MATHS

BOOKS - PEARSON IIT JEE FOUNDATION

TRIGONOMETRY

Example

1. Convert 45° into circular measure.

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2. Convert 150^g into sexagesimal measure.

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3. What is the sexagesimal measure of angle measuring $\dfrac{\pi^c}{3}$?

4. If $\sin\theta = \dfrac{3}{5}$, then find the value of $\tan\theta$ and $\sec\theta$.

5. Find the value of $\tan 45° + 2\cos 60° - \sec 60°$.

A. 1

B. 2

C. 0

D. none

Answer: C

6. Using the trignomertric table, evaluate

(a) $\sin^2 30° + \cos^2 30°$

(b) $\sec^2 60° - \tan^2 60°$.

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7. Find the value of

$\dfrac{\tan 60° - \tan 30°}{1 + \tan 60° \tan 30°}$ and $\tan 30°$. what do you observe?

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8. Find the value of $\sin 75°$.

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9. Find the value of $\tan 15°$.

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10. Eliminate θ from the equations $x = p\sin\theta$ and $y = q\cos\theta$.

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11. Find the relation obtained by eliminating θ from the equations $x = r\cos\theta + s\sin\theta$ and $y = r\sin\theta - s\cos\theta$.

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12. Eliminate θ from the equations

$x = \mathrm{cosec}\theta + \cot\theta$

$y = \mathrm{cosec}\theta + \cot\theta$.

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13.

θ from the equation $m = \tan\theta + \cot\theta$ and $n = \tan\theta - \cot\theta$.

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14. If $\cos(A + B) = \dfrac{1}{2}$ and $B = \sqrt{2},$ then find A and B.

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15. Find the length of the chord which substends an angle of $120°$ at the centre 'O' and which is at a distance of 5 m from the centre.

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16. Evaluate: $\sqrt{\dfrac{1 - \sin\theta}{1 + \sin\theta}}.$

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17. What is the value of $\tan 315°$?

18. Find the value of $\sin^2 135° + \sec^2 135°$.

19. If $\cos A = \dfrac{5}{13}$ and A is not in first quardrant, then find the value of $\dfrac{\sin A}{\tan}$

.

20. if ABCD is a cyclic quadrilateral, then find the value of cosA cosB - cos C cos D.

21. if $\cot 15° = m,$ then find $\dfrac{\cot 195° + \cot 345°}{\tan 15° - \cot 105°}$

22. If $\sin\theta$ and $\cos\theta$ are the roots of the equation $mx^2 + nx + 1 = 0,$

then find the relation between m and n.

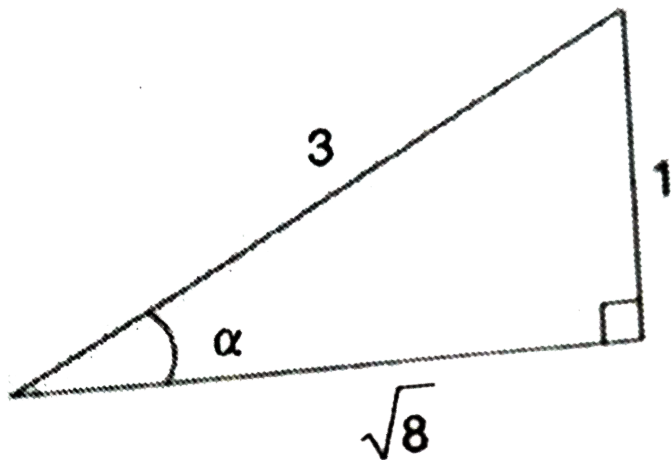A. $n^2 + m^2 = 4m$

B. $n^2 - m^2 = 2m$

C. $n^2 - m^2 = 5m$

D. $n^2 + m^3 = 3m$

Answer: B

23. If $\sin \alpha = \dfrac{1}{3}$ and $\cos \beta = \dfrac{4}{5}$, then find $\sin(\alpha + \beta)$.

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24. Express the following as a single trignometric ratio:

$\sqrt{3} \cos \theta - \sin \theta$

$\sin \theta - \cos \theta$.

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25. If $A + B = 90°$, then prove that

$\sin^2 A + \sin^2 B = 1$

$\tan^2 A + \cot^2 B = 0.$

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26. Simplifying the following: $\begin{vmatrix} \cos A & \sin A \\ \sin A & -\cos A \end{vmatrix}$

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27. Find the value of $\sin 65° 28'$.

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28. Find the area of th e right angle traingle with one of the acute angle being $65°$ and hypotenuse 6 cm.

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29. Find the length of the chord which substends an angle of $110°$ at the centre of the circle of radius 7 cm.

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30. From a point on the ground which is at a distance of 50 m from the foot of the towe, the angle of elevation of the top of the tower is observed to be $30°$. Find the height of the tower.

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31. The angle of elevation of the top of a tower at a point on the line through the foot of the tower is $45°$. After walking a distance towards the foot of the tower along the same horizontal line elevation of the top of the tower changes to $60°$. Find the height of tower.

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32. From the top of a building 100 m high, the angles of depression of the bottom and the top of an another building just oppositeto it are observed to be $60°$ and $45°$ respectively. Find the height of the building.

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1. If $\sin\theta = \dfrac{1}{2} where 0° \leq \theta \leq 180°$, then the possibel value of θ are "_____.

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2. $\cot\theta$ in terms of $\sin\theta$=_____ $(0 \leq \theta \leq 90°)$.

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3. If A and B are two complementery angle, then

$\sin A \cdot \cos B + \cos A \cdot \sin B=$_____.

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4. If the angle of a sector is $45°$ and the radius of the sector is 28 cm then

the length of the arc is _____.

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5. If ABCD is a cyclic quadrilateral, then $\tan A + \tan C=$_____.

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6. $\dfrac{1 - \cos 2\theta}{2} =$_____ (in terms of $\sin \theta$).

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7. $\cos 1° \cdot \cos 2° \cdot \cos 3° \cdot \cdot \cdot \cos 120°$ =_____.

8. The $\dfrac{3\pi}{2}$ is equivalent to _____in centesimal system.

9. If $A + B = 360°,$ then $\dfrac{\tan A + \tan B}{1 - \tan A \tan B}$=_____.

10. If $\tan\theta + \cot\theta = 2, then \tan^{10}\theta + \cot^{10}\theta$=_____ (Where $0 < \theta < 90°$).

11. Write an equation eliminating theta from the equations $a = d \sin \theta$ and $c = d \cos \theta$.

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12. Convert250^g into other two measures.

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13. $\sin(180 + \theta) + \cos(270 + \theta) + \cos(90 + \theta) + \sin \cdot (360 + \theta)$ =

_____.

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14. If $\theta + \cos \theta = 1$ and $0° \leq \theta \leq 90°$, then the possible value of θ

are _____.

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15. Evaluate $\sin^2 45° + \cos^2 60° + \cos ec^2 30°$.

16. If A,B,C and D are the angles of cyclic quadrilateral, prove that:

i) $\cos A + \cos B + \cos C + \cos D$

ii) $\cos(180° - A) + \cos(180° + B) + \cos(180° + C) - \sin(90°)$

17. $\cos ec(7\pi + \theta) \cdot (8\pi + \theta) =$ _____.

18.   If

$\theta_1 = \dfrac{7}{25}$ and $\theta_2 = \dfrac{24}{25}$, then find the relation between θ_1 and θ_2.

19. Find the value of $\tan 1140°$.

20. If $\sin(A + B) = \cos(A - B) = \dfrac{\sqrt{3}}{2}$, $then \cot 2A=$_____.

21. If $\triangle ABC$ is an isosceles traingle and right angled at B, then $\dfrac{\tan A + \tan C}{\cot A + \cot C}=$_____.

22. $[\sin(x - \pi) + \cos(x - \pi/2)] \cdot \cos(x - 2\pi)=$_____.

23. $\tan(A + B)\tan(A - B)=$ _____.

24. The angle of a quadrilateral are in the ratio $1:2:3:4$. Then the smallest angle in the centesimal system is _____.

25. If $\tan(A + B)\tan(A - B) =$ _____.

26. $[\sin \beta + \sin(180 - \beta) + \sin(180 + \beta)] \cos ec\beta =$_____.

27. Express $\dfrac{\tan\theta + 1}{\tan\theta - 1}$ as a single trignometric ratio.

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28. If $\cos ec\theta + \cot\theta = 3,$ then find $\cos\theta$.

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29. The top of a building from a fixed point is observed at an angle of elevation $60°$ and the distance from the foot of the building to the point is 100 m, then the height of the building is _____.

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30. If $\cot\theta = \dfrac{4}{3}$ where $180 < \theta < 270,$ then $\sin\theta + \cos\theta$ = _____.

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1. If the tip of the pendulum of a clock travels 13.2cm in one oscillation and the length of the pendulum is 6.3 cm, then the angle covered by the pendulum during this half oscillation in radian system is _____.

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2. If $\cos ec\theta$, $\sec \theta$ and $\cot \theta$ are in HP, then $\dfrac{\sin \theta + \tan \theta}{\cos \theta} =$_____.

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3. $\cot \dfrac{\pi}{18} \cdot \cot \dfrac{\pi}{9} \cdot \cot \dfrac{4\pi}{4} \cdot \cot \dfrac{4\pi}{18} \cdot \cot \dfrac{7\pi}{18} =$_____.

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4. If $\cot \theta = \dfrac{4}{3}$ and θ is acute, then find the value of $\dfrac{\tan \theta + \cot \theta}{\sec \theta + \cos ec\theta}$.

5. Simplify $\sin(A + 45°)\sin(A - 45°)$.

6. Eliminate θ from the following equations:

$x = a\sin\theta, y = b\cos\theta$ and $z = a\sin^2\theta + b\cos^2\theta$.

7. If $\sin A = \dfrac{3}{4}$ and A is not in the first quadrant, then find $\dfrac{\cos A + \cos 2A}{\tan A + \sec A}$.

8. If $\cos(A - B) = \dfrac{5}{13}$ and $\sin(A + B) = \dfrac{4}{5}$, then find sin2B.

9. If $\cos ec\theta - \cot\theta = 2$, find the value of $\cos ec^2\theta + \cot^2\theta$.

10. If $\tan 28° = n$, then find the value of $\dfrac{\tan 152° + \tan 62°}{\tan 242° + \tan 28°}$.

11. If $3\sin A + 4\cos A = 4$, then find $4\sin A - 3\cos A$.

12. A ladder of length 50 m rests against a vertical wall, at a height of 30 m from the ground. Find the inclination of the ladder with the horizontal. Also find the distance between the foot of the ladder and the wall.

13. Eliminate θ from the following equations:

$x \sin \alpha + y \cos \alpha = p$ and $x \cos \alpha - y \sin \alpha = q$

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1. The angle of depression of the top of the tower from the top of a building is $30°$ and angle of elevation of the top of the tower from the bottom of the building is $45°$ and if the height of the tower is 20 m, then find the height of the building.

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2. A vertiacal pole is 60 m high, The angle of depression of two points P and Q on the ground are $30°$ and $45°$ respectively. If the points P and Q

lie on either side of the pole, then find the distance PQ.

Level 1

1. If $\sin x^\circ = \sin \alpha$, then α is

A. $\dfrac{180}{\pi}$

B. $\dfrac{\pi}{270}$

C. $\dfrac{270}{\pi}$

D. $\dfrac{\pi}{180}$

Answer: D

2. If ina triangle ABC, A and B are complementary, then tan C is

A. ∞

B. 0

C. 1

D. $\sqrt{3}$

Answer: A

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3. If $\alpha = \dfrac{4}{5}$ and $\alpha = \dfrac{4}{5}$, then which of the following is true?

A. $\alpha < \beta$

B. $\alpha l > \beta$

C. $\alpha = \beta$

D. None of these

Answer: B

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4. $\sin^2 20 + \sin^2 70$ is equal to _____.

A. 1

B. -1

C. 0

D. 2

Answer: A

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5. $\cos 50° 50'$ $\cos 9° 10' - \sin 50° 50' \sin 9° 10' =$ _____.

A. 0

B. $\dfrac{1}{2}$

C. 1

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

Answer: B

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6. Write the value of $\sin\theta\cos(90° - \theta) + \cos\theta\sin(90° - \theta)$.

A. -1

B. 2

C. 0

D. 1

Answer: D

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7. A wheel makes 20 revolutions per hour. The radians turns through 25 minutes is _____.

A. $\dfrac{50\pi^c}{7}$

B. $\dfrac{250\pi^c}{3}$

C. $\dfrac{150\pi^c}{7}$

D. $\dfrac{50\pi^c}{3}$

Answer: D

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8. $\dfrac{\sin^4\theta - \cos^4\theta}{\sin^2 - \cos^2\theta} =$ _____.

A. -1

B. 2

C. 0

D. 1

Answer: D

9. Simplified expression of $(\sec\theta + \tan\theta)(1 - \sin\theta)$ is _____.

A. $\sin^2\theta$

B. $\cos^2\theta$

C. $\tan^2\theta$

D. $\tan^2\theta$

Answer: D

10. If $a = \sec\theta - \tan\theta$ and $b = \sec\theta + \tan\theta$, then

A. $a = b$

B. $\dfrac{1}{a} = \dfrac{-1}{b}$.

C. $a = \dfrac{1}{b}$.

D. $a - b = 1$

Answer: C

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11. If $\sec\alpha + \tan\alpha = m,$ then $\sec^4\alpha - \tan^4\alpha - 2\sec\alpha\tan\alpha$ is

_____.

A. m^2

B. $-m^2$

C. $\dfrac{1}{m^2}$

D. $\dfrac{-1}{m^2}$

Answer: C

12. If $\sin^4 A - \cos^4 A = 1, then (A/2)$ is _____.$(0 < A \leq 90°)$.

A. $45°$

B. $60°$

C. $30°$

D. $40°$

Answer: A

13. The value of $\tan 15° \tan 20° \tan 70° \tan 75$ is

A. -1

B. 2

C. 0

D. 1

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14. In a $\triangle ABC$, $\tan\left(\dfrac{A + C}{2}\right) = $ _____.

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15. If $\tan\left(A - 30°\right) = 2 - \sqrt{3}$, then find A.

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

B. $\dfrac{\pi^c}{4}$

C. $\dfrac{\pi^c}{6}$

D. $\dfrac{\pi^c}{3}$

Answer: B

16. If $\sin^4\theta - \cos^4 = k^4$, $then \sin^2\theta - \cos^2\theta$ is _____.

A. K^4

B. K^3

C. K^2

D. K

Answer: A

17. $\dfrac{\tan^3\theta - 1}{\tan\theta - 1} =$ _____.

A. $\sec^2\theta + \tan\theta$

B. $\sec^2\theta - \tan\theta$

C. 0

D. $\tan\theta - \sec^2\theta$

Answer: A

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18. For all values of θ, $1 + \cos\theta$ can be_____.

A. positive

B. negative

C. non-positive

D. non-negative

Answer: D

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19. If $\sin 3\theta = \cos(\theta - 6°)$, where 3θ and $(\theta - 6°)$ are acute angle then the value of θ is _____.

A. $42°$

B. $24°$

C. $12°$

D. $26°$

Answer: B

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20. $(\cos ecA - \sin A)(\sec A - \cos A)(\tan A + \cot A) =$ _____.

A. -1

B. 2

C. 0

D. 1

Answer: D

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21. If $x = a(\cos ec\theta + \cot \theta)$ and $y = b(\cot \theta - \cos ec\theta)$, then

A. $xy - ab = 0$

B. $xy + ab = 0$

C. $\dfrac{x}{a} + \dfrac{y}{b} = 1$

D. $x^2 y^2 = ab$

Answer: B

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22. The value of $\dfrac{\cos^4 x + \cos^2 x \sin^2 x + \sin^2 x}{\cos^2 x + \sin^2 x \cos^2 x + \sin^4 x}$ is _____.

A. 2

B. 1

C. 3

D. 0

Answer: B

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23. $\dfrac{1}{1 + \sin\theta} + \dfrac{1}{1 - \sin\theta}$ is equal to _____.

A. $2\sec^2\theta$

B. $2\cos^2\theta$

C. 0

D. 1

Answer: A

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24. if $\tan(\alpha + \beta) = \dfrac{1}{2}$ and $\tan\alpha = \dfrac{1}{3}$, *then* $\tan\beta=$_____.

A. $\dfrac{1}{6}$

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

C. 1

D. $\dfrac{7}{6}$

Answer: B

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25. The value of log

$\sin 0° + \log\sin 1° + \log\sin 2° + \cdots + \log\sin 90°$ is _____.

A. 0

B. 1

C. -1

D. undefined

Answer: D

---

26. Which of the following is not possible?

A. $\sin\theta = \dfrac{3}{5}$

B. $\sec\theta = 100$

C. $\cos ec\theta = 0.14$

D. None of these

Answer: B

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27. $\sin^2 20° + \cos^2 160° - \tan^2 45° =$ _____

A. 2

B. 0

C. 1

D. -2

Answer: D

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28. $\dfrac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} + \dfrac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta} = \text{-----------}.$

A. $\dfrac{2}{1 - 2\sin^2\theta}$

B. $\dfrac{2}{2\sin^2\theta - 1}$

C. Both (a) and (b)

D. None of these

Answer: B

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29. The length of the side (in cm) of an equilateral triangle inscribed in a circle of radius 8 cm is _____.

A. $16\sqrt{3}$

B. $12\sqrt{3}$

C. $8\sqrt{3}$

D. $10\sqrt{3}$

Answer: B

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30. Which among the following is true?

A. $\sin 1^\circ > \sin 1^c$

B. $\sin 1^\circ < \sin 1^c$

C. $\sin 1^\circ = \sin 1^c$

D. None of these

Answer: B

Level 2

1. If $2\sin\alpha + 3\cos\alpha = 2,$ then $3\sin\alpha - 2\cos\alpha =$ _____.

A. ± 3

B. ± 2

C. 0

D. ± 2

Answer: B

2. If $\dfrac{\sin^2\alpha - 3\sin\alpha + 2}{\cos^2\alpha} = 1$, then α can be _____.

A. $60°$

B. $45°$

C. $0°$

D. $30°$

Answer: D

3.

If $\cot A = \dfrac{5}{12}$ and A is not in the first quardant, then $\dfrac{\sin A - \cos A}{1 + \cot A}$ is _____.

A. $\dfrac{-74}{25}$

B. $\dfrac{-84}{221}$

C. $\dfrac{-87}{223}$

D. None of these

Answer: C

4. If $\dfrac{1 + \sin\alpha}{1 - \sin\alpha} = \dfrac{m^2}{n^2}$, $then \sin\alpha$ is _____.

A. $\dfrac{m^2 + n^2}{m^2 - n^2}$

B. $\dfrac{m^2 - n^2}{m^2 + n^2}$

C. $\dfrac{m^2 + n^2}{n^2 - m^2}$

D. $\dfrac{n^2 - m^2}{m^2 + n^2}$

Answer: C

5. If $\sin\theta - \cos\theta = \dfrac{3}{5}$, $then \sin\theta \cos\theta =$_____.

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

B. $\dfrac{9}{16}$

C. $\dfrac{9}{25}$

D. $\dfrac{8}{25}$

Answer: C

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6. If ABCD is a cyclic quadrilateral, then the value of $\cos^2 A - \cos^2 B - \cos^2 C + \cos^2 D$ is _____.

A. 0

B. 1

C. -1

D. 2

Answer: B

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7. The length of minute hand of a wall clock is 12 cm. find the distance covered by the tip of the minutes hand in 25 minutes.

A. $\dfrac{220}{7}$ cm

B. $\dfrac{110}{7}$ cm

C. $\dfrac{120}{7}$ cm

D. $\dfrac{240}{7}$ cm

Answer: A

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8. The value of $\sin^2 2° + \sin^2 4 + \sin^2 6° + ... + \sin^2 90°$ is

A. 22

B. 23

C. 44

D. 45

9. A straight highway leads to the foot of a tower of height 50 m. From the top of 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?

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

B. $50\sqrt{3}$

C. $\dfrac{50}{\sqrt{3}}$

D. $100\sqrt{3}$

10. The angle of elevation of the top of a hill from 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, then what is the height of the hill?

A. 180 m

B. 150 m

C. 100 m

D. 120 m

Answer: D

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11. $\tan 38° - \cot 22° = $ _____.

A. $\dfrac{1}{2}\cos ec38° \sec 22°$

B. $2\sin 22° \cos 38°$

C. $-\dfrac{1}{2}\cos ec22°\sec 38°$

D. None of these

Answer: D

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12. $\dfrac{1-\cos\theta}{\sin\theta}+\dfrac{\sin\theta}{1-\cos\theta}=\underline{\hspace{2cm}}.$

A. $2\sin\theta$

B. $2\cos\theta$

C. $2\cos ec\theta$

D. $2\sec\theta$

Answer: C

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13. $\sqrt{-4 + \sqrt{8 + 16\cos ec^4\alpha + \sin^4\alpha}}$ = _____.

A. $\cos ec\alpha - \sin\alpha$

B. $2\cos ec\alpha + \sin\alpha$

C. $2\cos ec\alpha - \sin\alpha$

D. $\cos ec\alpha - \sin\alpha$

Answer: C

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14. The angle of depression of the top and the bottom of a 7 m tall building from the top of a tower ar $45°$ and $60°$ respectively. Find the height of the tower in metres.

A. $7(3 + \sqrt{3})$

B. $\dfrac{7}{2}(3 - \sqrt{3})$

C. $\dfrac{7}{2}(3 + \sqrt{3})$

D. $7\left(3 - \sqrt{3}\right)$

Answer: A

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15. If $\tan 86^\circ = m,\ then \dfrac{\tan 176^\circ + \cot 4^\circ}{m + \tan 4^\circ}$ is _____.

A. $\dfrac{m^2 - 1}{m^2 + 1}$

B. $\dfrac{m^2 + 1}{1 - m^2}$

C. $\dfrac{1 - m^2}{1 + m^2}$

D. $\dfrac{m^2 + 1}{m^2 - 1}$

Answer: A

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16. The following sentences are the steps involved in proving the result $\dfrac{\cos x}{1 - \tan x} + \dfrac{\sin x}{1 - \cot x} = \cos x + \sin x$. Arrange them in sequential order from first to last.

A. $\dfrac{\cos^2 x}{\cos x - \sin x} + \dfrac{\sin^2 x}{\sin x - \cos x}$

B. $\dfrac{\cos^2 x - \sin^2 x}{\cos x - \sin x}$

C. $\dfrac{\cos x}{1 - \frac{\sin x}{\cos x}} + \dfrac{\sin x}{1 - \frac{\sin x}{\sin x}}$

D. (a) (A), (B) and (C)

(C), (A) and (B)

(C), (B) and (A)

Answer: B

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17. The following sentences are the steps involved in eliminating θ from the equations $x = y \tan \theta$ and $a = b \sec \theta$. Arrange them in sequential

order from first to last.

A. Substract $\left(\dfrac{x}{y}\right)^2$ from $\left(\dfrac{a}{b}\right)^2$

B. $\left(\dfrac{x}{y}\right)^2 - \left(\dfrac{a}{b}\right)^2 = 1$

C. Taking squares on both the sides

D. Find $\left(\dfrac{x}{y}\right)$ and $\left(\dfrac{a}{b}\right)$

(D),(A),(C) and (B) M

(D),(C),(B) and (A)

(D),(B),(A) and (C)

(D),(C),(A) and (B)

Answer: D

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Level 3

1. 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.

A. $50(\sqrt{3} - 1)$

B. $50(\sqrt{3} + 1)$

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

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

Answer: D

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2. A ballon is connected to a metrorological ground station by a cable of length 215 m inclined at $60°$ to the horizontal. Determine the height of the ballon from the ground. Assume that there is no slack in the cable.

A. $107.5\sqrt{3}$ m

B. $100\sqrt{3}$ m

C. $215\sqrt{3}$m

D. $215/\sqrt{3}$ m

Answer: C

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3. If

$\sin 2A = 2\sin A\cos A$ and $\sin 20° = K,$ then the value of $\cos 20°\cos 80°$

=_____.

A. K

B. $-\sqrt{1-k^2}$

C. $\dfrac{\sqrt{1-k^2}}{8}$

D. $-\dfrac{\sqrt{1-k^2}}{8}$

Answer: B

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4. If $\sqrt{2}\cos\theta - \sqrt{6}\sin\theta = 2\sqrt{2}$, then the value of θ can be _____.

A. $0°$

B. $-45°$

C. $30°$

D. $-60°$

Answer: B

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5. 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 $30o$. Calculate the distance covered by the artist in climbing to the top of the pole.

A. 24m

B. 6 m

C. 12 m

D. None of these

Answer: C

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6. Find the value of $\sin^2 5° + \sin^2 10° + \sin^2 15° + \cdots + \sin^2 90°$.

A. 8

B. 9

C. $\dfrac{17}{2}$

D. $\dfrac{19}{2}$

Answer: D

7. If $\sec\theta + \tan\theta = 2$, then find the value of $\sin\theta$.

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

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

C. $-\dfrac{3}{5}$

D. $-\dfrac{2}{5}$

Answer: A

8. If $\cos\theta + \left(\dfrac{1}{\sqrt{3}}\right)\sin\theta = \dfrac{2}{\sqrt{3}}$, then find θ in circular measure.

A. $\dfrac{\pi^c}{10}$

B. $\dfrac{\pi^c}{9}$

C. $\dfrac{\pi^c}{6}$

D. $\dfrac{\pi^c}{3}$

Answer: C

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9. $\sqrt{\dfrac{1 + \sin\theta}{1 - \sin\theta}} = \text{--}.$

A. $\sec\theta + \tan\theta$

B. $\sec\theta - \cot\theta$

C. $\cos ec\theta + \tan\theta$

D. $\cos ec\theta - \tan\theta$

Answer: A

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10. If $\dfrac{\sin^2 \theta - 5\sin \theta + 3}{\cos^2 \theta}$ =1, then θ can be _____.

A. $30°$

B. $45°$

C. $60°$

D. $0°$

Answer: A

11. If $\cot \theta = \dfrac{24}{7}$ and θ is not in the first quadrant, then find the value of $\tan \theta - \sec \theta$

A. 1

B. $\dfrac{4}{3}$

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

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

Answer: B

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12. If $\sin 20° = p,$ then find the value of $\left(\dfrac{\sin 380° - \sin 340°}{\cos 380° + \cos 340°} \right).$

A. $\sqrt{1 - P^2}$

B. $\sqrt{\dfrac{1 - p^2}{p}}$

C. $\dfrac{p}{\sqrt{1 - p^2}}$

D. None of these

Answer: C

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13. Find the value $\tan\left(22\dfrac{1}{2} \right).$

A. $\sqrt{2} - 1$

B. $1 + \sqrt{2}$

C. $2 + \sqrt{3}$

D. $2 - \sqrt{3}$

Answer: A

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14. If the sun ray' inclination increases from $45°$ to $60°$ the length of the shadow of a tower decreases by 50 m. Find the height of the tower (in m).

A. $50(\sqrt{3} - 1)$

B. $75(3 - \sqrt{3})$

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

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

Answer: D

15. The angles of depression of two points from the top of the tower are $30°$ and $60°$. IF the height of the tower is 30 m, then find the maximum possible distance between the two points.

    A. $40\sqrt{3}$ m

    B. $30\sqrt{3}$ m

    C. $20\sqrt{3}$ m

    D. $10\sqrt{3}$ m

Answer: A

16. From a point on the ground, the angle of elevation of an aeroplane flying at an altitude of 500m change from $45°$ to $30°$ in 5 seconds. Find the speed of the aeroplane (in kmph).

A. 243.52 km/s

B. 253.52 km/s

C. 263.52 km/s

D. 273.52 km/s

Answer: C

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17. From the top of a building, the angle of elevation and depression of top and bottom of a tower are $60°$ and $30°$ respectively. If the height of the building is 5 m, then find the height of the tower.
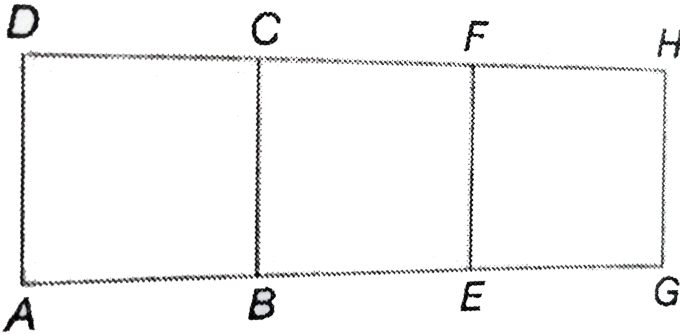
A. $10\sqrt{3}m$

B. 15 m

C. $15\sqrt{3}m$

D. 20 m

Answer: D

18. If the figure given below (not to scale), ABCD, CBEF and EGHF are three congruent squares. Find $\angle FAE + \angle HAG$.

A. $30°$

B. $45°$

C. $60°$

D. $90°$

Answer: B