression respectively. The height of the tower is

A. 16.39 m

B. 14.59 m

C. 14.29 m

D. none of these

Answer: A

26. If the elevation of the sun is $30°$, then the length of the shadow cast by a tower of 150 ft. height is

A. $75\sqrt{3}$ ft.

B. $200\sqrt{3}$ ft

C. $150\sqrt{3}$ ft.

D. none of these

Answer: D

27. A ladder rests against a vertical wall at angle α to the horizontal . If is foot is pulled away from the wall through a distance 'a' so that it slides a distance 'b' down the wall making the angle β with the horizontal , then

a =

A. $b \tan\left(\dfrac{\alpha - \beta}{2}\right)$

B. $b \tan\left(\dfrac{\alpha + \beta}{2}\right)$

C. $b \cot\left(\dfrac{\alpha - \beta}{2}\right)$

D. none of these

28. From the top of a cliff 300 metres high, the top of a tower was observed at an angle of depression $30°$ and from the foot of the tower the top of the cliff was observed at an angle of elevation $45°$, The height of the tower is

A. $50(3 - \sqrt{3})m$

B. $200(3 - \sqrt{3})$ m

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

D. none of these

Answer: A

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29. The angles of elevation of the top of a tower at the top and the foot of a pole of height 10 m are $30°$ and $60°$ respectively. The height of the tower is

A. 10 m

B. 15 m

C. 20 m

D. none of these

Answer: C

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30. A person standing on the bank of a river

finds that the angle of elevation of the top of

a tower on the opposite bank is $45°$, then which of the following statements is correct ?

A. Breadth of the river is twice the height of the tower

B. Breadth of the river and the height of the tower are the same

C. Breadth of the river is half of the height of the tower

D. none of these

Answer: B

31. A tower subtends an angle of $30°$ at a point on the same level as the foot of the tower. At a second point h meter above the first, the depression of the foot of the tower is $60°$. The horizontal distance of the tower from the point is

A. $\dfrac{h}{\sqrt{3}}$

B. $\dfrac{h}{3}$

C. 3h

D. $\dfrac{3h}{d}$

Answer: A

32. AB is a vertical pole and C is its mid point. The end A is on the level ground and P is any point on the level ground other than A the portion CB substends an angle β at P. If AP:AB=2:1, then β=

A. $\dfrac{\tan^{-1} 4}{9}$

B. $\dfrac{\tan^{-1} 1}{9}$

C. $\dfrac{\tan^{-1} 5}{9}$

D. $\dfrac{\tan^{-1} 2}{9}$

Answer: B

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33. The angle of depression of a point situated at a distance of 70 metres from the base of a tower is $45°$. The height of the tower is

A. 70 m

B. $70\sqrt{2}$ m

C. $\dfrac{70}{\sqrt{2}}$ m

D. 35 m

Answer: A

34. The angle of elevation of the top of a vertical tower from two points distance a and b from the base and in the same line with it,

are complimentary .If θ is the angle subtended at the top of the tower by the line joining these points then $\sin \theta =$

A. $\dfrac{a - b}{\sqrt{2}(a + b)}$

B. $\dfrac{a + b}{a - b}$

C. $\dfrac{a - b}{a + b}$

D. none of these

Answer: C

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

A. $120\sqrt{3}$ km/hour

B. $240\sqrt{3}$ hour

C. $250\sqrt{3}$ km/hour

D. none of these

Answer: B

36. At the foot of the mountain the elevation of its summit is $45°$, after ascending 100 m towards the mountain up a slope of $30°$ inclination, the elevation is found to be $60°$. The height of the mountain is

A. $\dfrac{\sqrt{3}+1}{2}$ m

B. $\dfrac{\sqrt{3}-1}{3}$ m

C. $\dfrac{\sqrt{3}+1}{2\sqrt{3}}$ m

D. none of these

Answer: A

37. At a distance 12 metres from the foot A of a tower AB of height 5 metres, a flagstaff BC on top of AB and the tower subtend the same angle. Then, the height of flagstaff is

A. $\dfrac{1440}{199}$ metres

B. $\dfrac{475}{119}$ metres

C. $\dfrac{845}{119}$ metres

D. none of these

Answer: C

38. A tower 50 m high , stands on top of a mount, from a point on the ground the angles of elevation of the top and bottom of the tower are found to be $75°$ and $60°$ respectively. The height of the mount is

A. 25 m

B. $25(\sqrt{3} - 1)\,\text{m}$

C. $25\sqrt{3}\text{m}$

D. $25(\sqrt{3} + 1)\ \text{m}$

Answer: C

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39. A person on a ship sailing north sees two lighthouses which are 6 km apart, in a line due west . After an hour's tailing one of them

bears south west and the other southern

south west. The ship is travelling at a rate of

A. 12 km/hr

B. 6 km/hr

C. $3\sqrt{2}$ km/hr

D. $(6 + 3\sqrt{2})$ km/hr

Answer: D

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40. An observer finds that the elevation of the top of a tower is $22.5°$ and after walking100 m towards the foot of the tower, he finds that the elevation of the top has increased to $67.5°$. The height of the tower in metres is:

A. 50

B. 75

C. 125

D. 175

Answer: B

41. A vertical lamp-post, 6m high, stands at a distance of 2 m from a wall, 4 m high . A 1.5 m tall man starts to walk away from the wall on the other side of the wall, in line with the lamp-post the maximum distance to which the man can walk remaining in the shadow is

A. $\dfrac{5}{2}m$

B. $\dfrac{3}{2}m$

C. 4m

D. none of these

42. The angle of elevation of the top of a vertical pole when observed from each vertex of a regular hexagon is $\frac{\pi}{3}$. If the area of the circle circumscribing the hexagon be A $metre^2$, then the area of the hexagon is

A. $\frac{3\sqrt{3}A}{8}m^2$

B. $\dfrac{\sqrt{3}A}{\pi}m^2$

C. $\dfrac{3\sqrt{3}A}{4\pi}m^2$

D. $\dfrac{3\sqrt{3}A}{2\pi}m^2$

Answer: D

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43. The upper $\left(\dfrac{3}{4}\right)^{th}$ portion of a vertical

pole subtends an angle $\tan^{-1}\dfrac{3}{5}$ at a point in

the horizontal plane through its foot at a

distance 40 m from the foot . A possible

height of the vertical pole is

A. 80 m

B. 20 m

C. 40 m

D. 60 m

Answer: C

44. A person standing on the bank of a river observes that the angle of elevation of the top of a tree on the opposite bank of the river is $60°$ and where he retires 40 meters away from the tree the angle of elevation becomes $30°$. The breadth of the river is

A. 60 m

B. 30 m

C. 40 m

D. 20 m

45. A tower subtends angles $\alpha, 2\alpha, 3\alpha$ respectively, at point A, B and C all lying on a horizontal line through the foot of the tower. Then $\dfrac{AB}{BC} =$

A. $\dfrac{\sin 3\alpha}{\sin 2\alpha}$

B. $1 + 2\cos 2\alpha$

C. $2\cos 3\alpha$

D. $\dfrac{\sin 2\alpha}{\sin \alpha}$

Answer: B

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