



MATHS

BOOKS - HIMALAYA MATHS (KANNADA ENGLISH)

INVERSE TRIGONOMETRIC FUNCTIONS

Question Bank

1. $2 \tan^{-1}(-3) =$

A. $-\pi + \frac{\tan^{-1}(3)}{4}$

B. $\frac{\tan^{-1}(3)}{4}$

C. $\pi + \tan^{-1}\left(-\frac{4}{3}\right)$

D. $\pi + \frac{\tan^{-1}(4)}{3}$

Answer: A



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2. $\sin^{-1}[\cos(-105^\circ)] =$

A. 75°

B. 15°

C. 105°

D. none of these

Answer: D



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3. The value of $\left(\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{3}\right)\right) =$

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

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

C. $\tan^{-1}\left(\frac{1}{6}\right)$

D. $\tan^{-1}\left(\frac{5}{6}\right)$

Answer: B

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4. $\frac{\tan^{-1}(1)}{3} + \frac{\tan^{-1}(1)}{4} =$

A. $\frac{\tan^{-1}(7)}{11}$

B. $\frac{\tan^{-1}(11)}{7}$

C. $\frac{\tan^{-1}(1)}{2}$

D. $\frac{\tan^{-1}(8)}{11}$

Answer: A

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5. $\tan\left[\frac{\sin^{-1}(1)}{\sqrt{2}} + \frac{\tan^{-1}(1)}{2}\right] =$

A. 3

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

C. $1i$

D. -1

Answer: A

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6. $\tan^{-1}\left(\frac{1}{11}\right) + \tan^{-1}\left(\frac{2}{12}\right) =$

A. $\frac{\tan^{-1}(3)}{132}$

B. $\frac{\tan^{-1}(1)}{2}$

C. $\frac{\tan^{-1}(132)}{33}$

D. none of these

Answer: D

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7. $\cot^{-1}\left(\frac{1}{5}\right) + \cot^{-1}\left(\frac{1}{3}\right) - \tan^{-1}\left(\frac{7}{4}\right) =$

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

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

C. 0

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

Answer: A



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8. $\tan^{-1} 1 + \tan^{-1} 2 + \tan^{-1} 3 =$

A. 0

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

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

D. π

Answer: D

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9. $\cot^{-1}(21) + \cot^{-1}(13) + \cot^{-1}(8) =$

A. 0

B. $\cot^{-1} 26$

C. π

D. none of these

Answer: C

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10. $\sin^{-1}\left(\frac{3}{5}\right) + \sin^{-1}\left(\frac{8}{17}\right) =$

A. $\sin^{-1}\left(\frac{77}{85}\right)$

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

C. $\sin^{-1}\left(\frac{3}{7}\right)$

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

Answer: A

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11. $\cos^{-1}\left(\frac{2}{\sqrt{5}}\right) + \tan^{-1}\left(\frac{1}{3}\right) =$

A. $\frac{\tan^{-1}(2)}{3\sqrt{5}}$

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

C. $\frac{\tan^{-1}(1)}{7}$

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

Answer: B

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12. $\sin^{-1}\left(\frac{5}{13}\right) + \tan^{-1}\left(\frac{12}{5}\right) =$

A. $\frac{\tan^{-1}(12)}{13}$

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

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

D. $\frac{\tan^{-1}(5)}{12}$

Answer: B



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13. $2\frac{\tan^{-1}(1)}{2} + \frac{\sin^{-1}(3)}{5} =$

A. $\frac{\tan^{-1}(12)}{25}$

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

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

D. $\frac{\tan^{-1}(25)}{12}$

Answer: C

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14. $\sin \left[\frac{\sin^{-1}(2)}{3} + 2 \frac{\cos^{-1}(2)}{3} \right] =$

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

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

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

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

Answer: A

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15. If $\tan^{-1} a^3 + \tan^{-1} a = \tan^{-1} b$, then $b =$

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

B. $\frac{a^3+a}{1-a^3}$

C. $\frac{a}{a^2-1}$

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

Answer: D

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16. $\tan^{-1}\left(\frac{1}{3}\right) + \tan^{-1}\left(\frac{1}{5}\right) + \tan^{-1}\left(\frac{1}{7}\right) = \tan^{-1}x$, then $x =$

A. $\frac{1}{9}$

B. $\frac{7}{9}$

C. 1

D. ∞

Answer: B

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17. $\sin \left[\sin^{-1} \left(\frac{1 - \sqrt{3}}{2\sqrt{2}} \right) + \cos^{-1} \left(\frac{\sqrt{3} + 1}{2\sqrt{2}} \right) \right] =$

A. 1

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

C. 0

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

Answer: C



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18. The value of $\cos^{-1} \left(\cos \frac{5\pi}{3} \right) + \sin^{-1} \left(\sin \frac{5\pi}{3} \right)$ is :

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

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

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

D. 0

Answer: D



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19. $\sec^{-1}(\csc 100^\circ) =$

A. 10°

B. 80°

C. 180°

D. 0°

Answer: A



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20. $\cos^{-1}\left(\frac{\tan(7\pi)}{4}\right) =$

A. 0

B. π

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

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

Answer: D

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21. $\cot^{-1} \left[\cos^{-1} \left(\frac{7}{25} \right) \right] =$

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

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

C. $\frac{25}{7}$

D. none of these

Answer: D

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22. $\sin(\tan^{-1} x) =$

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

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

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

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

Answer: A



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23. $\sin\left(\frac{\tan^{-1}(3)}{5}\right) =$

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

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

C. $\frac{3}{\sqrt{34}}$

D. $\frac{5}{\sqrt{34}}$

Answer: C

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24. $\sin \left[2 \cos^{-1} \left(-\frac{3}{5} \right) \right] =$

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

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

C. $\frac{7}{25}$

D. $-\frac{25}{7}$

Answer: B

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25. $\cos \left(2 \frac{\tan^{-1}(1)}{3} \right) =$

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

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

C. $\frac{5}{9}$

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

Answer: B



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26. The value of $\tan \left[2 \frac{\tan^{-1}(\sqrt{5} - 1)}{2} \right] =$

A. 4

B. 2

C. $\sqrt{5}$

D. $\sqrt{5} - 1$

Answer: B

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$$27. \cos\left(2\frac{\sin^{-1}(1)}{3}\right) =$$

A. $\frac{7}{9}$

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

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

D. none of these

Answer: A

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$$28. \sec\left(2\frac{\tan^{-1}(3)}{2}\right) =$$

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

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

C. $-\frac{13}{5}$

D. $-\frac{5}{13}$

Answer: C

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29. $\sin \left[2 \cos^{-1} \left(\frac{3}{5} \right) \right] =$

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

B. $\frac{2\sqrt{6}}{5}$

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

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

Answer: A

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

A. $\frac{4\sqrt{5}}{9}$

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

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

D. none of these

Answer: A

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31. $\tan\left(2\frac{\sin^{-1}(5)}{13}\right) =$

A. $\frac{51}{78}$

B. $\frac{60}{39}$

C. $\frac{100}{119}$

D. $\frac{120}{119}$

Answer: D



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$$32. \sin\left(\frac{1}{2} \sin^{-1}\left(\frac{8}{17}\right)\right) =$$

A. $\sqrt{17}$

B. $\frac{1}{\sqrt{17}}$

C. $\frac{15}{12}$

D. $\frac{8}{17}$

Answer: B



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$$33. \sin^2\left(2 \tan^{-1} \sqrt{\frac{1+x}{1-x}}\right) = , |x| < 1$$

A. $1 - x^2$

B. $1 + x^2$

C. $x^2 - 1$

D. x^2

Answer: A



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34. $\cos[\tan^{-1}\{\sin(\cot^{-1} x)\}] =$

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

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

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

D. none of these

Answer: B



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35. If $\sin[2 \cos^{-1}(\cot(2 \tan^{-1} x))] = 0$ then $x =$

A. $\frac{\tan(\pi)}{8}$

B. $\frac{\cot(\pi)}{8}$

C. 0

D. none

Answer: A



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36. $\tan^{-1}(\cot x) - \cot^{-1}(\tan x) =$

A. 0

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

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

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

Answer: A



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37. If $2 \tan^{-1}(\cos x) = \tan^{-1}(2 \cos ecx)$, then $x =$

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

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

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

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

Answer: C



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38. The number of real solutions of the equation

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

A. two

B. one

C. zero

D. infinitely many

Answer: A

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39. If $\frac{\sin^{-1}(1)}{3} + \frac{\sin^{-1}(2)}{3} = \sin^{-1} x$, then $x =$

A. 0

B. $\frac{\sqrt{5} - 4\sqrt{2}}{9}$

C. $\frac{\sqrt{5} + 4\sqrt{2}}{9}$

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

Answer: C

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40. If $\tan^{-1} x + \tan^{-1}(1 - x) = \frac{\tan^{-1}(4)}{3}$ then $x =$

A. $-\frac{1}{(2)^4}$

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

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

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

Answer: D



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41. If $\sin^{-1} 2x = \cos^{-1} x$, then $x =$

A. $\pm \frac{1}{\sqrt{5}}$

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

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

D. none of these

Answer: A

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42. The equation $\sin^{-1} x - \cos^{-1} x = \cos^{-1} \left(\frac{\sqrt{3}}{2} \right)$ has

- A. a unique solution
- B. no solution
- C. infinitely many solution
- D. exactly two solution

Answer: A

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43. The equation $2 \cos^{-1} x + \sin^{-1} x = \frac{11\pi}{6}$ has

A. unique solution

B. two solutions

C. three solutions

D. no solution

Answer: D

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44. If $\sin^{-1} x + \cos^{-1}(1 - x) = 0$ then $x =$

A. 1

B. -1

C. 0

D. none of these

Answer: C

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45. Considering only the principal values, if \tan

$$(\cot^{-1} x) = \sin\left(\cot^{-1} \frac{1}{2}\right), \text{ then } x \text{ is :}$$

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

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

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

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

Answer: D



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46. If $2 \frac{\tan^{-1}(1)}{2} + \sin^{-1} x = \frac{\pi}{2}$ then $x =$

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

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

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

D. none of these

Answer: A



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47. The only integer (s) satisfying $\sin^{-1} x + \sin^{-1}(1 - x) = \cos^{-1} x$

A. is 0

B. are 0 and 2

C. are 0 and $\frac{1}{2}$

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

Answer: C



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48. $\frac{\sin^{-1}(5)}{x} + \frac{\sin^{-1}(12)}{x} = \frac{\pi}{2}$ then $x =$

A. 10

B. 12

C. 13

D. 14

Answer: C



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49. If $\cos^{-1} x = \cot^{-1} \frac{4}{3} + \tan^{-1} \frac{1}{7}$, the $x =$

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

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

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

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

Answer: C



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50. If $3 \tan^{-1} \left(\frac{1}{2 + \sqrt{3}} \right) - \frac{\tan^{-1}(1)}{x} = \frac{\tan^{-1}(1)}{3}$ then $x =$

A. 1

B. 2

C. 3

D. $\sqrt{3}$

Answer: B



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

A. 1

B. -1

C. 0

D. π

Answer: C

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52. $\sec^2(\tan^{-1} 2) + \operatorname{cosec}^2(\cot^{-1} 3) =$

A. 5

B. 15

C. 13

D. 12

Answer: B

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53. The value of $\tan^2(\sec^{-1} 2) + \cot^2(\operatorname{cosec}^{-1} 3)$ is :

A. 10

B. 15

C. 11

D. 12

Answer: C



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54. The value of ,

$$\sec^{-1}\left(\frac{x}{a}\right) - \sec^{-1}\left(\frac{x}{b}\right) = \sec^{-1} b - \sec^{-1} a$$

A. $-ab$

B. ab

C. 1

D. both (a) and (b)

Answer: B



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55. $\sin^{-1}[\cos(\sin^{-1} x)] + \cos^{-1}[\sin(\cos^{-1} x)] =$

A. 0

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

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

D. π

Answer: C



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56. If $(\cos^{-1} x)^2 - (\sin^{-1} x)^2 > 0$ then

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

B. $-1 < x < \sqrt{2}$

C. $0 \leq x < \frac{1}{\sqrt{2}}$

D. $-1 \leq x < \frac{1}{\sqrt{2}}$

Answer: D



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

A. π

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

C. $4 \tan^{-1} x$

D. 0

Answer: A



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58. If $x = \sin^{-1} k$, $y = \cos^{-1} k$, $-1 \leq k \leq 1$, then the correct relationship is :

A. $x+y=2$

B. $x-y=2$

C. $x + y = \frac{\pi}{2}$

D. $x - y = \frac{\pi}{2}$

Answer: C



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59. If $\sin^{-1} x = \frac{\pi}{5}$ then $\cos^{-1} x =$

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

B. $\frac{3\pi}{10}$

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

D. $\frac{7\pi}{4}$

Answer: B



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60. 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 is equal to

- A. $\frac{a+b}{2}$
- B. $\frac{a-b}{1-ab}$
- C. $\frac{a+b}{1-ab}$
- D. $\frac{2(a+b)}{1-ab}$

Answer: C



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61. If $\tan^{-1} x - \tan^{-1} y = -\frac{\pi}{4}$ then

A. $x+y+x y=1$

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

C. $y=1+x+x y$

D. $x+y=1+x y$

Answer: C

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62. If $\sum_{i=1}^{20} \sin^{-1} x_i = 10\pi$ then $\sum_{i=1}^{20} x_i =$

A. 20

B. 10

C. 0

D. 5

Answer: A

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63. If $\sec^{-1} x + \sec^{-1} y + \sec^{-1} z = 3\pi$ then $xy + yz + zx =$

A. 0

B. -3

C. 3

D. 1

Answer: C



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64.

$$\tan^{-1}\left(\frac{1}{3}\right) + \frac{\tan^{-1}(1)}{7} + \frac{\tan^{-1}(1)}{13} + \dots + \frac{\tan^{-1}(1)}{n^2 + n + 1} + \dots \infty =$$

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

B. 0

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

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

Answer: D

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65. Sum of ten terms of the series

$\cot^{-1} 3 + \cot^{-1} 7 + \cot^{-1} 13 + \cot^{-1} 21 + \dots$ is

A. $\frac{\tan^{-1}(5)}{6}$

B. $\tan^{-1}(1000)$

C. $\frac{\tan^{-1}(6)}{5}$

D. $\frac{\tan^{-1}(1)}{100}$

Answer: A

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66. If $\tan^{-1} \left[\frac{\sqrt{1+x^2} - \sqrt{1-x^2}}{\sqrt{1+x^2} + \sqrt{1-x^2}} \right] = \alpha$ then $x^2 =$

A. $\cos 2\alpha$

B. $\tan 2\alpha$

C. $\sin 2\alpha$

D. $\cot 2\alpha$

Answer: C



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67. The value of $\cot^{-1} \left(\frac{\sqrt{1-\sin x} + \sqrt{1+\sin x}}{\sqrt{1-\sin x} - \sqrt{1+\sin x}} \right) =$

A. $\pi - x$

B. $2\pi - x$

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

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

Answer: D



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68. If $u = \cot^{-1}(\sqrt{\cos \theta}) - \tan^{-1}(\sqrt{\cos \theta})$ then $x =$

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

B. 1

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

D. -1

Answer: B



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69.

$$\sin^{-1}\left(x - \frac{x^2}{2} + \frac{x^3}{4} + \frac{-x^4}{8}\right) \dots\dots\dots + \cos^{-1}\left(x^2 - \frac{x^4}{2} + \frac{x^6}{4} - \dots\right)$$

then $x =$

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

B. 1

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

D. -1

Answer: B

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70. $\cot^{-1}(2.1^2) + \cot^{-1}(2.2^2) + \cot^{-1}(2.3^2) + \dots \dots \dots$ up to $\infty =$

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

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

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

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

Answer: B

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71. If $\frac{\cos^{-1}(x)}{2} + \frac{\cos^{-1}(y)}{3} = \theta$, then $9x^2 - 12xy \cos \theta + 4y^2 =$

A. 36

B. $-36 \sin^2 \theta$

C. $36 \sin^2 \theta$

D. $36 \cos^2 \theta$

Answer: C



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72. $\cos \left[2\cos^{-1} \frac{1}{5} + \sin^{-1} \frac{1}{5} \right] =$

A. $\frac{\sqrt{6}}{5}$

B. $-\left(\frac{2\sqrt{6}}{5}\right)$

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

D. $2\sqrt{6}$

Answer: B



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73. If $f(x) = \sin^{-1} \left[\frac{\sqrt{3}}{2}x - \frac{1}{2}\sqrt{1-x^2} \right]$, $-\frac{1}{2} \leq x \leq 1$ then $f(x) =$

A. $\frac{\sin^{-1}(1)}{2} - \sin^{-1} x$

B. $\sin^{-1} x - \frac{\pi}{6}$

C. $\sin^{-1} x + \frac{\pi}{6}$

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

Answer: B



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74. If $\sum_{i=1}^{2n} \cos^{-1} x_i = 0$, then $\sum_{i=1}^{2\pi} x_i =$

A. n

B. $2n$

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

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

Answer: B



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75. The principal value of $\cos^{-1} \left\{ \frac{1}{\sqrt{2}} \left(\cos \frac{9\pi}{10} - \sin \frac{9\pi}{10} \right) \right\}$ is :

A. $\frac{3\pi}{20}$

B. $\frac{17\pi}{20}$

C. $\frac{7\pi}{10}$

D. $\frac{21\pi}{20}$

Answer: B



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76. Principal value of $\cos^{-1}\left(-\frac{\sin(7\pi)}{6}\right)$ is

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

B. $\frac{7\pi}{6}$

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

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

Answer: C



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77. If $\sin\left(\sin^{-1}\left(\frac{1}{5}\right) + \cos^{-1} x\right) = 1$ then find the value of x .

A. 1

B. 0

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

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

Answer: D



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78. $\cot^{-1} 3 + \frac{\sec^{-1}(\sqrt{5})}{2} =$

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

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

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

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

Answer: A



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79. $\tan^{-1} x > \cot^{-1} x$, holds for

A. $x > 1$

B. $x \leq 1$

C. $x = 1$

D. for all values of x

Answer: A

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80. If $a \leq \tan^{-1} x + \cot^{-1} x + \sin^{-1} x \leq b$ then

A. $a, = 0, b = \pi$

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

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

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

Answer: A

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81. If $x_1 = 2 \tan^{-1} \left(\frac{1+x}{1-x} \right)$, $x_2 = \sin^{-1} \left(\frac{1-x^2}{1+x^2} \right)$ where $x \in (0, 1)$,

then $x_1 + x_2 =$

A. 0

B. 2π

C. π

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

Answer: C



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82. If $(\tan^{-1} x)^2 + (\cot^{-1} x)^2 = \frac{5\pi^2}{8}$, then $x =$

A. -1

B. -3

C. 0

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

Answer: A



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83. The value of $\sin^{-1}[\cos(\cos^{-1}(\cos x) + \sin^{-1}(\sin x))]$ where $x \in \left(\frac{\pi}{2}, \pi\right)$ is

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

B. $-\pi$

C. π

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

Answer: D



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84. If $-1 < x < 0$, then $\sin^{-1} x =$

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

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

C. $-\frac{\cot^{-1}(\sqrt{1 - x^2})}{x}$

D. $\operatorname{cosec}^{-1} x$

Answer: B



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85. $\sin^{-1} \left[\cot \left(\left(\sin^{-1} \sqrt{\frac{2 - \sqrt{3}}{4}} \right) + \frac{\cos^{-1}(\sqrt{12})}{4} + \sec^{-1} \sqrt{2} \right) \right]$

A. 0

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

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

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

Answer: A

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

- A. $x > 1$
- B. $|x| < 1$
- C. $|x| > 2$
- D. $|x| < 2$

Answer: A

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87. The value of $\cos^{-1} \sqrt{\frac{2}{3}} - \frac{\cos^{-1}(\sqrt{6} + 1)}{2\sqrt{3}}$ is

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

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

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

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

Answer: D

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88. The value of $\tan^{-1} \sqrt{\frac{a\lambda}{bc}} + \tan^{-1} \sqrt{\frac{b\lambda}{ca}} + \tan^{-1} \sqrt{\frac{c\lambda}{ab}}$ where $a, b, c \in R^+$ and $\lambda = a + b + c$ is equal to

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

B. π

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

D. none of these

Answer: D



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

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

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

C. 4π

D. 2π

Answer: C



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90. $\sin^{-1}(1-x) - 2\sin^{-1}x = \frac{\pi}{2}$, then x is equal to

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

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

C. 0

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

Answer: C



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91. Solve the following equations :

$\sin(\tan^{-1} x), |x| < 1$ equal to

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

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

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

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

Answer: D



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92. The principal value branch of $\sec^{-1} x$ is

A. $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right] - (0)$

B. $[0, \pi] - \left(\frac{\pi}{2}\right)$

C. $(0, \pi)$

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

Answer: B



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93. Which of the following corresponds to the principal value branch of \tan^{-1}

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

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

C. $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right) - (0)$

D. $(0, \pi)$

Answer: A



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94. Write the principal value branch of $\cos^{-1} x$

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

B. $(0, \pi)$

C. $[0, \pi]$

D. $(0, \pi) - \left(\frac{\pi}{2} \right)$

Answer: C



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95. Which of the following is the principal value branch of $\cos ec^{-1} x$?

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

B. $[0, \pi] - \left(\frac{\pi}{2}\right)$

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

D. $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right] - (0)$

Answer: D



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96. Write the principal value branch of $\cos^{-1} x$

A. $\left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$

B. $[\pi, 2\pi] - \left(\frac{3\pi}{2}\right)$

C. $(0, \pi)$

D. $[2\pi, 3\pi]$

Answer: D



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97. The value of $\sin^{-1}\left(\cos\left(\frac{43\pi}{5}\right)\right)$ is :

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

B. $-\frac{7\pi}{5}$

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

D. $-\frac{\pi}{10}$

Answer: D



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98. The principal value of the expression $\cos^{-1}[\cos(-680^\circ)]$ is :

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

B. $-\frac{2\pi}{9}$

C. $\frac{34\pi}{9}$

D. $\frac{\pi}{9}$

Answer: A



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99. The value of $\cot(\sin^{-1} x)$ is

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

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

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

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

Answer: D



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100. If $\tan^{-1} x = \frac{\pi}{10}$ for some $x \in \mathbb{R}$ then the value of $\cot^{-1} x$ is

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

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

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

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

Answer: B



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101. Find the domain of $\sin^{-1}(2x)$

A. $[0,1]$

B. $[-1,1]$

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

D. $[-2,2]$

Answer: C



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102. The principal value of $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$ is :

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

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

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

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

Answer: D



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103. If $\theta = \sin^{-1}[\sin(-600^\circ)]$, then the value of θ is

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

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

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

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

Answer: A



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104. The domain of the function $y = \sin^{-1}(-x^2)$ is

A. $[0,1]$

B. $(0,1)$

C. $(-1,1]$

D. ϕ

Answer: C



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105. The domain of $y = \cos^{-1}(x^2 - 4)$ is

A. $[3,5]$

B. $[0, \pi]$

C. $[-\sqrt{5}, -\sqrt{3}] \cap [-\sqrt{5}, \sqrt{3}]$

D. $[-\sqrt{5}, -\sqrt{3}] \cup [\sqrt{3}, \sqrt{5}]$

Answer: D



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106. The domain of the function defined by : $f(x) = \sin^{-1} x + \cos x$ is :

A. $[-1,1]$

B. $[-1, \pi + 1]$

C. $(-\infty, \infty)$

D. ϕ

Answer: A



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107. The value of $\sin (2 \sin^{-1}(.6))$ is :

A. 0.48

B. 0.96

C. 1.2

D. $\sin(1.2)$

Answer: B



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108. If $\sin^{-1} x + \sin^{-1} y = \frac{\pi}{2}$, then the value of $\cos^{-1} x + \cos^{-1} y$ is :

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

B. π

C. 0

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

Answer: A



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109. The value of $\tan\left(\frac{\cos^{-1}(3)}{5} + \frac{\tan^{-1}(1)}{4}\right)$ is

A. $\frac{19}{8}$

B. $\frac{8}{19}$

C. $\frac{19}{12}$

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

Answer: A



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110. The value of the expression $\sin[\cot^{-1}(\cos(\tan^{-1} 1))]$ is :

A. 0

B. 1

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

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

Answer: D



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111. The equation $\tan^{-1} x - \cot^{-1} x = \tan^{-1} \left(\frac{1}{\sqrt{3}} \right)$ has :

A. no solution

B. unique solution

C. infinite number of solutions

D. two. solutions

Answer: B



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112. If $\alpha \leq 2 \sin^{-1} x + \cos^{-1} x \leq \beta$, then

A. $\alpha = -\frac{\pi}{2}, \beta = \frac{\pi}{2}$

B. $\alpha = 0, \beta = \pi$

C. $\alpha = -\frac{\pi}{2}, \beta = \frac{3\pi}{2}$

D. $\alpha = 0, \beta = 2\pi$

Answer: B



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113. The value of $\tan^2(\sec^{-1} 2) + \cot^2(\operatorname{cosec}^{-1} 3)$ is :

A. 5

B. 11

C. 13

D. 15

Answer: B



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114. If $3 \tan^{-1} x + \cot^{-1} x \equiv \pi$ then x equal to

A. 0

B. 1

C. -1

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

Answer: B



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115. The value of $\sin^{-1} \left(\cos \left(\frac{33\pi}{5} \right) \right)$ is :

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

B. $-\frac{7\pi}{5}$

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

D. $-\frac{\pi}{10}$

Answer: D



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116. The domain of the function $\cos^{-1}(2x - 1)$ is

A. $[0,1]$

B. $[-1,1]$

C. $(-1,1)$

D. $[0, \pi]$

Answer: A



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117. The domain of the function $\sin^{-1} \sqrt{x-1}$ is :

- A. [1,2]
- B. [-1,1]
- C. [0,1]
- D. none of these

Answer: A



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118. If $\cos\left(\sin^{-1} \frac{2}{5} + \cos^{-1} x\right) = 0$, then x is equal to :

- A. $\frac{1}{5}$
- B. $\frac{2}{5}$
- C. 0
- D. 2

Answer: B



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119. The value of $\sin(2 \tan^{-1}(.75))$ is equal to

A. 0.75

B. 1.5

C. 0.96

D. $\sin 1.5$

Answer: C



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120. Find the value of $\cos^{-1}\left(\cos \frac{13\pi}{6}\right)$

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

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

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

D. $\frac{7\pi}{2}$

Answer: A

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121. The value of expression $2 \sec^{-1} 2 + \sin^{-1} \left(\frac{1}{2} \right)$ is :

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

B. $\frac{5\pi}{6}$

C. $\frac{7\pi}{6}$

D. 1

Answer: B

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122. if $\tan^{-1} x + \tan^{-1} y = \frac{4\pi}{5}$ then $\cot^{-1} x + \cot^{-1} y$ is equal to

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

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

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

D. π

Answer: A



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123. If $\sin^{-1}\left(\frac{2a}{1+a^2}\right) + \cos^{-1}\left(\frac{1-a^2}{1+a^2}\right) = \tan^{-1}\left(\frac{2x}{1-x^2}\right)$, where

$a, x \in (0,1)$, then the value of x is :

A. 0

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

C. a

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

Answer: D

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124. $\cot \left[\cos^{-1} \left(\frac{7}{25} \right) \right] =$

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

B. $\frac{25}{7}$

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

D. $\frac{7}{24}$

Answer: D

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125. The value of the expression $\tan \left(\frac{1}{2} \cos^{-1} \frac{2}{\sqrt{5}} \right)$ is

A. $2 - \sqrt{5}$

B. $\sqrt{5} - 2$

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

D. $5 + \sqrt{2}$

Answer: B



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

A. $4 \tan^{-1} x$

B. 0

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

D. π

Answer: A



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127. If $\cos^{-1} \alpha + \cos^{-1} \beta + \cos^{-1} \gamma = 3\pi$ then

$$\alpha(\beta + \gamma) + \beta(\gamma + \alpha) + \gamma(\alpha + \beta) =$$

A. 0

B. 1

C. 6

D. 12

Answer: C



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128. If $\cos^{-1} x > \sin^{-1} x$, then :

A. $\frac{1}{\sqrt{2}} \leq x \leq 1$

B. $0 \leq x < \frac{1}{\sqrt{2}}$

C. $-1 \leq x < \frac{1}{\sqrt{2}}$

$$D. x > 0$$

Answer: C



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$$129. \frac{\sin^{-1}(3)}{5} + \frac{\cos^{-1}(12)}{13} =$$

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

B. $\frac{\sin^{-1}(56)}{65}$

C. $\frac{2}{7}$

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

Answer: D



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$$130. \text{ show that } \tan^{-1}\left(\frac{2}{3}\right) = \frac{1}{2}\tan^{-1}\left(\frac{12}{5}\right) =$$

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

B. $\frac{11}{3}$

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

D. none of these

Answer: C



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131. If $\tan^{-1} 2x + \tan^{-1} 3x = \frac{\pi}{4}$, then $x =$

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

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

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

D. $\frac{1}{10}$

Answer: C



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132. If $\tan^{-1} 3 + \tan^{-1} x = \tan^{-1} 8$, then $x =$

A. 5

B. 3

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

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

Answer: C



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

A. $x = 1$

B. $x = -1$

C. $x = 0$

D. $x = \pi$

Answer: C



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134. Simplify the following:

Evaluate $\sin^{-1}[\sin(-600^\circ)]$

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

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

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

D. $\frac{7\pi}{6}$

Answer: D



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135. $\sin^{-1}\left(\frac{3}{5}\right) + \frac{\tan^{-1}(1)}{7} =$

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

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

C. $\cos^{-1}\left(\frac{4}{5}\right)$

D. π

Answer: A



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136. $\frac{\sin^{-1}(1)}{\sqrt{5}} + \cot^{-1} 3 =$

A. $(\pi)/3$

B. $(\pi)/2$

C. $(\pi)/6$

D. $(\pi)/4$

Answer: D



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$$137. \cos\left(2\frac{\sin^{-1}(1)}{2}\right) =$$

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

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

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

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

Answer: A



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$$138. \text{ If } \cos^{-1} x + \frac{\sin^{-1}(x)}{2} = \frac{\pi}{6} \text{ then } x =$$

A. $\pm\sqrt{3}$

B. 1

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

D. 0

Answer: B



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139. If $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \frac{\pi}{2}$ then $xy + yz + zx =$

A. 0

B. $x + y + z$

C. xyz

D. 1

Answer: D



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140. If $4 \sin^{-1} x + \cos^{-1} x = \pi$, then x equals

A. 2

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

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

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

Answer: B



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141. $3 \sin^{-1} \left(\frac{2x}{1+x^2} \right) - 4 \cos^{-1} \left(\frac{1-x^2}{1+x^2} \right) + 2 \tan^{-1} \left(\frac{2x}{1-x^2} \right) = \frac{\pi}{3}$

(then) $x =$

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

B. $(1)/(\text{sqrt}(3))'$

C. 2

D. 1

Answer: B



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142. The value of $\cos^{-1}(-1) - \sin^{-1}(1)$ is

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

B. π

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

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

Answer: A



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143. The value of $\tan \left[\cos^{-1}\left(\frac{4}{5}\right) + \tan^{-1}\left(\frac{2}{3}\right) \right]$ is :

A. $\frac{17}{6}$

B. $\frac{6}{17}$

C. $\frac{16}{7}$

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

Answer: A



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144. If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \frac{3\pi}{2}$, then $x^{100} + y^{100} + z^{100} - \frac{9}{x^{101} + y^{101} + z^{101}}$ is :

A. 1

B. 0

C. 4

D. 2

Answer: B



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145. The value of $\sin \left[\tan^{-1} \left(\frac{1-x^2}{2x} \right) + \cos^{-1} \left(\frac{1-x^2}{1+x^2} \right) \right] =$

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

B. 0

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

D. 1

Answer: D



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146. The solution of $\tan^{-1} x + 2 \cot^{-1} x = \frac{2\pi}{3}$ is

A. 3

B. $\sqrt{3}$

C. $\sqrt{2}$

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

Answer: B



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147. If $\tan^{-1} \frac{x+1}{x-1} + \tan^{-1} \frac{x-1}{x} = \tan^{-1}(-7)$ then the value of x is

A. -2

B. 0

C. 2

D. 1

Answer: C



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148. If $\cos^{-1} \sqrt{p} + \cos^{-1} \sqrt{1-p} + \cos^{-1} \sqrt{1-q} = \frac{3\pi}{4}$ then the value of q is

A. 1

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

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

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

Answer: D

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149. $\sin\left(\frac{1}{2}\cos^{-1}\frac{4}{5}\right) =$

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

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

C. $-\frac{1}{10}$

D. $\frac{1}{10}$

Answer: B

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150. If $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = 3\pi$ then $xy + yz + zx =$

A. 1

B. 0

C. -3

D. 3

Answer: D



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151. If $\frac{\sin^{-1}(x)}{5} + \cos ec^{-1} \frac{5}{4} = \frac{\pi}{2}$ then $x =$

A. 1

B. 4

C. 3

D. 5

Answer: C



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152. If $\cos^{-1} p + \cos^{-1} q + \cos^{-1} r = \pi$ then $p^2 + q^2 + r^2 + 2pqr =$

A. 3

B. 1

C. 2

D. -1

Answer: B



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153. The solution of $\sin^{-1} x - \sin^{-1} 2x = \pm \frac{\pi}{3}$ is.....

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

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

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

D. $\pm \frac{1}{4}$

Answer: B



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154. If $\tan^{-1} x + \tan^{-1} y = \frac{\pi}{4}$ then...

A. $x + y + xy = 1$

B. $x + y - xy = 1$

C. $x + y + xy + 1 = 0$

D. $x + y - xy + 1 = 0$

Answer: A



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155. If $\cos^{-1} x = \alpha$, ($0 < x < 1$) and $\sin^{-1}(2x\sqrt{1-x^2}) + \sec^{-1}\left(\frac{1}{2x^2-1}\right) = \frac{2\pi}{3}$, then $\tan^{-1}(2x)$ equals

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

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

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

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

Answer: D



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156. If $a > b > 0$, then the value of $\tan^{-1}\left(\frac{a}{b}\right) + \tan^{-1}\left(\frac{a+b}{a-b}\right)$ depends on

A. neither a nor b

B. a and not b

C. b and not a

D. both a and b

Answer: A



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157. The solution of $\tan^{-1} x + 2 \cot^{-1} x = \frac{2\pi}{3}$ is

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

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

C. $\sqrt{3}$

D. $-\sqrt{3}$

Answer: C



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158. The sum of $\frac{\tan^{-1}(1)}{2} + \frac{\tan^{-1}(1)}{8} + \frac{\tan^{-1}(1)}{18} + \dots$ is

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

B. π

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

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

Answer: D



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159. If x, y, z are all non zero and $x^2 + y^2 + z^2 = r^2$ then

$$\tan^{-1}\left(\frac{yz}{xr}\right) + \tan^{-1}\left(\frac{zx}{yr}\right) + \tan^{-1}\left(\frac{xy}{zr}\right)$$

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

B. π

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

D. none of these

Answer: C

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160. $\tan \frac{1}{2} \left[\sin^{-1} \frac{2x}{1+x^2} + \cos^{-1} \frac{1-y^2}{1+y^2} \right]$

A. ∞

B. 1

C. $\frac{2x}{1-x^2}$

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

Answer: C

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161. $\cot^{-1}(\sqrt{\cos \alpha}) - \tan^{-1}(\sqrt{\cos \alpha}) = x$, then $\sin x =$

A. $\frac{\tan^2(\alpha)}{2}$

B. $\frac{\cot^2(\alpha)}{2}$

C. $\tan \alpha$

D. $\frac{\cot(\alpha)}{2}$

Answer: A

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162. The trigonometric equation $\sin^{-1} x = 2 \sin^{-1} a$ has a solution for :

A. $\frac{1}{2} < |a| < \frac{1}{\sqrt{2}}$

B. for all real values of a

C. $|a| < \frac{1}{2}$

D. $|a| \leq \frac{1}{\sqrt{2}}$

Answer: D

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163. If $\cos^{-1} x - \frac{\cos^{-1}(y)}{2} = \alpha$ then $4x^2 - 4xy \cos \alpha + y^3$ is equal to

A. $2 \sin 2\alpha$

B. 4

C. $4 \sin^2 \alpha$

D. $-4 \sin^2 \alpha$

Answer: C



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164. If $\frac{\sin^{-1}(x)}{5} + \cos ec^{-1} \frac{5}{4} = \frac{\pi}{2}$ then $x =$

A. 3

B. 4

C. 3

D. 1

Answer: A



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165. If $x = \sin^{-1} k, y = \cos^{-1} k, -1 \leq k \leq 1$, then the correct relationship is :

A. $x+y=2$

B. $x-y=2$

C. $x + y = \frac{\pi}{2}$

D. $x - y = \frac{\pi}{2}$

Answer: C



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166. If $\tan(\cos^{-1} x) =$

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

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

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

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

Answer: D



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167. $\sin^{-1} x = \frac{\pi}{5}$, then $\cos^{-1} x =$

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

B. $\frac{3\pi}{10}$

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

D. $\frac{7\pi}{4}$

Answer: B



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168. If $\tan(\cos^{-1} x) =$

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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169. If

$$\sin^{-1}\left(x - \frac{x^2}{2} + \frac{x^3}{4} \dots\right) + \cos^{-1}\left(x^2 - \frac{x^4}{2} + \frac{x^6}{4} - \dots\right) = \frac{\pi}{2}$$

for $0 < |x| < \sqrt{2}$ then x equals :

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

B. 1

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

D. -1

Answer: B



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170. $3 \sin^{-1}\left(\frac{2x}{1+x^2}\right) - 4 \cos^{-1}\left(\frac{1-x^2}{1+x^2}\right) + 2 \tan^{-1}\left(\frac{2x}{1-x^2}\right) = \frac{\pi}{3}$ (then) $x =$

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

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

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

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

Answer: D

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171. If $\tan^{-1}(x + 1) + \tan^{-1}(x - 1) = \frac{\tan^{-1}(8)}{31}$ then $x =$

A. 1

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

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

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

Answer: D

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172. If $\cos^{-1}\left(\frac{3}{5}\right) - \sin^{-1}\left(\frac{4}{5}\right) = \cos^{-1} x$, then $x =$

A. -1

B. 1

C. 0

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

Answer: B

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173. $\tan\left(\frac{1}{2}\cos^{-1}0\right) =$

A. 0

B. -1

C. 1

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

Answer: C

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174. If $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \frac{\pi}{2}$, then $1 - xy - yz - zx =$

A. 1

B. 0

C. -1

D. 2

Answer: B



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175. The value of $\left(\tan^{-1} \left(\frac{1}{2} \right) + \tan^{-1} \left(\frac{1}{3} \right) \right) =$

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

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

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

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

Answer: B



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176. If $\tan^{-1} 3 + \tan^{-1} x = \tan^{-1} 8$, then $x =$

A. 5

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

C. $\frac{5}{14}$

D. $\frac{14}{5}$

Answer: B



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177. If $\cosh^{-1} x = \log(2 + \sqrt{3})$ then $x =$

A. 2

B. 1

C. 3

D. 5

Answer: A



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178. $\sec^2(\tan^{-1} 2) + \operatorname{cosec}^2(\cot^{-1} 3) =$

A. 5

B. 10

C. 15

D. 20

Answer: C



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179. If $\theta = \sin^{-1}[\sin(-600^\circ)]$, then the value of θ is

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

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

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

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

Answer: A



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180. The value of $\sec \left[\frac{\tan^{-1}(b+a)}{b-a} - \frac{\tan^{-1}(a)}{b} \right]$

A. $\sqrt{2}$

B. 4

C. 1

D. 2

Answer: A



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181. $\cos \left[\cos^{-1} \left(-\frac{1}{7} \right) + \sin^{-1} \left(-\frac{1}{7} \right) \right] =$

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

B. 0

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

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

Answer: B



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182. If $\sin^{-1} x + \sin^{-1}(1 - x) = \cos^{-1} x$, then $x \in$

A. (1,0)

B. (-1,1)

C. $\left(0, \frac{1}{2}\right)$

D. (2,0)

Answer: C



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183. $\frac{\sin^{-1}(4)}{5} + 2\frac{\tan^{-1}(1)}{3} =$

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

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

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

D. 0

Answer: C



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184. The principal value of $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$ is :

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

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

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

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

Answer: B



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185. The domain of $\sin^{-1} x$ is

A. $(-\pi, \pi)$

B. $[-1, 1]$

C. $(0, 2\pi)$

D. $(-\infty, \infty)$

Answer: B

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186. If $\frac{\sin^{-1}(1)}{3} + \frac{\sin^{-1}(2)}{3} = \sin^{-1} x$, then the value of $x =$

A. 0

B. $\frac{\sqrt{5} - 4\sqrt{2}}{9}$

C. $\frac{\sqrt{5} + 4\sqrt{2}}{9}$

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

Answer: C

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187. If $\sin^{-1} x + \frac{\cot^{-1}(1)}{2} = \frac{\pi}{2}$, then $x =$

A. 0

- B. $\frac{1}{\sqrt{5}}$
- C. $\frac{2}{\sqrt{5}}$
- D. $\frac{\sqrt{3}}{2}$

Answer: B



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188. The value of $\cos^{-1}\left(\cos\frac{5\pi}{3}\right) + \sin^{-1}\left(\sin\frac{5\pi}{3}\right)$ is :

- A. $\frac{\pi}{2}$
- B. $\frac{5\pi}{3}$
- C. $\frac{10\pi}{3}$
- D. 0

Answer: D



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189. If $\sec^{-1} x = \operatorname{cosec}^{-1} y$ then $\frac{\cos^{-1}(1)}{x} + \frac{\cos^{-1}(1)}{y} =$

A. π

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

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

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

Answer: D



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190. If $0 \leq x \leq 1$ and $\theta = \sin^{-1} x + \cos^{-1} x - \tan^{-1} x$, then

A. $\frac{\pi}{2} \leq \theta \leq \frac{3\pi}{4}$

B. $0 \leq \theta \leq \pi$

C. $-\frac{\pi}{4} \leq \theta \leq 0$

D. $\frac{\pi}{4} \leq \theta \leq \frac{\pi}{2}$

Answer: B

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191. $\sec (\operatorname{cosec}^{-1} x) =$

A. $\operatorname{cosec}(\sec^{-1} x)$

B. $\cot x$

C. π

D. none of these

Answer: A

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192. $\tan \left[\sin^{-1} \left(\frac{3}{5} \right) - \cos^{-1} \left(-\frac{4}{5} \right) \right] =$

A. $\frac{24}{7}$

B. $-\frac{24}{7}$

C. $\frac{7}{24}$

D. $-\frac{7}{24}$

Answer: A



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193. If $2 \tan^{-1}(\cos x) = \tan^{-1} \cos ec^2 x$ then $x =$

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

B. π

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

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

Answer: D



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194. The value of x for which $\sin(\cot^{-1}(1+x)) = \cos(\tan^{-1}x)$ is :

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

B. 1

C. 0

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

Answer: D



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195. The values of x satisfying

$$\tan^{-1}(x+3) - \tan^{-1}(x-3) = \sin^{-1}\left(\frac{3}{5}\right) \text{ are}$$

A. ± 4

B. 0,4

C. -4,0

D. 4,5

Answer: A



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196. $\frac{\cos^{-1}(1)}{2} + 2\frac{\sin^{-1}(1)}{2} =$

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

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

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

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

Answer: D



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197. The value of $\tan\left(\frac{\cos^{-1}(4)}{5} + \frac{\tan^{-1}(2)}{3}\right)$ is

A. $\frac{6}{17}$

B. $\frac{7}{16}$

C. $\frac{17}{6}$

D. none of these

Answer: C



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198. $\frac{C_0}{1} - \frac{C_1}{2} + \frac{C_2}{3} + \dots + \frac{(-1)^n}{n+1} \cdot C_n =$

A. $\frac{\tan^{-1}(y)}{x}$

B. $\frac{\tan^{-1}(x)}{y}$

C. $-\frac{\tan^{-1}(x)}{y}$

D. none of these

Answer: B



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199. The number of real solutions of the equation

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

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

Answer: C



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200. If $\tan^{-1} \left(\frac{1-x}{1+x} \right) = \frac{1}{2} \tan^{-1} x, x > 0$ find x

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

D. 2.

Answer: B

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201. If $\sum_{r=1}^{\infty} \tan^{-1} \left(\frac{1}{2r^2} \right) = t$ then $\tan t$ is equal to

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

B. 1

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

D. none of these

Answer: B

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202. If $\sin^{-1}\left(\frac{2a}{1+a^2}\right) + \cos^{-1}\left(\frac{1-a^2}{1+a^2}\right) = \tan^{-1}\left(\frac{2x}{1-x^2}\right)$, where

$a, x \in (0,1)$, then the value of x is :

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

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

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

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

Answer: D



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203. The solution set of the equation $\sin^{-1} x = 2 \tan^{-1} x$ is

A. (1,2)

B. (-1,2)

C. (-1,1,0)

D. $\left(1, \frac{1}{2}, 0\right)$

Answer: C



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204. Let (x, y) be such that $\sin^{-1}(\alpha x) + \cos^{-1}y + \cos^{-1}(bxy) = \frac{\pi}{2}$ If

$a = 1$ and $b = 2$, then (x, y) lies on

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

B. $(x^2 - 1)(y^2 - 1) = 0$

C. $y = x$

D. $(4x^2 - 1)(y^2 - 1) = 0$

Answer: A



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205. Let $\cos(2 \tan^{-1} x) = \frac{1}{2}$ then the value of x is

A. $\sqrt{3}$

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

C. $1 - \sqrt{3}$

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

Answer: B



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206. The value of x where $x > 0$ and $\tan\left(\sec^{-1}\left(\frac{1}{x}\right)\right) = \sin(\tan^{-1} 2)$

Is

A. $\sqrt{5}$

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

C. 1

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

Answer: B



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207. If $\frac{\sin^{-1}(3)}{x} + \frac{\sin^{-1}(4)}{x} = \frac{\pi}{2}$ then $x =$

A. 3

B. 5

C. 7

D. 11

Answer: B



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

A. \sqrt{ab}

B. $\sqrt{2ab}$

C. $2ab$

D. ab

Answer: A

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209. $\sin^{-1} \left[\cot \left(\left(\sin^{-1} \sqrt{\frac{2 - \sqrt{3}}{4}} \right) + \frac{\cos^{-1}(\sqrt{12})}{4} + \sec^{-1} \sqrt{2} \right) \right]$

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

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

C. 0

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

Answer: C



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

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

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

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

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

Answer: D



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211. If $\sec^{-1}x = \operatorname{cosec}^{-1}y$ then $\frac{\cos^{-1}(1)}{x} + \frac{\cos^{-1}(1)}{y} =$



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212. $\sin\left(2 \sin^{-1} \sqrt{\frac{63}{65}}\right) =$

A. $\frac{4\sqrt{65}}{65}$

B. $\frac{2\sqrt{126}}{65}$

C. $\frac{\sqrt{63}}{65}$

D. $\frac{8\sqrt{63}}{65}$

Answer: B



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213. $\cot^{-1}(2.1^2) + \cot^{-1}(2.2^2) + \cot^{-1}(2.3^2) + \dots$ up to $\infty =$

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

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

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

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

Answer: C



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214. If $a > b > 0$, $\sec^{-1}\left(\frac{a+b}{a-b}\right) = 2\sin^{-1}x$, then $x =$

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

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

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

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

Answer: C



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215. If $\tan^{-1}x = \frac{\pi}{4} - \tan^{-1}\left(\frac{1}{3}\right)$, then x is

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

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

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

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

Answer: B



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216. If x takes negative permissible value, then $\sin^{-1} x$ is equal to

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

B. $\cos^{-1} \sqrt{1 - x^2}$

C. $-\cos^{-1} \sqrt{1 - x^2}$

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

Answer: C



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217. The value of $\sin [\cot^{-1} \{ \cos(\tan^{-1} x) \}]$ is :

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

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

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

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

Answer: A



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218. If $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = 3\pi$ then $xy + yz + zx =$

A. 1

B. 0

C. -3

D. 3

Answer: D



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$$219. \tan^{-1}\left(\frac{1}{x+y}\right) + \tan^{-1}\left(\frac{y}{x^2+xy+1}\right) =$$

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

B. $\cot^{-1} x$

C. $\tan^{-1} y$

D. $\cot^{-1} y$

Answer: B



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