MATHS

BOOKS - OBJECTIVE RD SHARMA ENGLISH

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. $\frac{200\sqrt{3}}{3}$

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

D. $200\sqrt{3}$

Answer: B

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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°. 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°. Then the time taken (in minutes) by him, from B to reach the pillar is :

A. 6

B. 10

C. 20

D. 15

Answer: D

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3. A pole stands vertically , inside a triangular park $\triangle ABC$. 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. $\frac{h \sin\alpha \sin(\alpha - \beta)}{\sin\beta}$

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

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

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

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. $\frac{\pi}{2}$

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

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

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

Answer: A

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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

$\angle BPC = \beta$, then $\tan\beta$ is equal to : $\frac{2}{9}$ (2) $\frac{4}{9}$ (3) $\frac{6}{7}$ (4) $\frac{1}{4}$

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

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

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

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

Answer: A

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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 $\alpha, \beta$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. $\frac{a\left(3+\sqrt{3}\right)}{2}$

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

C. $\sqrt{3}a$

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

Answer: A

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

A. $20\sqrt{2}$

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

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

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

Answer: B

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11. If the anlges of elevation of the top of a tower from three collinear points A,B and C on a line leading to the foot of the tower are $30^\circ, 45^\circ \text{and } 60^\circ$ 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

1. $b\tan\alpha\cos ec\beta 2.\ 12a\tan\alpha\cos ecA 3.\ 12c\tan\alpha\cos ecC$

4. none of these

A. b tan α cosec β

B. $\frac{1}{2}$ a tan α cosec A

C. $\frac{1}{2}c\tan\alpha\cos ecC$

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. $\frac{3\sqrt{3}}{2}$ m

D. $\frac{3\sqrt{6}}{4}$ 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

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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 $\frac{1}{\sqrt{3}}$ of its height , then the altitude of the sun is

A. α

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

C. 2α

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

Answer: C

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16. A circular ring of radius 3cm hangs horizontally from a point 4 cm vertically above the centre by 4 strings attached at equal intervals to its circumference. If the angle between two consecutive strings be θ , then $\cos\theta$ is equal to (A) $\frac{4}{5}$ (B) $\frac{4}{25}$ (C) $\frac{16}{25}$ (D) none of these

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

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

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

D. none of these

Answer: C

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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

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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

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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. $\frac{2ah}{\sqrt{3}}$

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

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

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

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. $\frac{a}{\sqrt{3}}$

B. $\sqrt{3}a$

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

D. $2\sqrt{3}a$

Answer: A

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21. A person observes other angle of elevation of the peak of a hill from a station to be α . He walks $cmeters$ along a slope inclined at the angle β and finds the angle of elevation of the peak of the hill

be γ. Show that the height of the peak above the ground is $\frac{c\sin\alpha\sin(\gamma-\beta)}{(\sin\gamma-\alpha)}$.

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

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

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

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

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 60°. He moves away from the pole along the line BC to a point D such that m. From D the angle of elevation of the point A is 45°. Then the height of the pole is :

A. $\frac{7\sqrt{3}}{2}(\sqrt{3}-1)m$

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

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

D. $\frac{7\sqrt{3}}{2}(\sqrt{3}+1)$ 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. $\frac{\sqrt{3}}{20}$ m

C. $10\sqrt{3}$m

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

Answer: A

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

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

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

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

Answer: A

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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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Exercise

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. $\frac{5\sqrt{3}}{2}$

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

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

D. none of these

Answer: B

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3. ABC is a triangular park with AB=AC=100 m .A clock tower is situated at the midpoint of BC. The angle of elevation α and β of the top of the tower at A and B, respectively ,are such that cot α =3.2 cosec β = 2.6 Find the height of the tower .

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

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

Answer: C

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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. $\frac{h \cot p}{\cot p - \cot q}$

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

D. none of these

Answer: B

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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. $\frac{100\cot\alpha}{\cot\alpha-\cot\beta}$

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

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

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

Answer: C

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

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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 an equilateral triangle subtends an angle of 60° at the top of a tower h m high located at the centre of the triangle. If a is the length of each side of the triangle, 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. $\frac{10}{\sqrt{3}}$ 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. $\frac{\sqrt{3}-1}{\sqrt{3}+1}$. 60 metres

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

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

D. none of these

Answer: B

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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

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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. $\frac{n}{2n^2+1}$

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

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

D. none of these

Answer: A

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

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

Answer: C

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A. $100\sqrt{3}$

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

C. 50

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

Answer: A

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17. A tower subtends an angle α at a point A in 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 $b\tan\alpha\cot\beta$.

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

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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 $\frac{d}{\cot \alpha + \cot \beta}$ (b) $\frac{d}{\cot \alpha - \cot \beta}$ $\frac{d}{\tan \beta - tan\alpha}$ (d) $\frac{d}{\tan \beta + \tan \alpha}$

A. $\frac{a \sin \alpha \sin \beta}{\sin(\beta - \alpha)}$

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

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

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

Answer: A

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19. 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 $\frac{\tan\alpha\tan\beta}{\tan\alpha+\tan\beta}$

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

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

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

D. none of these

Answer: B

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20. A vertical tower stands on a declivity which is inclined at 15° to the horizontal. From the foot of the tower, a man ascends the declivity for 80 feet and then finds that the tower subtends an angle of 30°. The height of the tower is

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

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

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

D. none of these

Answer: B

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

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

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

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

Answer: B

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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

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24. A tower of height b subtends an angle at a point 0 on the ground level through the foot of the tower and at a distance a from the foot of the tower. A pole mounted on the top of the tower also subtends an equal angle at 0. The height of the pole is

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

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

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

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

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

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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: C

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

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

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

D. none of these

Answer: B

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

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

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

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: B

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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

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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. $\frac{h}{\sqrt{3}}$

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

C. 3h

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

Answer: A

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32. 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. $\frac{\tan^{-1} 4}{9}$

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

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

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

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. $\frac{70}{\sqrt{2}}$ m

D. 35 m

Answer: A

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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 θ =

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

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

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

D. none of these

Answer: C

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35. 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.

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

B. $240\sqrt{3}$ hour

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

D. none of these

Answer: B

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

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

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

D. none of these

Answer: A

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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. $\frac{1440}{199}$ metres

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

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

D. none of these

Answer: C

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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. $25\left(\sqrt{3}-1\right)$m

C. $25\sqrt{3}$m

D. $25\left(\sqrt{3}+1\right)$ 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. $\left(6+3\sqrt{2}\right)$ 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: A

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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. $\frac{5}{2}$m

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

C. 4m

D. none of these

Answer: A

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

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

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

Answer: D

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43. The upper $\frac{3}{4}$ th portion of a vertical pole subtends an angle θ such that $\tan\theta = \frac{3}{5}$ at a point in the horizontal plane through its foot and

at a distance 40m from the foot. Find the possible height of the vertical pole.

A. 80 m

B. 20 m

C. 40 m

D. 60 m

Answer: C

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44. 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 60^0. When he move 40 metres away from the bank, he finds the angle of elevation to be 30^0. Find the height of the tree and the width of the river.

A. 60 m

B. 30 m

C. 40 m

D. 20 m

Answer: D

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45. A tower subtends angles $\alpha, 2\alpha, 3\alpha$ respectively, at point $A, B, andC$ all lying on a horizontal line through the foot of the tower. Prove that $\frac{AB}{BC} = 1 + 2\cos 2\alpha$.

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

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

C. $2\cos 3\alpha$

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

Answer: B

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