Inverse Trigonometric Functions

Subjects : Maths **Previous Year Questions**

Maths - Section A (MCQ)

1. If $\cos^{-1} x = \sin^{-1} x$, then which one of the following is correct?

A) $x = 1$ **B)** $x = \frac{1}{2}$ **C)** $x = \frac{1}{\sqrt{2}}$ **D)** $x = \frac{1}{\sqrt{3}}$

2. What is $\sqrt{15 + \cot^2\left(\frac{\pi}{4} - 2\cot^{-1} 3\right)}$ equal to?

A) 1 **B)** 7 **C)** 8 **D)** 16

3. What is $\cot^2\left(\sec^{-1} 2\right) + \tan^2\left(\text{cosec}^{-1} 3\right)$ equal to?

A) $\frac{11}{12}$ **B)** $\frac{11}{24}$ **C)** $\frac{7}{24}$ **D)** $\frac{1}{24}$

4. What is $\tan^{-1}\left(\frac{a}{b}\right) - \tan^{-1}\left(\frac{a-b}{a+b}\right)$ equal to?

A) $-\frac{\pi}{4}$ **B)** $\frac{\pi}{4}$ **C)** $\tan^{-1}\left(\frac{a^2-b^2}{a^2+b^2}\right)$ **D)** $\tan^{-1}\left(\frac{2ab}{a^2+b^2}\right)$

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

A) $\frac{\pi}{2}$ **B)** π **C)** $\frac{3\pi}{2}$ **D)** 2π

6. What is $2\cot\left(\frac{1}{2}\cos^{-1}\frac{\sqrt{5}}{3}\right)$ equal to?

A) -1 **B)** 1 **C)** $3 + \sqrt{5}$ **D)** $3 - \sqrt{5}$

7. If $\sec^{-1} p - \text{cosec}^{-1} q = 0$, where $\text{p} > 0, \text{q} > 0$; then what is the value of $\text{p}^{-2} + \text{q}^{-2}$?

A) 1 **B)** 2 **C)** $\frac{1}{2}$ **D)** $\frac{1}{2\sqrt{2}}$

8. What is $1 + \sin^2\left(\cos^{-1}\left(\frac{3}{\sqrt{17}}\right)\right)$ equal to?

A) $\frac{25}{17}$ **B)** $\frac{8}{17}$ **C)** $\frac{9}{17}$ **D)** $\frac{47}{17}$

9. What is $\tan^{-1}\cot\left(\text{cosec}^{-1} 2\right)$ equal to?

A) $\frac{\pi}{8}$ **B)** $\frac{\pi}{6}$ **C)** $\frac{\pi}{4}$ **D)** $\frac{\pi}{3}$

10. If $\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{x}{3}\right) = \frac{\pi}{4}$, where $0 < x < 6$, then what is x equal to?

A) 1 **B)** 2 **C)** 3 **D)** 5

11. If $3\sin^{-1} x + \cos^{-1} x = \pi$, then what is x equal to?

A) 0 **B)** $\frac{1}{2}$ **C)** $\frac{1}{\sqrt{2}}$ **D)** $\frac{1}{\sqrt{3}}$

12. $\tan^{-1} x + \cot^{-1} x = \frac{\pi}{2}$ holds, when

A) $x \in R$ **B)** $x \in R - (-1, 1)$ only **C)** $x \in R - \{0\}$ only **D)** $x \in R - [-1, 1]$ only

13. What is the slope of the tangent of $y = \cos^{-1}(\cos x)$ at $x = -\frac{\pi}{4}$?

A) -1 B) 0 C) 1 D) 2

14. What is the value of the following?
$\cot\left[\sin^{-1}\frac{3}{5}+\cot^{-1}\frac{3}{2}\right]$

A) $\frac{6}{17}$ B) $\frac{7}{16}$ C) $\frac{16}{7}$ D) $\frac{17}{6}$

15. Let $\sin^{-1}x+\sin^{-1}y+\sin^{-1}z=\frac{3\pi}{2}$ for $0\le x,y,z\le 1$. What is the value of $x^{1000}+y^{1001}+z^{1002}$?

A) 0 B) 1 C) 3 D) 6

16. What is the domain of the function $f(x)=\cos^{-1}(x-2)$?

A) $[-1,1]$ B) $[1,3]$ C) $[0,5]$ D) $[-2,1]$

17. 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

18. If $\sin^{-1}\frac{2p}{1+p^2}-\cos^{-1}\frac{1-q^2}{1+q^2}=\tan^{-1}\frac{2x}{1-x^2}$, then what is x equal to ?

A) $\frac{p+q}{1+pq}$ B) $\frac{p-q}{1+pq}$ C) $\frac{pq}{1+pq}$ D) $\frac{p+q}{1-pq}$

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

A) $\frac{2}{3}$ B) $\frac{3}{4}$ C) $\frac{3}{8}$ D) $\frac{1}{9}$

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

A) 0 B) $\frac{\pi}{4}$ C) $\frac{\pi}{3}$ D) $\frac{\pi}{2}$

21. If $y=\sec^{-1}\left(\frac{x+1}{x-1}\right)+\sin^{-1}\left(\frac{x-1}{x+1}\right)$, then $\frac{dy}{dx}$ is equal to

A) 0 B) 1 C) $\frac{x-1}{x+1}$ D) $\frac{x+1}{x-1}$

22. Let x,y,z be positive real numbers such that x,y,z are in GP and $\tan^{-1}x,\tan^{-1}y$ and $\tan^{-1}z$ are in AP. Then which one of the following is correct?

A) $x=y=z$ B) $xz=1$ C) $x\ne y$ and $y=z$ D) $x=y$ and $y\ne z$

23. 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) $\frac{\pi}{2}$

24. If $y=\cot^{-1}\left[\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right]$, where $0<x<\frac{\pi}{2}$, then $\frac{dy}{dx}$ is equal to

A) 46024 B) 2 C) $\sin x+\cos x$ D) $\sin x-\cos x$

25. What is the value of $\cos\left(2\cos^{-1}(0.8)\right)$?

A) 0.81 B) 0.56 C) 0.48 D) 0.28

26. The equation $\tan^{-1}(1+x)+\tan^{-1}(1-x)=\frac{\pi}{2}$ is satisfied by

A) $x=1$ B) $x=-1$ C) $x=0$ D) $x=\frac{1}{2}$

27. Consider $x=4\tan^{-1}\left(\frac{1}{5}\right),y=\tan^{-1}\left(\frac{1}{70}\right)$ 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) $\tan^{-1}\left(\frac{170}{169}\right)$

28. Consider $x=4\tan^{-1}\left(\frac{1}{5}\right),y=\tan^{-1}\left(\frac{1}{70}\right)$ 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) $\frac{\pi}{4}$

29. If x and y are positive and $xy > 1$, then what is $\tan^{-1} x + \tan^{-1} y$ equal 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)** $\tan^{-1}\left(\frac{x-y}{1+xy}\right)$

30. If $\tan^{-1} 2, \tan^{-1} 3$ are two angles of a triangle, then what is the third angle?

A) $\tan^{-1} 2$ **B)** $\tan^{-1} 4$ **C)** $\pi/4$ **D)** $\pi/3$

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Maths - Section A (MCQ)

1 - C	2 - C	3 - B	4 - B	5 - C	6 - C	7 - A	8 - A	9 - D	10 - A
11 - C	12 - A	13 - A	14 - A	15 - C	16 - B	17 - D	18 - B	19 - B	20 - B
21 - A	22 - A	23 - B	24 - A	25 - D	26 - C	27 - B	28 - D	29 - B	30 - C