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MATHS

BOOKS - NTA MOCK TESTS

INVERSE TRIGONOMETRIC FUNCTIONS

Single Choice

1. $\tan^{-1}\frac{x-1}{x-2}+\tan^{-1}\frac{x+1}{x+2}=\frac{\pi}{4}$ then the value of x could be

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

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

C. $\pm \frac{1}{\sqrt{9}}$

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

Answer: D

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

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

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

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

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

Answer: A

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3. $\sum_{r=1}^{n} \tan^{-1}\left(\frac{x_r - x_{r-1}}{1 + x_{r-1}x_r}\right) =$

$\sum_{r=1}^{n} \left(\tan^{-1} x_r - \tan^{-1} x_{r-1}\right)$

$= \tan^{-1} x_n - \tan^{-1} x_0, \forall n \in N$

On the basis of above information answer the

following question

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

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

B. $\cot^{-1} 2$

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

D. None of these

Answer: D

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4. The value of satisfying the equation $\tan^{-1} 2 + \tan^{-1} 3x = \frac{\pi}{4}$ is

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

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

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

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

Answer: C

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5. If $\left[\sin^{-1}\cos^{-1}\sin^{-1}\tan^{-1}x\right]=1$, where [.] denotes the greatest integer function, then x belongs to the interval

A. $[\tan\sin\cos 1, \tan\sin\cos\sin 1]$

B. $(\tan\sin\cos 1, \tan\sin\cos\sin 1)$

C. $[-1, 1]$

D. $[\sin\cos\tan 1, \sin\cos\sin\tan 1]$

Answer: A

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6. The number of real solutions of (x,y) where

$y = |\sin x|, y = \cos^{-1}(\cos x),$

$-2\pi \leq x \leq 2\pi$ is

A. 2

B. 1

C. 3

D. 4

Answer: C

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7. The value of the expression $\cot^{-1}\frac{1}{2}+\cot^{-1}\frac{9}{2}+\cot^{-1}\frac{25}{2}+\cot^{-1}\frac{49}{2}+\ldots$ upto n terms is

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

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

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

D. $\tan^{-1}2n-\tan^{-1}1$

Answer: A

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8. Using the identity

$\sin^{-1}(\sin x) = x, \ -\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$

Statement I: $\sin^{-1}(\sin 2) = 2$

Statement II: The principal value of $\sin^{-1}(\sin x) = x$

A. Statement I is true, Statement II is also true and Statement II is the correct explanation of Statement I.

B. Statement I is true, Statement II is also true and Statement II is not the correct explanation of statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: D

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9. If α, β are the roots of the equation $6x^2 - 5x + 10$, then the value of $\tan\left(\tan^{-1}\alpha + \tan^{-1}\beta\right)$ is

A. 0

B. 1

C. -1

D. 2

Answer: B

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10. If

$$\tan^{-1}(x+2)+\tan^{-1}(x-2)+\tan^{-1}\left(\frac{1}{2}\right)=0$$

then one of the values of x is equal to

A. -1

B. 5

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

D. 1

Answer: D

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

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

B. all real values of a

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

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

Answer: D

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12. $\tan^{-1}\frac{m}{n} - \tan^{-1}\frac{m-n}{m+n}$ is equal to $(m, n > 0)$

A. $\tan^{-1}\frac{m+n}{m-n}$

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

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

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

Answer: B

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13. If x,y,z are in arthmetic progression and $\tan^{-1}x, \tan^{-1}y$ and $\tan^{-1}z$ are also in arithmetic progression then

A. $x = y = z$

B. $x = y = -z$

C. $x = 1, y = 2, z = 3$

D. $x = 2, y = 4, z = 6$

Answer: A

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14. The value of $\sin^{-1}(\cos(4095^\circ))$ is equal to

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

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

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

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

Answer: C

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15. 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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16. If $\tan^{-1} a + \tan^{-1} b = \sin^{-1} 1 - \tan^{-1} c$, then $\{a, b, c \neq 0\}$

A. $a + b + c = abc$

B. $ab + bc + ca = abc$

C. $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} - \frac{1}{abc} = 0$

D. $ab + bc + ca = a + b + c$

Answer: C

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17. The value of $\sin^{-1}\left(\cos\frac{33\pi}{5}\right)$ 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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18. The $\theta = \tan^{-1} a, \phi = \tan^{-1} b$ and $ab = -1$, then $(\theta - \phi)$ is equal to $\{a > 0, b > 0\}$

A. 0

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

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

D. None of these

Answer: C

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

A. 0

B. 1

C. 2

D. 3

Answer: A

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20. If $\left[\cot^{-1} x\right] + \left[\cos^{-1} x\right] = 0$, where x is a non negative real number and [.] denotes the greaest integer function then complete set of value of x is

A. $(\cos 1, 1]$

B. $(\cot 1, 1]$

C. $(\cos 1, \cot 1)$

D. None of these

Answer: B

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21. The values of x for which the function $f(x) = \tan^{-1} x - \cot^{-1} x + \cos^{-1}(2 - x)$ is defined is

A. $[0, 1]$

B. $[-1, 1]$

C. $[1, 3]$

D. None of these

Answer: C

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22. The relation $\tan^{-1}\left(\frac{1+x}{1-x}\right) = \frac{\pi}{4} + \tan^{-1} x$ holds true for all

A. $x \in R$

B. $x \in (-\infty, 1)$

C. $x \in (-1, \infty)$

D. $x \in (-\infty, 2)$

Answer: B

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23. If

$$\tan^{-1}\left(\frac{1}{3}\right)+\tan^{-1}\left(\frac{3}{4}\right)-\tan^{-1}\left(\frac{x}{3}\right)=0,$$

then x is equal to

A. 1. $\frac{7}{3}$

B. 3

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

D. $\frac{13}{3}$

Answer: D

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

A. 0

B. $\frac{\left(\sqrt{5}-4\sqrt{2}\right)}{9}$

C. $\frac{\left(\sqrt{5}+4\sqrt{2}\right)}{9}$

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

Answer: C

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25. If $\left(\tan\left(\cos^{-1}x\right)\right) = \sin\left(\cot^{-1}\frac{1}{2}\right)$, then x is equal to

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

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

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

D. None of these

Answer: B

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26. If

$$f(x) = 2\tan^{-1} x + \sin^{-1}\left(\frac{2x}{1+x^2}\right), x > 1,$$

then f(5) is equal to

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

B. $\tan^{-1}\left(\frac{65}{156}\right)$

C. π

D. $4\tan^{-1}(5)$

Answer: C

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27. If $\sin^{-1}\left(x-\frac{x^2}{2}+\frac{x^3}{4}-\ldots\right)+\cos^{-1}\left(x^2-\frac{x^4}{2}+\frac{x^6}{4}-\ldots\right)=\frac{\pi}{2}$ and $0<x<\sqrt{2}$ then x=

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

B. 1

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

D. -1

Answer:

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28. The range of $f(x) = \cos^{-1}\left(\frac{x^4 + x^2 + 1}{x^2 + x + 1}\right)$

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

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

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

D. $\left[0, \cos^{-1}\frac{3}{4}\right]$

Answer: D

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29. Number of solution of the equation $\sin^{-1}(1-x) - 4\sin^{-1}(x) = \frac{\pi}{2}$ is equal to

A. 0

B. 1

C. 2

D. 3

Answer: B

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30. Let $f: R \to \left(0, \frac{3\pi}{4}\right]$ be defined by $f(x) = \cot^{-1}\left(x^2 + x + a\right)$. If f(x) is surjective then the valueof a is

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

B. $\left(\frac{-3}{4}, \infty\right)$

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

D. $\left(-\infty, \frac{-3}{4}\right]$

Answer: A

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