



## MATHS

### BOOKS - MODERN PUBLICATION MATHS (KANNADA ENGLISH)

#### INVERSE TRIGONOMETRIC FUNCTIONS

##### Multiple Choice Questions Level I

1. 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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2. 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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3.  $\cot\left[\cos^{-1}\left(\frac{7}{25}\right)\right] =$

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

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

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

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

**Answer: D**



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4. 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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5. If  $3 \tan^{-1} x + \cot^{-1} x = \pi$ , then  $x$  equals to

A. 0

B. 1

C. -1

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

**Answer: B**



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6. 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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7. 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. 1

**Answer: B**



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8. The greatest and least value of  $(\sin^{-1}x)^2 + (\cos^{-1}x)^2$  are respectively :

A.  $\frac{5\pi^2}{4}$  and  $\frac{\pi^2}{8}$

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

C.  $\frac{\pi^2}{4}$  and  $\frac{-\pi^2}{4}$

D.  $\frac{\pi^2}{4}$  and 0

**Answer: A**



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9. 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.  $\phi$

**Answer: A**



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10. 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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11. 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.  $\pi$
- C. 0

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

**Answer: A**



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

D.  $\pi$

**Answer: A**



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13. Simplify the following:

Evaluate  $\tan\left(\cos^{-1}\frac{3}{5} + \tan^{-1}\frac{1}{4}\right)$

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

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

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

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

**Answer: A**



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14. 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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15. 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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16. If  $\alpha < 2 \sin^{-1} x + \cos^{-1} x \leq \beta$ , 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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17. 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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18. 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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19. 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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20. If  $\cos^{-1} x > \sin^{-1} x$ , then :

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

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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21. Considering only the principal values, if  $\tan(\cot^{-1} x) = \sin\left(\cot^{-1} \frac{1}{2}\right)$ , then  $x$  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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22. The value of  $\sin(\cot^{-1} x)$  is :

- A.  $\sqrt{1 + x^2}$
- B.  $x$
- C.  $(1 + x^2)^{-3/2}$

D.  $(1 + x^2)^{-1/2}$

**Answer: D**



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23. 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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24. 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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25. Two angles of a triangle are  $\cot^{-1} 2$  and  $\cot^{-1} 3$ . Then the third angle is :

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

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

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



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

**Answer: A**



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**26.** Solution set of  $\cos^{-1} x - \sin^{-1} x = \sin^{-1}(1 - x)$  is :

A.  $[-1,1]$

B.  $[-1,0]$

C.  $\left[0, \frac{1}{2}\right]$

D. None of these

**Answer: D**



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

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

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

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

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

**Answer: D**

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28. Principal value of :  $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) + \cos^{-1}\left(\cos\left(\frac{7\pi}{6}\right)\right)$  is :

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

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

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

D. None of these

**Answer: A**

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29. Value of :

$$\cos^{-1}\left(\frac{-1}{2}\right) - 2\sin^{-1}\left(\frac{1}{2}\right) + 3\cos^{-1}\left(-\frac{1}{\sqrt{2}}\right) - 4\tan^{-1}(-1)$$

equals :

- A.  $\frac{\pi}{12}$
- B.  $\frac{43\pi}{12}$
- C.  $\frac{7\pi}{4}$
- D.  $\frac{11\pi}{4}$

**Answer: B**



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30. Simplify the following:

$$\text{If } \sin\left\{\sin^{-1}\frac{1}{5} + \cos^{-1}x\right\} = 1 \text{ find } x$$

A. 0

B. 1

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

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

**Answer: C**

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

A. all real values

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

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

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

Answer: C



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33. 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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34. If  $\frac{\sin^{-1}(x)}{5} + \operatorname{cosec}^{-1} \frac{5}{4} = \frac{\pi}{2}$  then  $x =$

A. 3

B. 4

C. 5

D. 1

**Answer: A**



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35. The value of  $\cot \left( \operatorname{cosec}^{-1} \frac{5}{3} + \tan^{-1} \frac{2}{3} \right)$  is :

A.  $\frac{5}{17}$

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

C.  $\frac{3}{17}$

D.  $\frac{4}{17}$

**Answer: B**



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## Multiple Choice Questions Level Ii

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

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

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

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

D. None of these

**Answer: D**



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

A. 3

B. 1

C. 2

D. None of these

**Answer: B**



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3. 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. 2

C. 0

D. None of these

**Answer: D**



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4. The number of real solutions of :

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

A. zero

B. one

C. two

D. infinite

**Answer: C**



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5. If  $\cos^{-1} \frac{x}{a} + \cos^{-1} \frac{y}{b} = \alpha$ , then :

$\frac{x^2}{a^2} - \frac{2xy}{ab} \cos \alpha + \frac{y^2}{b^2}$  equals :

A.  $\cot^2 \alpha$

B.  $\cos^2 \alpha$

C.  $\tan^2 \alpha$

D.  $\sin^2 \alpha$

Answer: D



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6. 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.  $\frac{7\pi}{20}$

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

D. None of these

**Answer: D**



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7. If  $\sum_{i=1}^{2n} \sin^{-1} x_i = n\pi$ , then  $\sum_{i=1}^{2n} x_i$  is equal to :

A. n

B. 2n

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

D. None of these

**Answer: B**



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8.  $\sin \cot^{-1} \tan \cos^{-1} x$  is equal to :

A.  $x$

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

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

D. None of these

**Answer: A**



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9. Value of  $\cos \left\{ \tan^{-1} \left( \tan \frac{15\pi}{4} \right) \right\}$  is :

A. 1

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

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

D. None of these

**Answer: C**



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

A.  $-3$

B.  $-1$

C.  $0$

D.  $3$

**Answer: D**



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11. If  $\sum_{i=1}^{2n} \sin^{-1} x_i = n\pi$ , then  $\sum_{i=1}^{2n} x_i$  equals :

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

B.  $2n$

C.  $n$

D. None of these

**Answer: B**



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**12.** The number of positive integral solutions of :

$$\tan^{-1} x + \cos^{-1} \frac{y}{\sqrt{1+y^2}} = \sin^{-1} \frac{3}{\sqrt{10}} \text{ is :}$$

A. 0

B. 1

C. 2

D. None of these

**Answer: C**



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13. Value of  $\tan^{-1}\frac{1}{3} + \tan^{-1}\frac{1}{5} + \tan^{-1}\frac{1}{7} + \tan^{-1}\frac{1}{8}$  is :

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

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

C.  $\pi$

D. None of these

**Answer: A**



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14. If  $\tan^{-1}\frac{\sqrt{1+x^2}-1}{x} = 4$ , then x equals :

A.  $\tan 2$

B.  $\tan 4$

C.  $\tan 6$

D.  $\tan 8$

**Answer: D**



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**15.** The integral solution of :

$$\tan^{-1} x + \tan^{-1} \left( \frac{1}{y} \right) = \tan^{-1} 3 \text{ is :}$$

A. (1,4)

B. (2,1)

C. (3,13)

D. None of these

**Answer: D**



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16. If  $\sin^{-1} x + \cos^{-1}(1 - x) = \sin^{-1}(-x)$ , then  $x$  satisfies :

A.  $2x^2 + 3x + 1 = 0$

B.  $2x^2 - 3x = 0$

C.  $2x^2 + x - 1 = 0$

D.  $2x^2 + x + 1 = 0$

**Answer: B**



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17.

If

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

there  $0 < 1 \times 1 < \sqrt{2}$ , then  $x$  equals

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

B. 1

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

D.  $-1$

**Answer: B**



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18. If  $\cot^{-1}(\sqrt{\cos \alpha}) - \tan^{-1}(\sqrt{\cos \alpha}) = x$ , then  $\sin x$  is  $\frac{\tan^2 \alpha}{2}$  (b)  $\frac{\cot^2 \alpha}{2}$  (c)  $\tan^2 \alpha$  (d)  $\frac{\cot \alpha}{2}$

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

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

C.  $\tan \alpha$

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

**Answer: A**



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19. If  $\cos^{-1} x - \cos^{-1} \frac{y}{2} = \alpha$ , then  $4x^2 - 4xy \cos \alpha + y^2$  is equal to

A. 4

B.  $2 \sin^2 \alpha$

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

D.  $4 \sin^2 \alpha$

Answer: D



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20.

If

$0 < x < 1$ , then  $\sqrt{1+x^2} \left[ \{x \cos(\cot^{-1} x) + \sin(\cot^{-1} x)\}^2 - 1 \right]^{1/2}$

is equal to

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

B.  $x$

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

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

**Answer: C**



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**Aieee Jee Examinations**

1. The value of  $\cot \left( \sum_{n=1}^{23} \cot^{-1} \left( 1 + \sum_{k=1}^n 2k \right) \right)$  is

A.  $\frac{23}{25}$

B.  $\frac{25}{23}$

C.  $\frac{23}{24}$

D.  $\frac{24}{23}$

**Answer: D**



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2. If  $\tan^{-1} y = \tan^{-1} x + \tan^{-1} \left( \frac{2x}{1-x^2} \right)$ , where  $|x| < \frac{1}{\sqrt{3}}$ .

Then, the value of  $y$  is

A.  $\frac{3x - x^3}{1 - 3x^2}$

B.  $\frac{3x + x^3}{1 - 3x^2}$

C.  $\frac{3x - x^3}{1 + 3x^2}$

D.  $\frac{3x + x^3}{1 + 3x^2}$

**Answer: A**



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**Question From Karnataka Cet Comed**

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

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

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

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

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

**Answer: D**



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2. If  $x \neq n\pi$ ,  $x \neq (2n + 1)\frac{\pi}{2}$ ,  $n \in \mathbb{Z}$ , then :

$$\sin^{-1} \left( \frac{\sin^{-1}(\cos x) + \cos^{-1}(\sin x)}{\tan^{-1}(\cot x) + \cot^{-1}(\tan x)} \right) =$$

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

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

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

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

**Answer: D**



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3. Given  $0 \leq x \leq \frac{1}{2}$  then the value of

$$\tan \left[ \sin^{-1} \left\{ \frac{x}{\sqrt{2}} + \frac{\sqrt{1-x^2}}{\sqrt{2}} \right\} - \sin^{-1} x \right] \text{ is}$$

A.  $\sqrt{3}$

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

C. 1

D. -1

**Answer: C**



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

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

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

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

D.  $\left(\sqrt{\frac{x^2 - 1}{x^2 - 2}}\right)$

**Answer: A**

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5. The value  $\sin^{-1}\left(\frac{2\sqrt{2}}{3}\right) + \sin^{-1}\left(\frac{1}{3}\right)$  is equal to

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

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

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

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

**Answer: B**

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



A.  $\sqrt{3}$

B. 1

C. -1

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

**Answer: D**

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7. If  $\frac{(x+1)^2}{x^3+x} = \frac{A}{x} + \frac{Bx+C}{x^2+1}$  then

$\operatorname{cosec}^{-1}\left(\frac{1}{A}\right) + \cot^{-1}\left(\frac{1}{B}\right) + \sec^{-1}C = \underline{\hspace{2cm}}$

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

B. 0

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

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

**Answer: A**



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

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

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

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

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

Answer: C



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

A. 0

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

C.  $\pi$

D. None of these

**Answer: A**

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10.  $\tan\left(\cos^{-1}\left(\frac{1}{5\sqrt{2}}\right) - \sin^{-1}\left(\frac{4}{\sqrt{17}}\right)\right)$  is

A.  $\frac{\sqrt{29}}{3}$

B.  $\frac{29}{3}$

C.  $\frac{\sqrt{3}}{29}$

D.  $\frac{3}{29}$

**Answer: D**

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