



MATHS

BOOKS - NDA PREVIOUS YEARS

TRIGONOMETRY - RATIO & IDENTITY , TRIGONOMETRIC EQUATIONS

Mcq

1. The difference of two angles is 1° , the circular measure of their sum is

1 . What is the smaller angle in circular measure ?

A. $\left[\frac{180}{\pi} - 1 \right]$

B. $\left[1 - \frac{\pi}{180} \right]$

C. $\frac{1}{2} \left[1 - \frac{\pi}{180} \right]$

D. $\frac{1}{2} \left[\frac{180}{\pi} - 1 \right]$

Answer: C



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2. A positive acute angle is divided into two parts whose tangents are $\frac{1}{8}$ and $\frac{7}{9}$. What is the value of this angle ?

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

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

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

D. $\frac{\pi}{12}$

Answer: B



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3. If an angle B is complement of an angle A, what are the greatest and last values of $\cos A \cos B$ respectively ?

A. $0, -\frac{1}{2}$

B. $\frac{1}{2}, -1$

C. $1, 0$

D. $\frac{1}{2}, \frac{1}{2}$

Answer: D



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4. Three expressions are given below :

$$Q_1 = \sin(A + B) + \sin(B + C) + \sin(C + A)$$

$$Q_2 = \cos(A - B) + \cos(B - C) + \cos(C - A)$$

$$Q_3 = \sin A(\cos B + \cos C) + \sin B(\cos C + \cos A) + \sin C(\cos A + \cos B)$$

Which one the following is correct ?

A. $Q_1 = Q_2$

B. $Q_2 = Q_3$

C. $Q_1 = Q_3$

D. All the expressions are different

Answer: C

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5. For what values of x is the equation $2 \sin \theta = x + \frac{1}{x}$ valid?

A. $x = \pm 1$

B. All real values of x

C. $-1 < x < 1$

D. $x > 1$ and $x < -1$

Answer: A

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6. If $\sin(\pi \cos x) = \cos(\pi \sin x)$, then what is one of the values of $\sin 2x$?

A. $-\frac{1}{4}$

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

C. $-\frac{3}{4}$

D. -1

Answer: C



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7. In a triangle ABC , if $\cos A = \cos B \cos C$, what is the value of $\tan A - \tan B - \tan C$?

A. 0

B. -1

C. $1 + \tan A \tan B \tan C$

D. $\tan A \tan B \tan C - 1$

Answer: A

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8. $\sqrt{3} \cos \sec 20^\circ - \sec 20^\circ$

A. 4

B. 2

C. 1

D. 0

Answer: A

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9. Let $45^\circ \leq \theta < 90^\circ$. If $\tan \theta + \cot \theta = (\tan \theta)^i + (\cot \theta)^i$ for some $i \geq 2$, then what is the value of $\sin \theta + \cos \theta$?

A. $\sqrt{2}$

B. $\frac{1}{\sqrt{2}}$

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

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

Answer: A

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10. Given that

$$\tan \theta = m \neq 0, \tan 2\theta = n \neq 0 \text{ and } \tan \theta + \tan 2\theta = \tan 3\theta,$$

A. $m = n$

B. $m + n = 1$

C. $m + n = 0$

D. $mn = -1$

Answer: C

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11. Let A and B be obtuse angles such that $\sin A = \frac{4}{5}$ and $\cos B = -\frac{12}{13}$.

A. $-\frac{63}{65}$

B. $-\frac{33}{65}$

C. $\frac{33}{65}$

D. $\frac{63}{35}$

Answer: A



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12. If $\tan^2 B = \frac{1 - \sin A}{1 + \sin A}$ then what is the value of $A+2B$?

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

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

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

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

Answer: A



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13. Given that $\cos 20^\circ - \sin 20^\circ = p$, then what is the value of $\sin 40^\circ$?

A. $1 - p^2$

B. $1 + p^2$

C. p^2

D. $p^2 - 1$

Answer: A



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14. Given that $p = \tan \alpha + \tan \beta$, and $q = \cot \alpha + \cot \beta$, then what is

$\left(\frac{1}{p} - \frac{1}{q}\right)$ equal to ?

A. $\cot(\alpha - \beta)$

B. $\tan(\alpha - \beta)$

C. $\tan(\alpha + \beta)$

D. $\cot(\alpha + \beta)$

Answer: D



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15. A is a certain positive acute angle which satisfies the following equation :

$$\text{Number of degree in A} + \text{Number of radians in A} = (180 + \pi) / 3$$

What is the angle A ?

A. 20°

B. 40°

C. 60°

D. 80°

Answer: C



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16. If $\sin^3 \theta + \cos^3 \theta = 0$, then what is the value of θ ?

A. $\frac{-\pi}{4}$

B. 0

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

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

Answer: A



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17. What is the value of

$$\frac{\operatorname{cosec}(\pi + \theta) \cot\left\{\left(9\pi/2 - \theta\right)\right\} \operatorname{cosec}^2(2\pi - \theta)}{\cot(2\pi - \theta) \sec^2(\pi - \theta) \sec\left\{\left(3\pi/2\right) + \theta\right\}}$$

A. 0

B. 1

C. -1

D. ∞

Answer: B



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18. What is the value of $\sin(A + B)\sin(A - B) + \sin(B + C)\sin(B - C) + \sin(C + A)\sin(C - A)$?

A. 0

B. $\sin A + \sin B + \sin C$

C. $\cos A + \cos B + \cos C$

D. 1

Answer: A



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19. Given that $\tan \alpha = m / (m + 1)$, $\tan \beta = 1 / (2m + 1)$, then what is the value of $\alpha + \beta$?

A. 0

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

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

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

Answer: B



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20. If $x = r \sin \theta \cos \phi$, $y = r \sin \theta \sin \phi$ and $z = r \cos \theta$, then $x^2 + y^2 + z^2$ is independent of which of following ?

A. r only

B. r, ϕ

C. θ, ϕ

D. r, θ

Answer: C

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21. Minimum value of $\cos 2\theta + \cos \theta$ for all real value of θ is

A. -2

B. $-\frac{9}{8}$

C. 0

D. $-\frac{9}{16}$

Answer: B

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22. If $3 \tan \theta + 4 = 0$, where $(\pi/2) < \theta < \pi$, then what is the value of

$$2 \cot \theta - 5 \cos \theta + \sin \theta?$$

A. $-\frac{53}{10}$

B. $\frac{7}{10}$

C. $\frac{23}{10}$

D. $\frac{37}{10}$

Answer: C



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23. What is the value of $\operatorname{cosec}(13\pi/12)$?

A. $\sqrt{6} + \sqrt{2}$

B. $-\sqrt{6} + \sqrt{2}$

C. $\sqrt{2} - \sqrt{2}$

D. $-\sqrt{6} - \sqrt{2}$

Answer: D



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24. What is the value of $(\sec \theta - \cos \theta)(\operatorname{cosec} \theta - \sin \theta)(\cot \theta + \tan \theta)$?

A. 1

B. 2

C. $1 \sin \theta$

D. $\cos \theta$

Answer: A



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25. If $\alpha + \beta = \frac{\pi}{2}$ and $\beta + \gamma = \alpha$, then which one of the following is correct ?

A. $2 \tan \beta + \tan \gamma = \tan \alpha$

B. $\tan \beta + 2 \tan \gamma = \tan \alpha$

C. $\tan \beta + 2 \tan \gamma = \tan \alpha$

D. $2(\tan \beta + \tan \gamma) = \tan \alpha$

Answer: B



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26. What is the value of $\frac{(\cos 10^\circ + \sin 20^\circ)}{(\cos 20^\circ - \sin 10^\circ)}$?

A. $\frac{1}{\sqrt{3}}$

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

C. $\sqrt{3}$

D. $-\sqrt{3}$

Answer: C



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27. If α and β are such that $\tan \alpha = 2 \tan \beta$, then what is $\sin(\alpha + \beta)$ equal to ?

A. 1

B. $2 \sin(\alpha - \beta)$

C. $\sin(\alpha - \beta)$

D. $3 \sin(\alpha - \beta)$

Answer: D



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28. What is the value of $\cos 306^\circ + \cos 234^\circ + \cos 162^\circ + \cos 18^\circ$?

A. 1

B. -1

C. 0

D. 2

Answer: C



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29. Let ABCD be a square and let P be a point on AB such that

$AP:PB = 1:2$. If $\angle APD = \theta$, then what is the value of $\cos \theta$?

A. $\frac{1}{\sqrt{10}}$

B. $\frac{1}{\sqrt{5}}$

C. $\frac{2}{\sqrt{10}}$

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

Answer: A



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30. If $\cos 3A = \frac{1}{2}$, then how many value can $\sin A$ assume ?

$(0 < A < 360^\circ)$

A. 3

B. 4

C. 5

D. 6

Answer: D



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31. Let $0^\circ < \theta < 45^\circ$. Which one of the following is correct ?

A. $\sin^2 \theta + \cos^6 \theta = \sin^6 \theta + \cos^2 \theta$

B. $\operatorname{cosec}^2 \theta + \cot^6 \theta = \operatorname{cosec}^6 \theta \cot^2 \theta$

C. $\sin^2 \theta - \cos^4 \theta = \sin^4 \theta + \cos^2 \theta$

D. $\operatorname{cosec}^2 \theta + \cot^4 \theta = \operatorname{cosec}^4 \theta + \cot^2 \theta$

Answer: D



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32. If $\sin A = \sin B$ and $\cos A = \cos B$, then which one of the following is correct ?

A. $B = n\pi + A$

B. $A = 2n\pi - B$

C. $A = 2n\pi + B$

D. $B = n\pi - A$ (n is an integer)

Answer: A

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33. If $\alpha = \frac{\pi}{8}$, what is the value of $\cos \alpha \cos 2\alpha \cos 4\alpha$?

A. 0

B. $\frac{1}{4}$

C. 8

D. 4

Answer: A

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34. What is the value of $\cot (-870^\circ)$?

A. $\sqrt{3}$

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

C. $-\sqrt{3}$

D. $-\frac{1}{\sqrt{3}}$

Answer: A



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35. Let $X = \{\theta \in [0, 2\pi] : \sin \theta = \cos \theta\}$

Assertion (A) : The number of elements in X is 2.

Reason (R) : $\sin \theta$ and $\cos \theta$ are both negative both in second and fourth quadrants.

A. Both A and R are individually true , and R is the correct explanation of A .

B. Both A and R are individually true but R is not the correct explanation of A .

C. A is true but R is false .

D. A is false but R is true.

Answer: C



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36. What is the measure of the angle $114^{\circ} 35' 30''$ in radian ?

A. 1 rad

B. 2 rad

C. 3rad

D. 4rad

Answer: B



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37. What is the value of $\left(\sin 22\frac{1^{\circ}}{2} + \cos 22\frac{1^{\circ}}{2} \right)$?

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

B. $\frac{1 + 2\sqrt{2}}{2}$

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

D. 1

Answer: A



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38. What one of the following is correct ?

$$\left(1 + \cos 67\frac{1^\circ}{2}\right) \left(1 + \cos 112\frac{1^\circ}{2}\right) \text{ is}$$

A. an irrational number and is greater than 1

B. a rational number but not an integer

C. an integer

D. an irrational number and is less than 1

Answer: D



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39. If $\sin 2A = \frac{4}{5}$, then what is the value of $\tan A$ ($0 \leq A \leq \frac{\pi}{4}$)?

A. 1

B. -1

C. $\frac{1}{2}$

D. 2

Answer: C



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40. What is the value of $\frac{\cos 10^\circ - \sin 10^\circ}{\cos 10^\circ + \sin 10^\circ}$?

A. $\tan 35^\circ$

B. $\tan 10^\circ$

C. $\frac{1}{\sqrt{2}}$

D. 1

Answer: A



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41. For what values of x does the equation

$$4 \sin x + 3 \sin 2x - 2 \sin 4x = 2\sqrt{3} \text{ hold?}$$

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

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

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

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

Answer: A



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42. Which one of the following pairs is not correctly matched ?

A. $\sin 2\pi$: $\sin(-2\pi)$

B. $\tan 45.^\circ$: $\tan(-315^\circ)$

C. $\cot(\tan^{-1} 0.5)$: $\tan(\cos^{-1} 0.5)$

D. $\tan 420.^\circ$: $\tan(-60^\circ)$

Answer: D

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43. What is the value of $\sin\left(\frac{5\pi}{12}\right)$?

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

B. $\frac{\sqrt{6} + \sqrt{2}}{4}$

C. $\frac{\sqrt{3} + \sqrt{2}}{4}$

D. $\frac{\sqrt{6} + 1}{2}$

Answer: B

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44. What is the correct sequence of the following values ?

1. $\sin\left(\frac{\pi}{12}\right)$

2. $\cos\left(\frac{\pi}{12}\right)$

3. $\cot\left(\frac{\pi}{12}\right)$

Select the correct answer using the code given below

A. $3 > 2 > 1$

B. $1 > 2 > 3$

C. $1 > 3 > 2$

D. $3 > 1 > 2$

Answer: A



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45. What is the value of $\cos 15^\circ$?

A. $\frac{1}{2} \left(\sqrt{2 - \sqrt{3}} \right)$

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

C. $\sqrt{2} + \sqrt{3}$

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

Answer: B



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46. How many values of θ between 0° and 360° satisfy $\tan \theta = k \neq 0$, where k is a given number ?

A. 1

B. 2

C. 4

D. Many

Answer: D



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47. If $\sin x + \sin y = a$, $\cos x + \cos y = b$, then what is the value of $\cos(x - y)$?

A. $a^2 - 1$

B. $b^2 - 1$

C. $\frac{1}{2}(a^2 + b^2 - 2)$

D. $\frac{1}{2}(a^2 + b^2)$

Answer: C



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48. What is $\sqrt{2 + \sqrt{2 + \sqrt{2 + 2 \cos 4A}}}$ equal to ?

A. $\cos A$

B. $\cos(2A)$

C. $2 \cos(A/2)$

D. $\sqrt{2 \cos A}$

Answer: C

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49. The equation $\tan^2 \phi + \tan^6 \phi = \tan^3 \phi \cdot \sec^2 \phi$ is

A. identity for only one value of ϕ

B. not an identity

C. identity for all values of ϕ

D. None of the above

Answer: B

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50. If $\sec A + \tan A = p$, then what is the values of $\sin A$?

A. $\frac{p^2 - 1}{p^2 + 1}$

B. $\frac{p^2 + 1}{p^2 - 1}$

C. 1

D. None of these

Answer: A



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51. $\tan(-1575^\circ)$

A. 1

B. $1/2$

C. 0

D. -1

Answer: A



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52. For which acute angle θ , $\operatorname{cosec}^2 \theta = 3\sqrt{3} \cot \theta - 5$?

A. $\frac{5\pi}{12}$

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

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

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

Answer: C



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53. If $\tan^2 \theta = 2 \tan^2 \phi + 1$, then which one of the following is correct?

A. $\cos(2\theta) = \cos(2\phi) - 1$

B. $\cos(2\theta) = \cos(2\phi) + 1$

C. $\cos(2\theta) = [\cos(2\phi) - 1] / 2$

D. $\cos(2\theta) = [\cos(2\phi) + 1] / 2$

Answer: C



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54. What is the values of $1 - \sin 10^\circ \sin 50^\circ \sin 70^\circ$?

A. $1/8$

B. $3/8$

C. $5/8$

D. $7/8$

Answer: D



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55. the sines of two angles of a triangle are equal to $\frac{5}{13}$ & $\frac{99}{101}$ the cosine of the third angle is

A. $\frac{255}{1313}$

B. $\frac{265}{1313}$

C. $\frac{275}{1313}$

D. $\frac{770}{1313}$

Answer: A



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56. After subtending an angle of 1000° from its initial position, the revolving line will be situated in which one of the following quadrants ?

A. First quadrant

B. Second quadrant

C. Third quadrant

D. Fourth quadrant

Answer: D



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57. One radian is approximately equal to which one of the following ?

A. 90°

B. 108°

C. 57°

D. 47°

Answer: C



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58. If $\cot(x + y) = 1/\sqrt{3}$, $\cot(x - y) = \sqrt{3}$ then what are the smallest positive values of x and y respectively ?

A. $45^\circ, 30^\circ$

B. $30^\circ, 45^\circ$

C. $15, 60^\circ$

D. $45^\circ, 15^\circ$

Answer: D



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59. $x = \sin \theta \cos \theta$ and $y = \sin \theta + \cos \theta$ are satisfied by which one of the following equations ?

A. $y^2 - 2x = 1$

B. $y^2 + 2x = 1$

C. $y^2 - 2x = -1$

$$D. y^2 + 2x = -1$$

Answer: A



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60. If $\sin^4 x - \cos^4 x = p$, then which one of the following is correct ?

A. $p = 1$

B. $p = 0$

C. $|p| > 1$

D. $|p| \leq 1$

Answer: D



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61. If $\cos \theta < \sin \theta$ and θ lies in the first quadrant, then which one of the following is correct ?

A. $0 < \theta < \pi/4$

B. $\pi/4 < \theta < \pi/2$

C. $0 < \theta < \pi/3$

D. $\pi/3 < \theta < \pi/2$

Answer: B



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62. If $\sin^2 x + \sin^2 y = 1$, then what is the value of $\cot(x + y)$?

A. 1

B. $\sqrt{3}$

C. 0

D. $1/\sqrt{3}$

Answer: C



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63. What is the value of $\cos 10^\circ + \cos 110^\circ + \cos 130^\circ$?

A. -1

B. 0

C. 1

D. 2

Answer: B



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64. Find the length of an arc of a circle of radius 5 cm subtending a central angle measuring 15° .

A. $5\pi / 12cm$

B. $7\pi / 12cm$

C. $\pi / 12cm$

D. $\pi / 5cm$

Answer: A

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65. What is the maximum value of $\sin \theta \cos \theta$?

A. 1

B. $1/2$

C. $1/\sqrt{2}$

D. $\sqrt{3}/2$

Answer: B

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66. If $\sin x + \operatorname{cosec} x = 2$, then what is the value of $\sin^4 x + \operatorname{cosec}^4 x$?

A. 2

B. 4

C. 8

D. 16

Answer: A



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67. Find $\tan 15^\circ$ and hence show that $\tan 15^\circ + \cot 15^\circ = 4$

A. $\sqrt{3}$

B. $2\sqrt{3}$

C. 4

D. 2

Answer: C



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68. If $A + B + C = \frac{\pi}{2}$, then find the value of $\tan A \tan B + \tan B \tan C + \tan C \tan A$

A. 0

B. 1

C. -1

D. $\tan A \tan B \tan C$

Answer: B



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69. $1(\sin x + \operatorname{cosec} x)^2 + (\cos x + \sec x)^2 = k + \tan^2 x + \cot^2 x$, then what is the value of k ?

- A. 8
- B. 7
- C. 4
- D. 3

Answer: B



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70. If $p = \sin(989^\circ)\cos(991^\circ)$, then which one of the following is correct?

- A. p is finite and positive
- B. p is finite and negative
- C. $p = 0$

D. p is undefined

Answer: B



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71. If $A = \frac{41\pi}{12}$, then what is the value of $\frac{1 - 3 \tan^2 A}{3 \tan A - \tan^3 A}$?

A. -1

B. 1

C. 1/3

D. 3

Answer: B



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72. Consider the following statements

I. If $\theta = 1200^\circ$, then $(\sec \theta + \tan \theta)^{-1}$ is positive.

II. If $\theta = 1200^\circ$, then $(\operatorname{cosec} \theta - \cot \theta)$ is negative.

Which of the statements given above is / are correct ?

A. I only

B. II only

C. Both I and II

D. Neither I nor II

Answer: D



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73. If $\cot \theta = 2 \cos \theta$, where $(\pi/2) < \theta < \pi$, then what is the value of θ ?

A. $5\pi/6$

B. $2\pi/3$

C. $3\pi/4$

D. $11\pi/12$

Answer: A



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74. If $\cot \theta = 5/12$ and θ lies in the third quadrant, then what is $(2 \sin \theta + 3 \cos \theta)$ equal to?

A. -4

B. $-p^2$ for some odd prime p

C. $(-q/p)$ where p is an odd prime and q a positive integer with (q/p) not an integer

D. $-p$ for some odd prime p

Answer: D



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75. What is the value of

$$\cos(\pi/9) + \cos(\pi/3) + \cos(5\pi/9) + \cos(7\pi/9)?$$

A. 1

B. -1

C. $-1/2$

D. $1/2$

Answer: D



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76. $\sqrt{3} \cos \sec 20^\circ - \sec 20^\circ$

A. 4

B. 3

C. 2

Answer: A



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77. Match List I with II and select the correct answer using the code given below the lists

	List-I		List-II
A.	$\tan 15^\circ$	1.	$-2 - \sqrt{3}$
B.	$\tan 75^\circ$	2.	$2 + \sqrt{3}$
C.	$\tan 105^\circ$	3.	$-2 + \sqrt{3}$
		4.	$2 - \sqrt{3}$

A. $A \ B \ C$
4 1 2

B. $A \ B \ C$
4 2 1

C. $A \ B \ C$
3 2 1

D. $A \ B \ C$
2 1 4

Answer: B



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78. If $\tan A = \frac{1}{2}$ and $\tan B = \frac{1}{3}$, then what is the value of $(A + B)$?

A. 0

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

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

D. π

Answer: B



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79. If $\cos x \neq -1$, then what is $\frac{\sin x}{1 + \cos x}$ equal to ?

A. $-\cot \frac{x}{2}$

B. $\cot \frac{x}{2}$

C. $\tan \frac{x}{2}$

D. $-\tan \frac{x}{2}$

Answer: C



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80. What is the value of $\frac{1 + \tan 15^\circ}{1 - \tan 15^\circ}$?

A. 1

B. $\frac{1}{\sqrt{2}}$

C. $\frac{1}{\sqrt{3}}$

D. $\sqrt{3}$

Answer: D



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81. $\sqrt{3} \cos \sec 20^\circ - \sec 20^\circ$

A. $1/4$

B. 4

C. 2

D. 1

Answer: B



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82. What is $\tan\left(7\frac{1}{2}\right)^\circ$ equal to ?

A. $\sqrt{6} + \sqrt{3} - \sqrt{2} + 2$

B. $\sqrt{6} + \sqrt{3} + \sqrt{2} + 2$

C. $\sqrt{6} - \sqrt{3} + \sqrt{2} - 2$

D. $\sqrt{6} + \sqrt{3} + \sqrt{2} - 2$

Answer: C



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83. What is the value of $\frac{\cos 15^\circ + \cos 45^\circ}{\cos^3 15^\circ + \cos^3 45^\circ}$

A. $\frac{1}{4}$

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

C. $\frac{1}{3}$

D. None of these

Answer: D



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84. What angle A lies in the third quadrant and it satisfies the equation

$4(\sin^2 x + \cos x) = 1$. What is the measure of the angle A?

A. 225°

B. 240°

C. 210°

D. None of these

Answer: B

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85. What is $\frac{\sin \theta + 1}{\cos \theta}$ equal to ?

A. $\frac{\sin \theta + \cos \theta - 1}{\sin \theta + \cos \theta + 1}$

B. $\frac{\sin \theta + \cos \theta + 1}{\sin \theta + \cos \theta - 1}$

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

D. $\frac{\sin \theta - \cos \theta + 1}{\sin \theta + \cos \theta - 1}$

Answer: D

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86. One of the angles of a triangle is $1/2$ radian and the other is 99° .

What is the third angle in radian measure ?

A. $\frac{9\pi - 10}{\pi}$

B. $\frac{90\pi - 100}{7\pi}$

C. $\frac{90\pi - 10}{\pi}$

D. None of these

Answer: D



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87. What is $\left(\frac{\sec 18^\circ}{\sec 144^\circ} + \frac{\operatorname{cosec} 18^\circ}{\operatorname{cosec} 144^\circ} \right)$ equal to ?

A. $\sec 18^\circ$

B. $\operatorname{cosec} 18^\circ$

C. $-\sec 18^\circ$

D. $-\operatorname{cosec} 18^\circ$

Answer: A



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88. If α and β are positive angles such that $\alpha = \beta = \frac{\pi}{4}$, then what is $(1 - \tan \alpha)(1 + \tan \beta)$ equal to ?

A. 0

B. 1

C. 2

D. 3

Answer: C



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89. The value of $\sin 50^\circ - \sin 70^\circ + \sin 10^\circ$ is

A. 1

B. $\frac{1}{\sqrt{2}}$

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

D. 0

Answer: D



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90. If $\cos A + \cos B = m$ and $\sin A + \sin B = n$ then $\sin(A + B) =$

A. $\frac{mn}{m^2 + n^2}$

B. $\frac{2mn}{m^2 + n^2}$

C. $\frac{m^2 + n^2}{2mn}$

D. $\frac{mn}{m + n}$

Answer: B



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91. If $y = \sec^2 \theta + \cos^2 \theta$, where $0 < \theta < \frac{\pi}{2}$, then which one of the following is correct ?

A. $y = 0$

B. $0 \leq y \leq 2$

C. $y \geq 2$

D. None of these

Answer: C



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92. If $\tan A = 3/4$ and $\tan B = -12/5$, then how many values can $\cot(A - B)$ have depending on the actual values of A and B ?

A. 1

B. 2

C. 3

D. 4

Answer: D



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93. What is the values of $\sin 15^\circ \sin 75^\circ$?

A. $1/4$

B. $1/8$

C. $1/16$

D. 1

Answer: A



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94. What is the value of $\frac{\sin \theta + \cos \theta - \tan \theta}{\sec \theta + \operatorname{cosec} \theta - \cot \theta}$, when $\theta = \frac{3\pi}{4}$?

A. 0

B. 1

C. -1

D. None of these

Answer: B



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95. What is the value of $\sin 292\frac{1}{2}$?

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

B. $-\frac{1}{3}\sqrt{2 - \sqrt{3}}$

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

$$D. -\frac{1}{2}\sqrt{2 + \sqrt{2}}$$

Answer: C



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96. Which one of the following is correct ?

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

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

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

D. $\sin 1^\circ = \frac{\pi}{180}\sin 1$

Answer: B



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97. If in general , the value of $\sin A$ is known , but the value of A is not known , then how many values of $\tan \left(\frac{A}{2} \right)$ can be calculated ?

A. 1

B. 2

C. 3

D. 4

Answer: B



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98. If $x = \sin \theta + \cos \theta$ and $y = \sin \theta \cdot \cos \theta$, then what is the value of $x^4 - 4x^2y - 2x^2 + 4y^2 + 4y + 1$?

A. 0

B. 1

C. 2

D. None of these

Answer: A



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99. If $(1 + \tan \theta)(1 + \tan \phi) = 2$, then what is $(\theta + \phi)$ equal to ?

A. 30°

B. 45°

C. 60°

D. 90°

Answer: B



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100. Angle α is divided into two parts A and B such that $A - B = x$ and $\tan A : B = P : q$. The value of $\sin x$ is equal to

- A. $3 \sin \alpha$
- B. $(2 \sin \alpha) / 3$
- C. $(\sin \alpha) / 3$
- D. $2 \sin \alpha$

Answer: A



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101. the value of $\tan 9^\circ - \tan 27^\circ - \tan 63^\circ + \tan 81^\circ$ is equal to

- A. 1
- B. 2
- C. 3
- D. 4

Answer: D



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102. If $x = y \cos\left(\frac{2\pi}{3}\right) = z \cos\left(\frac{4\pi}{3}\right)$, then what is $xy + yz + zx$ equal to ?

A. -1

B. 0

C. 1

D. 2

Answer: B



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103. If $\sin A + \sin B + \sin C = 3$ then what is $\cos A + \cos B + \cos C$ equal to ?

A. -1

B. 0

C. 1

D. 3

Answer: B



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104. If $\tan A - \tan B = x$ and $\cot B - \cot A = y$, then what is $\cot (A - B)$ equal to ?

A. $\frac{1}{y} - \frac{1}{x}$

B. $\frac{1}{x} - \frac{1}{y}$

C. $\frac{1}{x} + \frac{1}{y}$

D. $-\frac{1}{x} - \frac{1}{y}$

Answer: C



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105. If $\tan A = 1/2$ and $\tan B = 1/3$, then what is the value of $4A + 4B$?

A. $\pi/4$

B. $\pi/2$

C. π

D. 2π

Answer: C



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106. What is the maximum value of $3 \cos x + 4 \sin x + 5$?

A. 5

B. 7

C. 10

D. 12

Answer: C



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107. If $\sin \theta = \cos^2 \theta$, then what is $\cos^2 \theta (1 + \cos^2 \theta)$ equal to ?

A. 1

B. 0

C. $\cos^2 \theta$

D. $2 \sin \theta$

Answer: A



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108. What is the value of $\tan 15^\circ \cdot \tan 195^\circ$?

A. $7 - 4\sqrt{3}$

B. $7 + 4\sqrt{3}$

C. $7 + 2\sqrt{3}$

D. $7 + 6\sqrt{3}$

Answer: A

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109. What is $\frac{\sin x}{1 + \cos x} + \frac{1 + \cos x}{\sin x}$ equal to ?

A. $2 \tan x$

B. $2 \operatorname{cosec} x$

C. $2 \cos x$

D. $2 \sin x$

Answer: B

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110. If $\sin 3A = 1$, then how many distinct values can $\sin A$ assume ?

A. 1

B. 2

C. 3

D. 4

Answer: B



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111. What is $\frac{\sin \theta}{\operatorname{cosec} \theta} + \frac{\cos \theta}{\sec \theta}$ equal to ?

A. 1

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

C. $\frac{1}{3}$

D. 2

Answer: A



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112. If $\tan \theta + \sec \theta = 4$, then what is the value of $\sin \theta$?

A. $8/17$

B. $8/15$

C. $15/17$

D. $23/32$

Answer: C



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113. What is the angles subtended by 1 m pole at a distance 1 km on the ground in sexagesimal measure ?

A. $\frac{9}{50\pi}$ degree

B. $\frac{9}{5\pi}$ degree

C. 3.4 minute

D. 3.5 minute

Answer: A



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114. If $\cot A \cdot \cot B = 2$, then what is the value of $\cos(A + B) \cdot \sec(A - B)$?

A. $\frac{1}{2}$

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

C. 1

D. -1

Answer: A



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115. What is $\tan\left(\frac{\pi}{12}\right)$ equal to ?

A. $2 - \sqrt{3}$

B. $2 + \sqrt{3}$

C. $\sqrt{2} - \sqrt{3}$

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

Answer: A



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116. If $\theta = 18^\circ$, then what is the value of $4\sin^2\theta + 2\sin\theta$?

A. -1

B. 1

C. 0

D. 2

Answer: B

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117. If $\operatorname{cosec}\theta - \cot\theta = \frac{1}{\sqrt{3}}$ where $\theta \neq 0$, then what is the value of $\cos\theta$?

A. 0

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

C. $\frac{1}{2}$

D. $\frac{1}{\sqrt{2}}$

Answer: C

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118. What is the maximum value of $\sin 3\theta \cos 2\theta + \cos 3\theta \sin 2\theta$?

- A. 1
- B. 2
- C. 4
- D. 10

Answer: A



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119. What is $\sin A \cos A \tan A + \cos A \cot A$ equal to ?

- A. $\sin A$
- B. $\cos A$
- C. $\tan A$

D. 1

Answer: D



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120. Which one of the following is positive in the third quadrant ?

A. $\sin \theta$

B. $\cos \theta$

C. $\tan \theta$

D. $\sec \theta$

Answer: C



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121. What is the value of $\sin (1920)$?

A. $1/2$

B. $\frac{1}{\sqrt{2}}$

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

D. $1/3$

Answer: C



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122. Let $\sin(A + B) = 1$ and $\sin(A - B) = \frac{1}{2}$ where $A, B \in \left[0, \frac{\pi}{2}\right]$.

What is the value of A?

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

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

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

D. $\frac{\pi}{8}$

Answer: B

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123. What is $\tan (A+2B) \cdot \tan (2A+B)$ equal to ?

A. -1

B. 0

C. 1

D. 2

Answer: C

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124. What is $\sin^2 A - \sin^2 B$ equal to ?

A. 0

B. $1/2$

C. 1

D. 2

Answer: B



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125. Prove that $:\sin 420^\circ \cos 390^\circ + \cos(-300^\circ)\sin(-330^\circ) = 1$

A. 0

B. 1

C. 2

D. -1

Answer: B



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126. Consider the following statements :

1. 1° in radian measure is less than 0.02 radians .
2. 1 radian in degree measure is greater than 45° .

Which of the above statements is / are correct ?

- A. 1 only
- B. 2 only
- C. Both 1 and 2
- D. Neither 1 nor 2

Answer: C



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127. What is maximum value of $\sin^2 x$

- A. -1
- B. 0

C. 1

D. Infinity

Answer: C



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128. If $ABCD$ is a cyclic quadrilateral then what is $\sin A + \sin B - \sin C - \sin D$ equal to ?

A. 0

B. 1

C. 2

D. $2(\sin A + \sin B)$

Answer: A



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129. What is the value of $\sin 15^\circ$?

A. $\frac{\sqrt{3} - 1}{2\sqrt{2}}$

B. $\frac{\sqrt{3} + 1}{2\sqrt{2}}$

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

D. $\frac{\sqrt{3} + 1}{\sqrt{3} - 1}$

Answer: A



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130. If $4 \sin^2 \theta = 1$ where $0 < \theta < 2\pi$, how many values does θ take?

A. 1

B. 2

C. 4

D. None of the above

Answer: C



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131. find the value of $\sin 18^\circ$ and $\cos 36^\circ$

A. 4

B. 2

C. 1

D. $1/4$

Answer: D



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132. If $\sec \alpha = \frac{13}{5}$ where $270^\circ < \alpha < 360^\circ$ then what is $\sin \alpha$ equal to ?

A. $\frac{5}{13}$

B. $\frac{12}{13}$

C. $-\frac{12}{13}$

D. $-\frac{13}{12}$

Answer: C



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133. Find the values of the following trigonometric ratio: $\tan(-585^\circ)$

A. 1

B. -1

C. $-\sqrt{2}$

D. $-\sqrt{3}$

Answer: B



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134. Consider the following statements I. The value of $\cos 46^\circ - \sin 46^\circ$ is positive.II. The value of $\cos 44^\circ - \sin 44^\circ$ is negative.Which of the above statement(s) is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: D



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135. The angle subtended at the centre of a circle of radius 3 cm by an arc of length 1 cm is :

A. $\frac{30^\circ}{\pi}$

B. $\frac{60^\circ}{\pi}$

C. 60°

D. None of the above

Answer: B



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136. If $\sin A = \frac{2}{\sqrt{5}}$ and $\cos B = \frac{1}{\sqrt{10}}$ where A and B are acute angles ,
then what is A +B equal to ?

A. 135°

B. 90°

C. 75°

D. 60°

Answer: A



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137. If $\operatorname{cosec}\theta + \cot\theta = c$, then what is $\cos\theta$ equal to ?

A. $\frac{c}{c^2 + 1}$

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

C. $\frac{c^2 - 1}{c^2 + 1}$

D. None of the above

Answer: C



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138. If $\sin\theta + 2\cos\theta = 1$, then what is $2\sin\theta - \cos\theta$ equal to ?

A. 0

B. 1

C. 2

D. 4

Answer: C



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139. If $A + B = 90^\circ$, then what is $\sqrt{\sin A \sec B - \sin A \cos B}$ equal to ?

A. $\sin A$

B. $\cos A$

C. $\tan A$

D. 0

Answer: B



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140. What is $\tan^4 A - \sec^4 A + \tan^2 A + \sec^2 A$ equal to ?

A. 0

B. 1

C. 2

D. -1

Answer: A



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141. What is the value of $\tan 105^\circ$?

A. $\frac{\sqrt{3} + 1}{\sqrt{3} - 1}$

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

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

D. $\frac{\sqrt{3} + 2}{\sqrt{3} - 1}$

Answer: B



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142. If $\tan A = x + 1$ and $\tan B = x - 1$, then $x^2 \tan(A - B)$ has the value :

A. 1

B. x

C. 0

D. 2

Answer: D



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143. What is the value of $(\sin^4 \theta - \cos^4 \theta + 1) \operatorname{cosec}^2 \theta$?

A. -2

B. 0

C. 1

D. 2

Answer: D

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144. Let $f(x) = \frac{\operatorname{cosec} x + \cot x - 1}{1 + \cot x - \operatorname{cosec} x}$. The Primitive of $f(x)$ with respect to x is equal to

A. $\frac{\sin x}{1 - \cos x}$

B. $\frac{1 - \cos x}{\sin x}$

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

D. $\frac{\sin x}{1 + \cos x}$

Answer: C

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145. What is $\frac{1 - \tan^2 \frac{x}{2}}{1 + \tan^2 \frac{x}{2}}$ equal to :

A. $\sin x \cdot \cos x$

B. $\tan x$

C. $\sin x$

D. $\cos x$

Answer: D

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146. The value of $\frac{\cot 54^\circ}{\tan 36^\circ} + \frac{\tan 20^\circ}{\cot 70^\circ}$ is

A. 0

B. 1

C. 2

D. 3

Answer: C

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147. What is $\sin^2 20^\circ + \sin^2 70^\circ$ equal to ?

A. 1

B. 0

C. -1

D. $\frac{1}{2}$

Answer: A



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148. What is $(1 - \sin^2 \theta)(1 + \tan^2 \theta)$ equal to ?

A. $\sin^2 \theta$

B. $\cos^2 \theta$

C. $\tan^2 \theta$

D. 1

Answer: D



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149. What is $\tan 15^\circ$ equal to ?

A. $2 - \sqrt{3}$

B. $2 + \sqrt{3}$

C. $1 - \sqrt{3}$

D. $1 + \sqrt{3}$

Answer: A



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150. Consider the following :

1. $\tan\left(\frac{\pi}{6}\right)$

2. $\tan\left(\frac{3\pi}{4}\right)$

3. $\tan\left(\frac{5\pi}{4}\right)$

$\tan\left(\frac{2\pi}{3}\right)$

What is the correct order ?

A. $1 < 4 < 2 < 3$

B. $4 < 2 < 1 < 3$

C. $4 < 2 < 3 < 1$

D. $1 < 4 < 3 < 2$

Answer: B



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151. If $\cos x = \frac{1}{3}$, then what is $\sin x \cdot \cot x \cdot \operatorname{cosec} x \cdot \tan x$ equal to ?

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

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

C. 2

D. 1

Answer: D



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152. The complete solution of $3 \tan^2 x = 1$ is given by :

A. $x = n\pi \pm \frac{\pi}{3}$

B. $x = n\pi + \frac{\pi}{3}$ only

C. $x = n\pi \pm \frac{\pi}{6}$

D. $x = n\pi + \frac{\pi}{6}$ only

Answer: C



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153. Find the Value of $\cos 36^\circ$ or $\sin 54^\circ$

A. $\frac{\sqrt{5} - 1}{4}$

B. $\frac{\sqrt{5} + 1}{4}$

C. $\frac{\sqrt{10 + 2\sqrt{5}}}{4}$

D. $\frac{\sqrt{10 - 2\sqrt{5}}}{4}$

Answer: B



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154. Consider the following statements :

1. Value of $\sin \theta$ oscillates between - 1 and .
2. Value of $\cos \theta$ oscillates between 0 and 1 .

Which of the above statements is / are correct ?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: A



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155. Consider the following statements I.

$$n \left(\sin^2 \left(67 \frac{1}{2}^\circ \right) - \sin^2 \left(22 \frac{1}{2}^\circ \right) \right) > 1 \text{ for all positive integers } n \geq 2. \text{II.}$$

If x is any positive real number, then $nx > 1$ for all positive integers

$n \geq 2$. Which of the above statement(s) is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: A



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156. Consider the following statements :

1. 3θ is an acute angle such that $\sin 3\theta = \cos 2\theta$, then the measurement of θ in radian equals to $\frac{\pi}{10}$.
2. One radian is the angle subtended at the centre of a circle by an arc of the same circle by an arc of the same circle whose length is equal to the diameter of that circle.

Which of the above statements is /are correct ?

- A. 1 only
- B. 2 only
- C. Both 1 and 3
- D. Neither 1 nor 3

Answer: A





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157. Consider the following statements I. $\sin|x| + \cos|x|$ is always positive. II. $\sin(x^2) + \cos(x^2)$ is always positive.

A. 1 only

B. 2 only

C. Both 1 and 4

D. Neither 1 nor 4

Answer: D



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158. What is $\frac{1 + \sin A}{1 - \sin A} - \frac{1 - \sin A}{1 + \sin A}$ equal to ?

A. $\sec A - \tan A$

B. $2 \sec A. \tan A$

C. $4 \sec A \cdot \tan A$

D. $4 \cos ec A \cdot \cot A$

Answer: C



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159. What is $\frac{\cot 224^\circ - \cot 134^\circ}{\cot 226^\circ + \cot 316^\circ}$ equal to ?

A. $-\operatorname{cosec} 88^\circ$

B. $-\operatorname{cosec} 2^\circ$

C. $-\operatorname{cosec} 44^\circ$

D. $-\operatorname{cosec} 46^\circ$

Answer: B



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160. $\cos 20^\circ + \cos 100^\circ + \cos 140^\circ =$

A. 2

B. 1

C. $1/2$

D. 0

Answer: D



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161. What is $\sin^2(3\pi) + \cos^2(4\pi) + \tan^2(5\pi)$ equal to ?

A. 0

B. 1

C. 2

D. 3

Answer: B



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162. What is $\sqrt{1 + \sin 2\theta}$ equal to ?

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

B. $\cos \theta + \sin \theta$

C. $2 \cos \theta + \sin \theta$

D. $\cos \theta + 2 \sin \theta$

Answer: B



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163. If $\cot A = 2$ and $\cot B = 2$, then what is the value of $A + B$?

A. $\pi/6$

B. π

C. $\pi/2$

D. $\pi/4$

Answer: D



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164. What is $\sin^2 66\frac{1^\circ}{2} - \sin^2 23\frac{1^\circ}{2}$ equal to ?

A. $\sin 47^\circ$

B. $\cos 47^\circ$

C. $2\sin 47^\circ$

D. $2\cos 47^\circ$

Answer: B



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165. What is $\frac{\cos 7x - \cos 3x}{\sin 7x - 2 \sin 5x + \sin 3x}$ equal to ?

- A. $\tan x$
- B. $\cot x$
- C. $\tan 2x$
- D. $\cot 2x$

Answer: B



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166. If $\frac{\sin(x + y)}{\sin(x - y)} = \frac{a + b}{a - b}$, then show that $\frac{\tan x}{\tan y} = \frac{a}{b}$.

- A. $\frac{b}{a}$
- B. $\frac{a}{b}$
- C. ab
- D. 1

Answer: B



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167. If $\sin A \sin (60^\circ - A)\sin(60^\circ + A) = k \sin 3A$, then what is k equal to ?

A. $1/4$

B. $1/2$

C. 1

D. 4

Answer: A



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168. The line $y = \sqrt{3}$ meets the graph $y = \tan x$, where $x \in \left(0, \frac{\pi}{2}\right)$, in k point . What is k equal to ?

A. One

B. Two

C. Three

D. Infinity

Answer: A



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169. Which one of the following is one of the solutions of the equation of the equation $\tan \theta = 1$?

A. $\pi/2$

B. $\pi/6$

C. $\pi/4$

D. $\pi/3$

Answer: B

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170. Given that $16 \sin^5 x = p \sin 5x + q \sin 3x + r \sin x$.

What is the value of p ?

A. 1

B. 2

C. -1

D. -2

Answer: A

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171. Given that $16 \sin^5 x = p \sin 5x + q \sin 3x + r \sin x$. What is the value of q ?

A. 3

B. 5

C. 10

D. -5

Answer: D



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172. Given that $16 \sin^5 x = p \sin 5x + q \sin 3x + r \sin x$.

What is the value of r ?

A. 5

B. 8

C. 10

D. -10

Answer: C



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173. Let θ be a positive angle. If the number of degrees in θ is divided by the number of radians in θ , then an irrational number $\frac{180}{\pi}$ results. If the number of degrees in θ is multiplied by the number of radians in θ , then an irrational number $\frac{125\pi}{9}$ results. The angle θ must be equal to

A. 30°

B. 45°

C. 50°

D. 60°

Answer: C

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174. If α is a root of $25 \cos^2 \theta + 5 \cos \theta - 12 = 0$, $\frac{\pi}{2} < \alpha < \pi$ the $\sin 2\alpha$ is equal to:

A. $\frac{-3}{4}$

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

C. $\frac{-4}{3}$

D. $\frac{-4}{5}$

Answer: A



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175. If α is a root of $25 \cos^2 \theta + 5 \cos \theta - 12 = 0$, $\frac{\pi}{2} < \alpha < \pi$ the $\sin 2\alpha$

is equal to:

A. $\frac{24}{25}$

B. $\frac{-24}{25}$

C. $\frac{-5}{12}$

D. $\frac{-21}{25}$

Answer: B

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176. $(1 - \sin A + \cos A)^2$ is equal to ?

A. $2(1 - \cos A)(1 + \sin A)$

B. $2(1 - \sin A)(1 + \cos A)$

C. $2(1 - \cos A)(1 - \sin A)$

D. None of the above

Answer: B

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177. What is $\frac{\cos \theta}{1 - \tan \theta} + \frac{\sin \theta}{1 - \cot \theta}$ equal to ?

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

B. $\sin \theta + \cos \theta$

C. $2 \sin \theta$

D. $2 \cos \theta$

Answer: B



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178. $\sin^2 5^\circ + \sin^2 10^\circ + \sin^2 15^\circ + \dots + \sin^2 85^\circ + \sin^2 90^\circ =$

A. 7

B. 8

C. 9

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

Answer: D



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179. Prove that:

$$\frac{\cos^3 A - \cos 3A}{\cos A} + \frac{\sin^3 A + \sin 3A}{\sin A} = 3$$

- A. $\sin 3A$
- B. $\cos 3A$
- C. $\sin A + \cos A$
- D. 3

Answer: D



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180. If $\sin x + \sin y = a$ and $\cos x + \cos y = b$, then

$\tan^2 \frac{x+y}{2} + \tan^2 \frac{x-y}{2}$ is equal to

- A. $\frac{a^4 + b^4 + 4b^2}{a^2b^2 + b^4}$
- B. $\frac{a^4 - b^4 + 4b^2}{a^2b^2 + b^4}$
- C. $\frac{a^4 - b^4 + 4b^2}{a^2b^2 + a^4}$

D. None of the above

Answer: B

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181. Consider a triangle ABC satisfying

$$2a \sin^2\left(\frac{C}{2}\right) + 2c \sin^2\left(\frac{A}{2}\right) = 2a + 2c - 3b$$

The sides of the triangle are in

A. G .P

B. A.P

C. H . P

D. Neither in G . P . Nor in A . P nor in H . P

Answer: B

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182. Consider a triangle ABC satisfying

$$2a \sin^2\left(\frac{C}{2}\right) + 2c \sin^2\left(\frac{A}{2}\right) = 2a + 2c - 3b$$

Sin A , sin B , sin C are in

A. G . P

B. A . P

C. H . P

D. Neither in G . P . Nor in A . P nor in H . P

Answer: B



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183. If $p = \tan\left(-\frac{11\pi}{6}\right)$, $q = \tan\left(\frac{21\pi}{4}\right)$ and $r = \cot\left(\frac{283\pi}{6}\right)$, then

which of the following is / are correct ?

1. The value of $p \times r$ is 2.

2. p , q and r are in G . P . Select the correct answer using the code given below :

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: B



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184. Given that $\tan \alpha$ and $\tan \beta$ are the roots of the equation $x^2 + bx + c = 0$ with $b \neq 0$.

What is $\tan(\alpha + \beta)$ equal to ?

A. $b(c - 1)$

B. $c(b - 1)$

C. $c(b - 1)^{-1}$

D. $b(c - 1)^{-1}$

Answer: D



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185. Given that $\tan \alpha$ and $\tan \beta$ are the roots of the equation $x^2 + bx + c = 0$ with $b \neq 0$.

What is $\sin(\alpha + \beta)\sec \alpha \sec \beta$ equal to ?

A. b

B. $-b$

C. c

D. $-c$

Answer: B



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186. If $A = (\cos 12^\circ - \cos 36^\circ)(\sin 96^\circ + \sin 24^\circ)$

and $B = (\sin 60^\circ - \sin 12^\circ)(\cos 48^\circ - \cos 72^\circ)$, then what is $\frac{A}{B}$ equal to ?

A. -1

B. 0

C. 1

D. 0

Answer: C



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187. $\sin A + 2 \sin 2A + \sin 3A$ is equal to which of the following ?

1. $4 \sin 2A \cos^2\left(\frac{A}{2}\right)$

2. $2 \sin 2A \left(\sin \frac{A}{2} + \cos \frac{A}{2}\right)^2$

3. $8 \sin A \cos A \cos^2\left(\frac{A}{2}\right)$

Select the correct answer using the code given below :

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. 1, 2 and 3

Answer: C

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188. If $x = \sin 70^\circ \cdot \sin 50^\circ$ and $y = \cos 60^\circ \cdot \cos 80^\circ$, then what is xy equal to ?

A. $1/16$

B. $1/8$

C. $1/4$

D. $1/2$

Answer: A

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189. If $\sin \theta_1 + \sin \theta_2 + \sin \theta_3 + \sin \theta_4 = 4$, then what is the value of $\cos \theta_1 + \cos \theta_2 + \cos \theta_3 + \cos \theta_4 = ?$

A. 0

B. 1

C. 2

D. 4

Answer: A

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190. $\left(1 + \cos. \frac{\pi}{8}\right) \left(1 + \cos. \frac{3\pi}{8}\right) \left(1 + \cos. \frac{5\pi}{8}\right) \left(1 + \cos. \frac{7\pi}{8}\right)$ is equal to

A. $\frac{1}{2}$

B. $\frac{1}{2} + \frac{1}{2\sqrt{2}}$

C. $\frac{1}{2} - \frac{1}{2\sqrt{2}}$

D. $\frac{1}{8}$

Answer: D



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191. If $x \cos \theta + y \sin \theta = z$, then what is the value of $(x \sin \theta - y \cos \theta)^2$?

A. $x^2 + y^2 - z^2$

B. $x^2 - y^2 - z^2$

C. $x^2 - y^2 + z^2$

D. $x^2 + y^2 + z^2$

Answer: A



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192. If $\sin 18^\circ = \frac{\sqrt{5} - 1}{4}$ then what is the value of $\sin 81^\circ$

A. $\frac{\sqrt{3 + \sqrt{5}} + \sqrt{5 - \sqrt{5}}}{4}$

B. $\frac{\sqrt{3 + \sqrt{5}} + \sqrt{5 + \sqrt{5}}}{4}$

C. $\frac{\sqrt{3 - \sqrt{5}} + \sqrt{5 - \sqrt{5}}}{4}$

D. $\frac{\sqrt{3 + \sqrt{5}} - \sqrt{5 - \sqrt{5}}}{4}$

Answer: A



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193. $\frac{1 - \tan 2^\circ \cot 62^\circ}{\tan 152^\circ - \cot 88^\circ} (a)\sqrt{3}(b) - \sqrt{3} (c)\sqrt{2}-1(d)1-\sqrt{2}$

A. $\sqrt{3}$

B. $-\sqrt{3}$

C. $\sqrt{2} - 1$

D. $1 - \sqrt{2}$

Answer: B



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194. If $\sin A = \frac{3}{5}$ where $450^\circ < A < 540^\circ$, then $\cos \frac{A}{2}$ is equal to

A. $\frac{1}{\sqrt{10}}$

B. $-\sqrt{\frac{3}{10}}$

C. $\frac{\sqrt{3}}{\sqrt{10}}$

D. None of the above

Answer: D



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195. $\frac{1}{\sin 10^\circ} - \frac{\sqrt{3}}{\cos 10^\circ} =$

A. 0

B. 1

C. 2

D. 4

Answer: D



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196. If $K = \sin\left(\frac{\pi}{18}\right)\sin\left(\frac{5\pi}{18}\right)\sin\left(\frac{7\pi}{18}\right)$, then the numerical value of K is _____

A. $\frac{1}{2}$

B. $\frac{1}{4}$

C. $\frac{1}{8}$

D. $\frac{1}{16}$

Answer: C



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197. The expression $\frac{\sin \alpha + \sin \beta}{\cos \alpha + \cos \beta}$ is equal to

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

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

C. $\sin\left(\frac{\alpha + \beta}{2}\right)$

D. $\cos\left(\frac{\alpha + \beta}{2}\right)$

Answer: A



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198. If $\sin \theta = 3 \sin(\theta + 2\alpha)$, then the value of $\tan(\theta + \alpha) + 2 \tan \alpha$ is

A. -1

B. 0

C. 1

D. 2

Answer: B



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199. What is the value of $\tan 18^\circ$?

A. $\frac{\sqrt{5} - 1}{\sqrt{10 + 2\sqrt{5}}}$

B. $\frac{\sqrt{5} - 1}{\sqrt{10 + \sqrt{5}}}$

C. $\frac{\sqrt{10 + 2\sqrt{5}}}{\sqrt{5} - 1}$

D. $\frac{\sqrt{10 + \sqrt{5}}}{\sqrt{5} - 1}$

Answer: A



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200. If $\tan(\alpha + \beta) = 2$ and $\tan(\alpha - \beta) = 1$, then $\tan(2\alpha)$ is equal to

A. -3

B. -2

C. $\frac{1}{3}$

D. 1

Answer: A



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201. If $\sec \theta - \operatorname{cosec} \theta = \frac{4}{3}$, then what is $(\sin \theta - \cos \theta)$ equal to ?

A. -2 only

B. $\frac{1}{2}$ only

C. Both -2 and $\frac{1}{2}$

D. Neither $\frac{1}{2}$ nor -2

Answer: B



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202. the value of $\tan 9^\circ - \tan 27^\circ - \tan 63^\circ + \tan 81^\circ$ is equal to

A. -1

B. 0

C. 1

D. 4

Answer: D



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203. $\sqrt{3} \cos \sec 20^\circ - \sec 20^\circ$

A. 4

B. 2

C. 1

D. -4

Answer: A



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204. Angle α is divided into two parts A and B such that $A - B = x$ and

$\frac{\tan A}{\tan B} = \frac{p}{q}$. The value of $\sin x$ is equal to

A. $\frac{(p + q)\sin \alpha}{p - q}$

B. $\frac{p \sin \alpha}{p + q}$

C. $\frac{p \sin \alpha}{p - q}$

D. $\frac{(p - q)\sin \alpha}{p + q}$

Answer: D



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205. $\sqrt{1 + \sin A} = - \left(\sin \frac{A}{2} + \cos \frac{A}{2} \right)$ is true if

A. $\frac{3\pi}{2} < A < \frac{5\pi}{2}$ only

B. $\frac{\pi}{2} < A < \frac{3\pi}{2}$ only

C. $\frac{3\pi}{2} < A < \frac{7\pi}{2}$

D. $0 < A < \frac{3\pi}{2}$

Answer: C

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206. If $\sin x = \frac{1}{\sqrt{5}}$, $\sin y = \frac{1}{\sqrt{10}}$ where $0 < x < \frac{\pi}{2}$, $0 < y < \frac{\pi}{2}$,

then what is $\sin(x+y)$ equal to ?

A. π

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

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

D. 0

Answer: C



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207. What is $\frac{\sin 5x - \sin 3x}{\cos 5x + \cos 3x}$ equal to ?

A. $\sin x$

B. $\cos x$

C. $\tan x$

D. $\cot x$

Answer: C



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208. What is $\sin 105^\circ + \cos 105^\circ$ equal to ?

A. $\sin 50^\circ$

B. $\cos 50^\circ$

C. $\frac{1}{\sqrt{2}}$

D. 0

Answer: C



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209. If $\frac{\sin(x + y)}{\sin(x - y)} = \frac{a + b}{a - b}$, then show that $\frac{\tan x}{\tan y} = \frac{a}{b}$.

A. $\frac{a}{b}$

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

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

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

Answer: A



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210. If $\sin \alpha + \sin \beta = 0 = \cos \alpha + \cos \beta$, where $0 < \beta < \alpha < 2\pi$, then which one of the following is correct ?

A. $\alpha = \pi - \beta$

B. $\alpha = \pi + \beta$

C. $\alpha = 2\pi - \beta$

D. $2\alpha = \pi + 2\beta$

Answer: B



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211. suppose $\cos A$ is given if only one value of $\cos(A/2)$ is possible then A is must be

A. An odd multiple of 90°

B. A multiple of 90°

C. An odd multiple of 180°

D. A multiple of 180°

Answer: C



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212. If
 $\cos \alpha + \cos \beta + \cos \gamma = 0$, where $0 < \alpha \leq \frac{\pi}{2}$, $0 < \beta \leq \frac{\pi}{2}$, $0 < \gamma \leq \frac{\pi}{2}$
, then what is the value of $\sin \alpha + \sin \beta + \sin \gamma$?

A. 0

B. 3

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

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

Answer: B



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213. What is the period of the function $f(x) = \sin x$?

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

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

C. π

D. 2π

Answer: D



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214. What is $\frac{2 \tan \theta}{1 + \tan^2 \theta}$ equal to ?

A. $\cos 2\theta$

B. $\tan 2\theta$

C. $\sin 2\theta$

D. $\operatorname{cosec} 2\theta$

Answer: C



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215. If $\sec(\theta - \alpha)$, $\sec(\theta + \alpha)$ are in AP, where $\cos \alpha \neq 1$, then what is the value of $\sin^2 \theta + \cos \alpha$?

A. 0

B. 1

C. -1

D. $1/2$

Answer: A



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216. A is an angle in the fourth quadrant. It satisfies the trigonometric equation $3(3 - \tan^2 A - \cot A)^2 = 1$. Which one of the following is a

value of A?

A. 300°

B. 315°

C. 330°

D. 345°

Answer: A



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217. What is / are the solutions of the trigonometric equation

$\operatorname{cosec} x + \cot x = \sqrt{3}$, where $0 < x < 2\pi$?

A. $\frac{5\pi}{3}$ only

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

C. π only

D. $\pi, \frac{\pi}{3}, \frac{5\pi}{3}$

Answer: B



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218. If $\theta = \frac{\pi}{8}$, then what is value of $(2 \cos \theta + 1)^{10} (2 \cos 2\theta - 1)^{10} (2 \cos \theta - 1)^{10} (2 \cos 4\theta - 1)^{10}$? (i) 0 (ii) 1 (iii) 2 (iv) 4

A. 0

B. 1

C. 2

D. 4

Answer: B



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219. If $\cos \alpha$ and $\cos \beta$ are the roots of $4x^2 - 3 = 0$, then what is the value of $\sec \alpha \times \sec \beta$?

A. $-\frac{4}{3}$

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

C. $\frac{3}{4}$

D. $-\frac{3}{4}$

Answer: A



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220. If $A = \sin^2 \theta + \cos^4 \theta$, then for all real values of θ

A. $1 \leq A \leq 2$

B. $\frac{3}{4} \leq A \leq 1$

C. $\frac{13}{16} \leq A \leq 1$

D. $\frac{3}{4} \leq A \leq \frac{13}{16}$

Answer: B



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221. What is the least value of $25 \operatorname{cosec}^2 x + 36 \sec^2 x$?

A. 1

B. 11

C. 120

D. 121

Answer: D



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222. What is the value of

$$\frac{\sin 34^\circ \cos 236^\circ - \sin 56^\circ \sin 124^\circ}{\cos 28^\circ \cos 88^\circ + \cos 178^\circ \sin 208^\circ}?$$

A. -2

B. -1

C. 2

D. 1

Answer: A



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223. $\tan 54^\circ$ can be expressed as

A. $\frac{\sin 9^\circ + \cos 9^\circ}{\sin 9^\circ - \cos 9^\circ}$

B. $\frac{\sin 9^\circ - \cos 9^\circ}{\sin 9^\circ + \cos 9^\circ}$

C. $\frac{\cos 9^\circ + \sin 9^\circ}{\cos 9^\circ - \sin 9^\circ}$

D. $\frac{\sin 36^\circ}{\cos 36^\circ}$

Answer: C



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224. If

$$= X \cos \theta - Y \sin \theta, q = X \sin \theta + Y \cos \theta \text{ and } p^2 + 4pq + q^2 = AX^2 + E$$

What is the value of θ ?

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

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

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

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

Answer: C



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225. If

$$= X \cos \theta - Y \sin \theta, q = X \sin \theta + Y \cos \theta \text{ and } p^2 + 4pq + q^2 = AX^2 + E$$

What is the value of A ?

A. 4

B. 3

C. 2

D. 1

Answer: B



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226.

If

$$p = X \cos \theta - Y \sin \theta, q = X \sin \theta + Y \cos \theta \text{ and } p^2 + 4pq + q^2 = AX^2 +$$

. What is the value of B ?

A. -1

B. 0

C. 1

D. 2

Answer: A



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227. It is given that $\cos(\theta - \alpha) = a$, $\cos(\theta - \beta) = b$

What is $\cos(\alpha - \beta)$ equal to ?

A. $ab + \sqrt{1 - a^2}\sqrt{1 - b^2}$

B. $ab - \sqrt{1 - a^2}\sqrt{1 - b^2}$

C. $a\sqrt{1 - b^2} - b\sqrt{1 - a^2}$

D. $a\sqrt{1 - b^2} + b\sqrt{1 - a^2}$

Answer: A



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228. It is given that $\cos(\theta - \alpha) = a$, $\cos(\theta - \beta) = b$

What is $\sin^2(\alpha - \beta) + 2ab \cos(\alpha - \beta)$ equal to ?

A. $a^2 + b^2$

B. $a^2 - b^2$

C. $b^2 - a^2$

D. $-(a^2 + b^2)$

Answer: A



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229. If $\sin \alpha + \cos \alpha = p$, then what is $\cos^2(2\alpha)$ equal to ?

A. p^2

B. $p^2 - 1$

C. $p^2(2 - p^2)$

D. $p^2 + 1$

Answer: C



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230. If $\tan \theta = \frac{1}{2}$ and $\tan \phi = \frac{1}{3}$, then the value of $\theta + \phi$ is

A. 0

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

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

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

Answer: C



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231. If $\cos A = \frac{3}{4}$, then what is the value of $\sin\left(\frac{A}{2}\right)\sin\left(\frac{3A}{2}\right)$?

A. $\frac{5}{8}$

B. $\frac{5}{16}$

C. $\frac{5}{24}$

D. $\frac{7}{32}$

Answer: B



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232. $\tan 75^\circ + \cot 75^\circ =$

A. 2

B. 4

C. $2\sqrt{3}$

D. $4\sqrt{3}$

Answer: B



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233. What is the value of $\cos 46^\circ \cos 47^\circ \cos 48^\circ \cos 49^\circ \cos 50^\circ \dots \cos 135^\circ$?

- A. -1
- B. 0
- C. 1
- D. Greater than 1

Answer: B



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234. If $\sin 2\theta = \cos 3\theta$, where $0 < \theta < \frac{\pi}{2}$, then what is $\sin \theta$ equal to ?

- A. $\frac{\sqrt{5} + 1}{4}$
- B. $\frac{\sqrt{5} - 1}{4}$
- C. $\frac{\sqrt{5} + 1}{16}$
- D. $\frac{\sqrt{5} - 1}{16}$

Answer: B



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235. What is $(1 + \tan \alpha \tan \beta)^2 + (\tan \alpha - \tan \beta)^2 - \sec^2 \alpha \sec^2 \beta$ equal to

- A. 0
- B. 1
- C. 2
- D. 4

Answer: A



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236. If $p = \operatorname{cosec} \theta - \cot \theta$ and $q = (\operatorname{cosec} \theta + \cot \theta)^{-1}$, then which one of the following is correct ?

A. $pq = 1$

B. $p = q$

C. $p+q = 1$

D. $p+q = 0$

Answer: B

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237. If $\sin \theta + \cos \theta = \sqrt{2} \cos \theta$ then what is $(\cos \theta - \sin \theta)$ equal to ?

A. $-\sqrt{2} \cos \theta$

B. $-\sqrt{2} \sin \theta$

C. $\sqrt{2} \sin \theta$

D. $2 \sin \theta$

Answer: C

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238. If $\sin \theta = -\frac{1}{2}$ and $\tan \theta = \frac{1}{\sqrt{3}}$, then in which quadrant does θ lie

?

- A. First
- B. Second
- C. Third
- D. Fourth

Answer: C



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