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CTQ - 2023

CTQ : Concept Through Questions

Year : 2023

Topic : Inverse Trigonometric

- The value of $\cos(2 \cos^{-1} 0.8)$ is
(a) 0.28 (b) 0.32
(c) 0.52 (d) 0.56 [Video Solution](#)
- If $\sin^{-1} a + \sin^{-1} b + \sin^{-1} c = \pi$, then the value of $a\sqrt{1-a^2} + b\sqrt{1-b^2} + c\sqrt{1-c^2}$ will be
(a) $2abc$ (b) abc
(c) $1/2 abc$ (d) $1/3 abc$ [Video Solution](#)
- $\sin^{-1} x + \sin^{-1} \frac{1}{x} + \cos^{-1} x + \cos^{-1} \frac{1}{x}$ is equal to
(a) π (b) $\pi/2$
(c) $3\pi/2$ (d) None of these [Video Solution](#)
- 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 [Video Solution](#)
- The value of $\sum_{r=0}^{\infty} \tan^{-1} \left(\frac{1}{1+r+r^2} \right)$ is equal to
(a) $\pi/2$ (b) $3\pi/4$
(c) $\pi/4$ (d) None of these [Video Solution](#)
- If we consider only the principle value of the inverse trigonometric functions, then the value of $\tan \left(\cos^{-1} \frac{1}{5\sqrt{2}} - \sin^{-1} \frac{4}{\sqrt{17}} \right)$ is
(a) $\sqrt{\frac{29}{3}}$ (b) $\frac{29}{3}$
(c) $\sqrt{\frac{3}{29}}$ (d) $\frac{3}{29}$ [Video Solution](#)
- If in a ΔABC , $\angle A = \tan^{-1} 2$ and $\angle B = \tan^{-1} 3$, then angle C is equal to
(a) $\pi/2$ (b) $\pi/3$
(c) $\pi/4$ (d) None of these [Video Solution](#)
- If $y = \sec^{-1} \left(\frac{x+1}{x-1} \right) + \sin^{-1} \left(\frac{x-1}{x+1} \right)$, $x \in [0, \infty)$ and $x \neq 1$, then $\frac{dy}{dx}$ is equal to:
(a) 1 (b) $\frac{x-1}{x+1}$
(c) 0 (d) $\frac{x+1}{x-1}$ [Video Solution](#)
- The number of solutions for $\tan^{-1} \sqrt{x(x+1)} + \sin^{-1} \sqrt{x^2 + x + 1} = \frac{\pi}{2}$ is :
(a) Zero (b) One
(c) Two (d) None of these [Video Solution](#)

[NIMCET 2008]



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[NIMCET 2009]

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

- (a) $1/6$ (b) $1/3$
(c) $1/2$ (d) $1/4$

[Video Solution](#)

[NIMCET 2009]

11. If $\sin^{-1} x + \cos^{-1}(1-x) = \sin^{-1}(-x)$, then x satisfies the equation

- (a) $2x^2 - x + 2 = 0$ (b) $2x^2 - 3x = 0$
(c) $2x^2 + x - 1 = 0$ (d) None of these

[Video Solution](#)

[NIMCET 2009]

12. If $\theta = \tan^{-1} \frac{1}{1+2} + \tan^{-1} \frac{1}{1+(2)(3)} + \tan^{-1} \frac{1}{1+(3)(4)} + \dots + \tan^{-1} \frac{1}{1+n(n+1)} = \tan^{-1} \theta$, then θ is equal to

- (a) $\frac{n}{n+1}$ (b) $\frac{n+1}{n+2}$
(c) $\frac{n}{n+2}$ (d) $\frac{n-1}{n+2}$

[Video Solution](#)

[NIMCET 2009]

13. If $\sin^{-1} \frac{2a}{1+a^2} - \cos^{-1} \frac{1-b^2}{1+b^2} = \tan^{-1} \frac{2x}{1-x^2}$ then x is equal to:

- (a) a (b) b
(c) $\frac{a+b}{1-ab}$ (d) $\frac{a-b}{1+ab}$

[Video Solution](#)

[NIMCET 2010]

14. The value of $\sin^{-1} \frac{1}{\sqrt{2}} + \sin^{-1} \frac{\sqrt{2}-\sqrt{1}}{\sqrt{6}} + \sin^{-1} \frac{\sqrt{3}-\sqrt{2}}{\sqrt{12}} + \dots$ to infinity is equal to

- (a) π (b) $\pi/3$
(c) $\pi/2$ (d) $\pi/4$

[Video Solution](#)

[NIMCET 2015]

15. Find the principal value of $\cot^{-1}(-\sqrt{3})$

- (a) $\pi/2$ (b) $\pi/6$
(c) $7\pi/6$ (d) $5\pi/6$

[Video Solution](#)

[NIMCET 2017]

16. The value of A that satisfies the equation $a \sin A + b \cos A = c$ is equal to

- (a) $\tan^{-1} \left(\frac{a}{b} \right) \pm \cos^{-1} \left(\frac{c}{\sqrt{a^2+b^2}} \right)$
(b) $\tan^{-1} \left(\frac{c}{b} \right) \pm \sin^{-1} \left(\frac{c}{\sqrt{a^2+b^2}} \right)$
(c) $\tan^{-1} \left(\frac{a}{b} \right) \pm \sin^{-1} \left(\frac{c}{\sqrt{a^2+b^2}} \right)$
(d) None of these

[Video Solution](#)

[NIMCET 2017]

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

- (a) $x = \frac{(a-b)}{(1+ab)}$ (b) $x = \frac{ab}{(a-b)}$
(c) $x = \frac{(a+b)}{(1-ab)}$ (d) $x = \frac{1-ab}{1+ab}$

[Video Solution](#)

[NIMCET 2017, 2010]



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18. The value of $2 \tan^{-1} [\operatorname{cosec}(\tan^{-1} x) - \tan(\cot^{-1} x)]$ is

- (a) $\tan x$ (b) $\cot x$
(c) $\tan^{-1} x$ (d) $\operatorname{cosec}^{-1} x$

[Video Solution](#)

[NIMCET 2020]

19. If $y = \sin^{-1} \left(\frac{x^2+1}{\sqrt{1+3x^2+x^4}} \right)$ ($x > 0$), then $\frac{dy}{dx} =$

- (a) $\frac{x^2-1}{x^4+3x^2+1}$ (b) $\frac{x^2+1}{x^4+3x^2+1}$
(c) $\frac{x^2-1}{1+3x^2+x^4}$ (d) $\frac{x^2+1}{x^4-3x^2+1}$

[Video Solution](#)

[NIMCET 2021]

20. If $y = \tan^{-1} \left(\frac{3x-x^3}{1-3x^2} \right)$, $\frac{1}{\sqrt{3}} < x < \frac{1}{\sqrt{3}}$ then $\frac{dy}{dx}$ is

- (a) $-\frac{1}{1+x^2}$ (b) $\frac{3}{1+x^2}$
(c) $\frac{3}{\sqrt{1+x^2}}$ (d) $\frac{1}{\sqrt{1+x^2}}$

[Video Solution](#)

[NIMCET 2021]

21. The domain of the function $f(x) = \frac{\cos^{-1} x}{[x]}$ is

- (a) $[-1, 0) \cup \{1\}$ (b) $[-1, 1]$
(c) $[-1, 1)$ (d) None of the above

[Video Solution](#)

[NIMCET 2022]

22. The correct expression for $\cos^{-1}(-x)$ is

- (a) $\frac{\pi}{2} - \cos^{-1} x$ (b) $\pi - \cos^{-1} x$
(c) $\pi + \cos^{-1} x$ (d) $\frac{\pi}{2} + \cos^{-1} x$

[Video Solution](#)

[NIMCET 2022]

23. Solution of the expression $\tan^{-1} \sqrt{x^2+x} + \sin^{-1} \sqrt{x^2+x+1} = \frac{\pi}{2}$ are

- (a) 0, 1 (b) 1, -1
(c) 0, -1 (d) 0, -2

[Video Solution](#)

[NIMCET 2022, 2009]

24. If $\cos^{-1} \frac{x}{2} + \cos^{-1} \frac{y}{2} = \phi$, the $9x^2 - 12xy \cos \phi + 4y^2$ is equal to

- (a) $-36 \sin^2 \phi$ (b) $36 \sin^2 \phi$
(c) $36 \cos^2 \phi$ (d) 36

[Video Solution](#)

[NIMCET 2022]

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

- (a) 6/17 (b) 3/17
(c) 4/17 (d) 5/17

[Video Solution](#)

[NIMCET 2022, 2018]



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Answer Key

Ques.	1	2	3	4	5	6	7	8	9	10
Ans.	A	A	A	A	A	D	C	C	C	A
Ques.	11	12	13	14	15	16	17	18	19	20
Ans.	B	C	D	C	D	A	C	C	A	B
Ques.	21	22	23	24	25					
Ans.	A	B	C	B	A					