MATHS

BOOKS - NDA PREVIOUS YEARS

PROPERTIES OF TRIANGLE, INVERSE TRIGONOMETRIC FUNCTION

Mcq

1. In a triangle ABC, a = 2b and $\angle A = 3\angle B$. Which one of the following is correct ?

A. The triangle is isosceles

B. The triangle is equilateral

C. The triangle is right-angled

D. Such triangle does not exist

Answer: C

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2. What is the value of $\tan\left(\tan^{-1}x+\tan^{-1}y+\tan^{-1}z\right)-\cot\left(\cot^{-1}x+\cot^{-1}y+\cot^{-1}z\right)$?

A. 0

B. $2(x+y+z)$

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

D. $\frac{3\pi}{2}+x+y+z$

Answer: A

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3. What is the value of x that satisfies the equation $\cos^{-1} x = 2\sin^{-1} x$?

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

B. -1

C. 1

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

Answer: A

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4. The median AD of triangle ABC is bisected at F, and BF is produced to meet the side AC in P. If $AP = \lambda AC$ then what is the value of λ

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

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

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

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

Answer: D

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5. What is the value of $\sin^{-1}\left(\sin\frac{2\pi}{3}\right)$?

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

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

C. $-\frac{2\pi}{3}$

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

Answer: D

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6. What are the values of (x, y) satisfying the simultaneous equation $\sin^{-1}x + \sin^{-1}y = \frac{2\pi}{3}$ and $\cos^{-1}x - \cos^{-1}y = \frac{\pi}{3}$?

A. (0, 1)

B. $\left(\frac{1}{2}, 1\right)$

C. $\left(1, \frac{1}{2}\right)$

D. $\left(\frac{\sqrt{3}}{2}, 1\right)$

Answer: B

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7. If the perimeter of a triangle ABC is 30 cm, then what is the value of $a\cos^2(C/2) + c\cos^2(A/2)$?

A. 15 cm

B. 10 cm

C. $\frac{15}{2}cm$

D. 13 cm

Answer: A

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8. In ΔABC, if $\angle A : \angle B : \angle C = 1 : 2 : 3$, then what is BC : CA : AB ?

A. $1 : 2 : 3$

B. $1 : \sqrt{3} : 2$

C. $2 : \sqrt{3} : 1$

D. $\sqrt{3} : 1 : 2$

Answer: B

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9. The angles A, B, C of a triangle are in the ratio 2 : 5 : 5. What is the value of tan B tan C ?

A. $4+\sqrt{3}$

B. $4+2\sqrt{3}$

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

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

Answer: C

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10. If A, B and C are angles of a triangle such than tan A = 1, tan B = 2, then what is the value of tan C ?

A. 0

B. 1

C. 2

D. 3

Answer: C

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11. What is sin $\left[\cot^{-1}\left\{\cos\left(\tan^{-1}x\right)\right]\right.$ where x $>$ 0, equal to ?

A. $\sqrt{\frac{(x^2+1)}{(x^2+2)}}$

B. $\sqrt{\frac{(x^2+2)}{(x^2+1)}}$

C. $\frac{(x^2+1)}{(x^2+2)}$

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

Answer: A

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12. In a triangle ABC, if a = 2b and A = 3B then which one of the following is correct ?

A. The triangle is obtuse-angled

B. The triangle is acute-angled but not right-angled

C. The triangle is right-angled

D. The triangle is isosceles but not obtuse-angled

Answer: C

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13. If $\sin^{-1} x = \tan^{-1} y$ what is the value of $\frac{1}{x^2} - \frac{1}{y^2}$?

A. 1

B. -1

C. 0

D. 2

Answer: A

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14. $\cos\left[\tan^{-1}\left\{\tan\left(\frac{15\pi}{4}\right)\right\}\right]$

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

B. 0

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

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

Answer: C

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15. Two angles of a triangle are $\tan^{-1}\frac{1}{2}$ and $\tan^{-1}\frac{1}{3}$. What is the third angle ?

A. 30°

B. 45°

C. 90°

D. 135°

Answer: D

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16. If median of the ΔABC through A is perpendicular to BC, then which one of the following is correct ?

A. tan A + tan B = 0

B. tan B - tan C = 0

C. tan C + 2 tan A = 0

D. tan B + tan C = 0

Answer: B

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17. If $\cos^{-1}\left(\frac{1}{\sqrt{5}}\right) = \theta$, then what is the value of $\text{cosec}^{-1}(\sqrt{5})$?

A. $\left(\frac{\pi}{2}\right) + \theta$

B. $\left(\frac{\pi}{2}\right) - \theta$

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

D. $-\theta$

Answer: B

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18. What is the value of $\tan^{-1}\left(\frac{m}{n}\right) - \tan^{-1}\left(\frac{m-n}{m+n}\right)$?

A. π

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

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

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

Answer: C

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19. $\tan\left(\cos^{-1} x\right)$ is equal to

A. $\frac{\sqrt{1-x^2}}{x}$

B. $\frac{x}{1+x^2}$

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

D. $\sqrt{1-x^2}$

Answer: A

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20. If $\sin^{-1} x - \cos^{-1} x = \frac{\pi}{6}$, then what is the value of x ?

A. $x = -\frac{1}{2}$

B. x = 1

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

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

Answer: D

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21. In a triangle ABC, b = $\sqrt{3}$ cm, c = 1 cm, $\angle A = 30^\circ$, what is the value of a ?

A. $\sqrt{2}$ cm

B. 2 cm

C. 1 cm

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

Answer: C

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22. Let $-1 \leq x \leq 1$ If $\cos\left(\sin^{-1} x\right) = \frac{1}{2}$, then how many value does $\tan\left(\cos^{-1} x\right)$ assume?

A. One

B. Two

C. Four

D. Infinite

Answer: B

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23. The equation $\sin^{-1}(3x - 4x^3) = 3\sin^{-1}(x)$ is true for all value of x lying in which one of the following intervals ?

A. $\left[-\frac{1}{2}, \frac{1}{2}\right]$

B. $\left[\frac{1}{2}, 1\right]$

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

D. $[-1, 1]$

Answer: D

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24. Which one of the following in not correct ?

A. $\sin^{-1}\{\sin(5\pi/4)\} = -\pi/4$

B. $\sec^{-1}\{\sec(5\pi/4)\} = 3\pi/4$

C. $\tan^{-1}\{\tan(5\pi/4)\} = \pi/4$

D. $\cos ec^{-1}\{\cos ec(7\pi/4)\} = \pi/4$

Answer: D

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25. If $\sin^{-1}x + \sin^{-1}y = \pi/2$ and $\cos^{-1}x - \cos^{-1}y = 0$, then value x and y respectively

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

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

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

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

Answer: D

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26. ABC is a triangle is which AB = 6 cm, BC = 8 cm and CA = 10 cm. What is the value of cot(A/4) ?

A. $\sqrt{5}-2$

B. $\sqrt{5}+2$

C. $\sqrt{3}-1$

D. $\sqrt{3}+1$

Answer: B

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27. If the sides of a triangle are 6 cm, 10 cm and 14 cm, then what is the largest angle included by the sides ?

A. 90°

B. 120°

C. 135°

D. 150°

Answer: B

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28. For finding the area of a triangle ABC, which of the following entities are required ?

A. Angles A, B and side a

B. Angles A, B and side b

C. Angles A, B and side c

D. Either (a) or (b) or (c)

Answer: C

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29. The formula $\sin^{-1}\left\{2x\sqrt{1-x^2}\right\} = 2\sin^{-1}x$ is true for all values of x lying in the interval

A. [-1, 1]

B. [0, 1]

C. [-1, 0]

D. $\left[-1/\sqrt{2}, 1/\sqrt{2}\right]$

Answer: D

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30. If sin A = $1/\sqrt{5}$, cos B = $3/\sqrt{10}$, A, B being positive acute angles, then what is (A + B) equal to ?

A. $\pi/6$

B. $\pi/4$

C. $\pi/3$

D. $\pi/2$

Answer: B

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31. If $\sin^{-1}\left(\frac{2a}{1+a^2}\right) - \cos^{-1}\left(\frac{1-b^2}{1+b^2}\right) = \tan^{-1}\left(\frac{2x}{1-x^2}\right)$, then what os the value of x ?

A. a/b

B. ab

C. b/a

D. $\frac{a-b}{1+ab}$

Answer: D

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32. If in a ΔABC, cos B = (sin A)/(2 sin C), then the triangle is

A. Isosceles triangle

B. Equilateral triangle

C. Right angled triangle

D. Scalene triangle

Answer: A

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33. If $\sin^{-1} x + \cot^{-1}(1/2) = \pi/2$, then what is the value of x ?

A. 0

B. $1/\sqrt{5}$

C. $2/\sqrt{5}$

D. $\sqrt{3}/2$

Answer: B

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34. In a ΔABC, a + b = 3 $\left(1+\sqrt{3}\right)$ cm and a - b = 3 $\left(1-\sqrt{3}\right)$ cm. If angle A is 30°, then what is the angle B ?

A. 120°

B. 90°

C. 75°

D. 60°

Answer: D

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35. What is the principle value of $\text{cosec}^{-1}\left(-\sqrt{2}\right)$?

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

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

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

D. 0

Answer: C

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36. If $\sin^{-1}\frac{5}{x}+\sin^{-1}\frac{12}{x}=\frac{\pi}{2}$, then what is the value of x?

A. 1

B. 7

C. 13

D. 17

Answer: C

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37. If angles A, B and C are in AP, then what is sin A + 2 sin B + sin C equal to ?

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

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

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

D. $4\sin(2B)\cos^2\left(\frac{A-C}{4}\right)$

Answer: B

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38. Statement I : If $-1 \leq x < 0$, then $\cos\left(\sin^{-1} x\right) = -\sqrt{1-x^2}$

Statement II : If $-1 \leq x < 0$, then $\sin\left(\cos^{-1} x\right) = \sqrt{1-x^2}$

Which one of the following is correct is respect of the above statements ?

A. Both statement I and II are independently correct and statement II is the correct explanation of statement I

B. Both statements I and II are independently correct but statement II is not the correct explanation of statement I

C. Statement I is correct but statement II is false

D. Statement I is false but statement II is correct.

Answer: D

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39. In a triangle ABC, BC = $\sqrt{39}$, AC = 5 and AB = 7. What is the measure of the angle A?

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

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

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

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

Answer: B

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40. What is the value of $\sin^{-1}\frac{4}{5} + 2\tan^{-1}\frac{1}{3}$?

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

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

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

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

Answer: B

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41. ABC is a triangle in which BC = 10 cm, CA = 6 cm and AB = 8 cm. Which one of the following is correct ?

A. ABC is an acute angled triangle

B. ABC is an obtuse angled triangle

C. ABC is a right angled triangle

D. None of these

Answer: C

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42. In a ΔABC, if c = 2, A = 120°, a = $\sqrt{6}$, then what is C equal to ?

A. 30°

B. 45°

C. 60°

D. 75°

Answer: B

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43. ABC is a right angles triangle at B. The hypotenuse AC is four times the perpendicular BD drawn to it from the opposite vertex and AD

A. 15°

B. 30°

C. 45°

D. None of these

Answer: A

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44. ABC is a right angles triangle at B. The hypotenuse AC is four times the perpendicular BD drawn to it from the opposite vertex and AD

A. 15°

B. 30°

C. 45°

D. None of these

Answer: A

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45. ABC is a triangle right-angled at B. The hypotenuse (AC) is four the perpendicular (BD) drawn to it from the opposite vertex AD $<$ DC. What is AD : DC equal to ?

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

B. $\left(7-4\sqrt{3}\right):1$

C. $1:2$

D. None of these

Answer: B

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46. ABC is a right angles triangle at B. The hypotenuse AC is four times the perpendicular BD drawn to it from the opposite vertex and AD

A. 0

B. 1

C. 2

D. None of these

Answer: D

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47. Consider the following

I. $\text{cosec}^{-1}\left(-\frac{2}{\sqrt{3}}\right) = -\frac{\pi}{3}$

II. $\sec^{-1}\left(\frac{2}{\sqrt{3}}\right) = \frac{\pi}{6}$

Which of the above is/are correct ?

A. Only I

B. Only II

C. Both I and II

D. Neither I nor II

Answer: C

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48. If $\sin\left(\sin^{-1}\frac{1}{5}+\cos^{-1}x\right)=1$, then what is x equal to ?

A. 0

B. 1

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

D. $\frac{1}{5}$

Answer: D

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49. What is the principle value of $\sec^{-1}\left(\frac{2}{\sqrt{3}}\right)$?

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

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

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

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

Answer: D

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50. In any triangle ABC, the sides are 6 cm, 10 cm and 14 cm. Then the triangle is obtuse angled with the obtuse angle equal to

A. 150°

B. 135°

C. 120°

D. 105°

Answer: C

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51. In a triangle ABC, if A = $\tan^{-1} 2$ and $B = \tan^{-1} 3$, then C is equal to

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

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

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

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

Answer: B

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52. If the sides of a triangle are in the ratio $2:\sqrt{6}:1+\sqrt{3}$, then what is the smallest angle of the triangle ?

A. 75°

B. 60°

C. 45°

D. 30°

Answer: C

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53. In a triangle ABC, A = 8, b = 10 and c = 12. What is the angle C equal to ?

A. A/2

B. 2A

C. 3A

D. 3A/2

Answer: B

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54. The sides a, b, c of a triangle ABC are in arithmetic progression and 'a' is the smallest side. What is cos A equal to ?

A. $\frac{3c-4b}{2c}$

B. $\frac{3c-4b}{2b}$

C. $\frac{4c-3b}{2c}$

D. $\frac{3b-4c}{2c}$

Answer: C

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55. What is the value of $\cos\left\{\cos^{-1}\frac{4}{5}+\cos^{-1}\frac{12}{13}\right\}$?

A. 63/65

B. 33/65

C. 22/65

D. $11/65$

Answer: B

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56. In a triangle ABC if the angles A, B, C are in AP, then which one of the following is correct ?

A. c = a + b

B. $c^2 = a^2 + b^2 - ab$

C. $a^2 = b^2 + c^2 - bc$

D. $b^2 = a^2 + c^2 - ac$

Answer: D

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57. If $\sin^{-1} 1 + \sin^{-1} \frac{4}{5} = \sin^{-1} x$, then what is x equal to?

A. $3/5$

B. $4/5$

C. 1

D. 0

Answer: A

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58. If two angles of a triangle are $\tan^1, 2$ and $\tan^1, 3$, what is the third angle.

A. $\tan^{-1} 2$

B. $\tan^{-1} 4$

C. $\pi/4$

D. $\pi/3$

Answer: C

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59. What is the value of $\sec^2 \tan^{-1}\left(\frac{5}{11}\right)$?

A. 121/96

B. 211/921

C. 146/121

D. 267/121

Answer: C

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60. What is $\sin\left[\sin^{-1}\left(\frac{3}{5}\right)+\sin^{-1}\left(\frac{4}{5}\right)\right]$ equal to ?

A. 0

B. $1/2$

C. 1

D. 2

Answer: C

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61. In any triangle ABC, if $a = 18, b = 24, c = 30$, findsinA, sinB, sinC

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

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

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

D. 1

Answer: D

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62. If $\sin^{-1}\left(\frac{2a}{1+a^2}\right) + \sin^{-1}\left(\frac{2b}{1+b^2}\right) = 2\tan^{-1} x$ then $x =$

A. $\frac{a-b}{1+ab}$

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

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

D. $\frac{a+b}{1-ab}$

Answer: D

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63. If the angles of a triangle are $30^0 and 45^0$ and the included side is $(\sqrt{3}+1)cm$ then the area of the triangle is_____.

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

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

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

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

Answer: A

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64. What is $\tan^{-1}\left(\frac{1}{2}\right)+\tan^{-1}\left(\frac{1}{3}\right)$ equal to ?

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

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

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

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

Answer: C

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65. If x and y are positive and $xy > 1$, then what is $\tan^{-1} x + \tan^{-1} y$ to?

A. $\tan^{-1}\left(\frac{x+y}{1-xy}\right)$

B. $\pi + \tan^{-1}\left(\frac{x+y}{1-xy}\right)$

C. $\pi - \tan^{-1}\left(\frac{x+y}{1-xy}\right)$

D. $\tan^{-1}\left(\frac{x-y}{1+xy}\right)$

Answer: B

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66. Consider the following statement :

1. There exixts no triangle ABC for which sin A + sin B = sin C.

2. If the angle of a triangle are in the ratio 1 : 2 : 3, then its sides will be in the ratio $1 : \sqrt{3} : 2$.

Which of the above statement 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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67. Consider the following statement :

1. $\tan^{-1} 1 + \tan^{-1}(0.5) = \pi/2$

2. $\sin^{-1}(1/3) + \cos^{-1}(1/3) = \pi/2$

Which of the above statement is/are correct ?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: B

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68. If A + B + C = π, then what is cos(A + B) + cos C equal to ?

A. 0

B. 2 cos C

C. cos C - sin C

D. 2 sin C

Answer: A

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69. What is $\sin^{-1}\sin\frac{3\pi}{5}$ equal to ?

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

B. $\frac{2\pi}{5}$

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

D. None of these

Answer: B

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70. What is $\sin^{-1}\frac{3}{5} - \sin^{-1}\frac{4}{5}$ equal to ?

A. $\pi/2$

B. $\pi/3$

C. $\pi/4$

D. $\pi/6$

Answer: A

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71. In a triangle ABC, c = 2, A = 45°, a = $2\sqrt{2}$, than what is C equal to ?

A. 30°

B. 15°

C. 45°

D. None of these

Answer: A

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72. In a triangle ABC, $\sin A - \cos B = \cos C$, then angle B is

A. π

B. $\pi/3$

C. $\pi/2$

D. $\pi/4$

Answer: C

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73. If in triangle ABC, $(a = (1 + \sqrt{3})cm, b = 2cm, and \angle C = 60^0$, then find the other two angles and the third side.

A. 45° and 75°

B. 30° and 90°

C. 105° and 15°

D. 100° and 20°

Answer: A

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74. A solution of the equation

$\tan^{-1}(1 + x) + \tan^{-1}(1 - x) = \frac{\pi}{2}$ is

A. x = 1

B. x = -1

C. x = 0

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

Answer: C

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75. Conisder x = 4 $\tan^{-1}\left(\frac{1}{5}\right), y = \tan^{-1}\left(\frac{1}{70}\right)$ and $z = \tan^{-1}\left(\frac{1}{99}\right)$.

What is x equal to ?

A. $\tan^{-1}\left(\frac{60}{119}\right)$

B. $\tan^{-1}\left(\frac{120}{119}\right)$

C. $\tan^{-1}\left(\frac{90}{169}\right)$

D. $\tan^{-1}\left(\frac{170}{169}\right)$

Answer: B

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76. Conisder $x = 4\tan^{-1}\left(\frac{1}{5}\right), y = \tan^{-1}\left(\frac{1}{70}\right)$ and $z = \tan^{-1}\left(\frac{1}{99}\right)$.

What is x - y equal to ?

A. $\tan^{-1}\left(\frac{828}{845}\right)$

B. $\tan^{-1}\left(\frac{8287}{8450}\right)$

C. $\tan^{-1}\left(\frac{8281}{8450}\right)$

D. $\tan^{-1}\left(\frac{8287}{8471}\right)$

Answer: C

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77. Conisder $x = 4\tan^{-1}\left(\frac{1}{5}\right), y = \tan^{-1}\left(\frac{1}{70}\right)$ and $z = \tan^{-1}\left(\frac{1}{99}\right)$.

What is x - y + z equal to ?

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

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

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

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

Answer: D

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78. The value of $\tan\left(2\tan^{-1}\frac{1}{5}-\frac{\pi}{4}\right)$ is

A. $-\frac{7}{17}$

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

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

D. $\frac{7}{17}$

Answer: A

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79. Consider the following statements : 1. $\sin^{-1}\frac{4}{5}+\sin^{-1}\frac{3}{5}=\frac{\pi}{2}$ and 2. $\tan^{-1}\sqrt{3}+\tan^{-1}1=-\tan^{-1}\left(2+\sqrt{3}\right)$ 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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80. If a, b and c are the sides of a $\triangle ABC$, then $a^{1/p} + b^{1/p} - c^{1/p}$, where $p > 1$, is

A. always negative

B. always positive

C. always zero

D. positive if 1 $<$ p $<$ 2 and negative if p $>$ 2

Answer: B

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81. Consider a triangle ABC in which $\cos A + \cos B + \cos C = \sqrt{3}\sin\frac{\pi}{3}$

What is the value of $\sin\frac{A}{2}\sin\frac{B}{2}\sin\frac{C}{2}$?

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

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

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

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

Answer: C

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82. Consider a triangle ABC in which $\cos A + \cos B + \cos C = \sqrt{3}\sin\frac{\pi}{3}$

What is the value of $\cos\left(\frac{A+B}{2}\right)\cos\left(\frac{B+C}{2}\right)\cos\left(\frac{C+A}{2}\right)$?

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

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

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

D. None of these

Answer: D

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83. Consider the following statements :

1. There exists $\theta \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ for which $\tan^{-1}(\tan\theta) \neq \theta$.

2. $\sin^{-1}\left(\frac{1}{3}\right) - \sin^{-1}\left(\frac{1}{5}\right) = \sin^{-1}\left(\frac{2\sqrt{2}\left(\sqrt{3}-1\right)}{15}\right)$

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: B

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84. Consider the following statements :

1. $\tan^{-1} x + \tan^{-1}\left(\frac{1}{x}\right) = \pi$

2. There exist x, y $\in [-1, 1]$, where x $\neq$ y such that $\sin^{-1} x + \cos^{-1} y = \frac{\pi}{2}$.

Which of the above statement 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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85. Consider the following statement :

1. If ABC is an equilateral triangle, then 3 tan(A + B) tan C = 1.

2. If ABC is a triangle in which $A = 78^\circ, B = 66^\circ$, then $\tan\left(\frac{A}{2} + C\right) < \tan A$

3. If ABC is any triangle, then $\tan\left(\frac{A+B}{2}\right)\sin\left(\frac{C}{2}\right) < \cos\left(\frac{C}{2}\right)$

Which of the above statements is/are correct?

A. 1 only

B. 2 only

C. 1 and 2

D. 2 and 3

Answer: B

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86. The value of $\cos\left(2\cos^{-1}0.8\right)$ is

A. 0.81

B. 0.56

C. 0.48

D. 0.28

Answer: D

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87. Consider the following for triangle ABC :

1. $\sin\left(\frac{B+C}{2}\right) = \cos\left(\frac{A}{2}\right)$
2. $\tan\left(\frac{B+C}{2}\right) = \cot\left(\frac{A}{2}\right)$
3. sin (B + C) = cos A
4. tan(B + C) = -cot A

Which of the above are correct ?

A. 1 and 3

B. 1 and 2

C. 1 and 4

D. 2 and 2

Answer: B

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88. The value of $\sin^{-1}\left(\frac{3}{5}\right) + \tan^{-1}\left(\frac{1}{7}\right)$ is equal to

A. 0

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

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

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

Answer: B

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89. In a triangle ABC, $a - 2b + c = 0$.The value of $\cot\left(\frac{A}{2}\right)\cot\left(\frac{C}{2}\right)$ is

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

B. 3

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

D. 1

Answer: B

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90. In ΔABC If, $\frac{\sin^2 A + \sin^2 B + \sin^2 C}{\cos^2 A + \cos^2 B + \cos^2 C}$=2 Then the triangle is

A. right-angled

B. equilateral

C. isosceles

D. obtuse-angled

Answer: A

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91. The principal value of $\sin^{-1} x$ lies in the interval

A. $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

B. $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

C. $\left[0, \frac{\pi}{2}\right]$

D. $[0, \pi]$

Answer: B

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92. In a triangle ABC if a = 2, b = 3 and sin A = $\frac{2}{3}$, then what is angle B equal to?

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

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

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

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

Answer: B

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93. The principle value of $\sin^{-1}\left(\sin\frac{2\pi}{3}\right)$ is

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

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

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

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

Answer: C

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94. If x, x - y and x + y are the angles of a triangle (not an equilateral triangle) such that tan(x - y), tan x and tan(x + y) are in GP, then what is x equal to ?

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

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

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

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

Answer: B

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95. ABC is a triangle inscribed in a circle with centre O. Let $\alpha = \angle BAC$, where $45^\circ < \alpha < 90^\circ$. Let $\beta = \angle BOC$. Which one of the following is correct ?

A. $\cos\beta = \dfrac{1 - \tan^2\alpha}{1 + \tan^2\alpha}$

B. $\cos\beta = \dfrac{1 + \tan^2\alpha}{1 - \tan^2\alpha}$

C. $\cos\beta = \dfrac{2\tan\alpha}{1 + \tan^2\alpha}$

D. $\sin\beta = 2\sin^2\alpha$

Answer: A

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96. What is $\tan^{-1}\left(\dfrac{1}{4}\right) + \tan^{-1}\left(\dfrac{3}{5}\right)$ equal to ?

A. 0

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

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

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

Answer: B

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97. If $A + B + C = 180^\circ$, then what is sin 2A - sin 2N - sin 2C equal to ?

A. $-4 \sin A \sin B \sin C$

B. $-4 \cos A \sin B \cos C$

C. $-4 \cos A \cos B \sin C$

D. $-4 \sin A \cos B \cos C$

Answer: D

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98. Consider the following values of x :

1. 8

2. -4

3. $\frac{1}{6}$

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

Which of the above values of x is/are the solutions of the equation $\tan^{-1}(2x) + \tan^{-1}(3x) = \frac{\pi}{4}$.

A. 3 only

B. 2 and 3 only

C. 1 and 4 only

D. 4 only

Answer: A

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99. Let the slope of the curve $y = \cos^{-1}$ (sin x) be tan θ : Then the value of θ in the interval $(0, \pi)$ is

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

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

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

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

Answer: B

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100. What is the value of $\sin^{-1}\frac{4}{5} + \sec^{-1}\frac{5}{4} - \frac{\pi}{2}$?

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

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

C. π

D. 0

Answer: D

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101. if $\sin^{-1}\left(\frac{2p}{1+p^2}\right) - \cos^{-1}\left(\frac{1-q^2}{1+q^2}\right) = \tan^{\frac{2x}{1-x^2}}$ prove that $x = \frac{p-q}{1+pq}$ where $p, q\varepsilon(0, 1)$

A. $\frac{p+q}{1+pq}$

B. $\frac{p-q}{1+pq}$

C. $\frac{pq}{1+pq}$

D. $\frac{p+q}{1-pq}$

Answer: B

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102. If in triangle the angles be to the one another as $1:2:3$, prove that the corresponding sides are $1:\sqrt{3}:2$.

A. $1:2:3$

B. $3:2:1$

C. $1:\sqrt{3}:2$

D. $1:\sqrt{3}:\sqrt{2}$

Answer: C

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103. What is the derivative of $\sec^2\left(\tan^{-1}x\right)$ with respect to x ?

A. 2x

B. x^2+1

C. x + 1

D. x^2

Answer: A

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