

Class: XII
Subject: Maths
Topic: Inverse Trigonometric Functions
No. of Questions: 25

Q1. If $\sin^{-1}x = \frac{\pi}{5}$, $x \in (-1, 1)$, then $\cos^{-1}x =$

- A. $\frac{3\pi}{10}$
- B. $\frac{5\pi}{10}$
- C. $-\frac{3\pi}{10}$
- D. $\frac{9\pi}{10}$

Q2. The domain of $\sin^{-1}x$ is

- A. $[-\pi, \pi]$
- B. $[-1, 1]$
- C. $(2, 2\pi]$
- D. $[-\infty, \infty]$

[Foreign 2010]

Q3. $\tan(\cos^{-1}x)$ is equal to

- A. $\frac{\sqrt{1-x^2}}{x}$
- B. $\frac{1+x^2}{\sqrt{1+x^2}}$
- C. $\frac{\sqrt{1+x^2}}{x}$
- D. $\sqrt{1-x^2}$

Q4. $\cos^{-1}\left(\cos\frac{7\pi}{6}\right)$ is equal to

[Hots; Delhi 2011, 2009; All India 2009]

- A. $\frac{7\pi}{6}$
- B. $\frac{5\pi}{6}$
- C. $\frac{\pi}{3}$
- D. $\frac{\pi}{6}$

Q5. If $\sec^{-1}\sqrt{1+x^2} + \operatorname{cosec}^{-1}\frac{\sqrt{1+y^2}}{y} + \cot^{-1}\frac{1}{z} = \pi$, then $x + y + z$ is equal to

- A. xyz
- B. $2xyz$
- C. xyz^2
- D. x^2yz

Q6. $2\cos^{-1}x = \cos^{-1}(2x^2 - 1)$ holds true if

- A. $|x| \leq 1$
- B. $0 \leq x \leq 1$
- C. $|x| < \frac{1}{2}$
- D. None of these

Q7. $\tan(\sin^{-1} x)$ is equal to

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

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

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

D. None of these

Q8. $\cos^{-1}\left(\cos\left(-\frac{\pi}{3}\right)\right)$ is equal to

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

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

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

D. None of these

Q9. If $\sin^{-1} x = \pi/6$, then $\cos^{-1} x$ is equal to

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

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

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

D. None of these

Q10. If $\theta = \tan^{-1} x$, then $\sin 2\theta$ is equal to

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

D. None of these

Q11. The range of $\tan^{-1} x$ is

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

Q12. $\cot(\cos^{-1}x)$ is equal to

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

D. None of these

Q13. $\cos(\tan^{-1}x)$ is equal to

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

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

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

D. None of these

Q14. If $x > 0$, then $\tan^{-1}x + \tan^{-1}\left(\frac{1}{x}\right)$ is equal to

A. 1

B. $\tan 1$

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

D. None of these

Q15. If $x \in [-1, 1]$ and $\sin^{-1}x = \frac{3\pi}{13}$, then $\cos^{-1}x$ is equal to

A. $\frac{10\pi}{13}$

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

C. $\frac{19\pi}{26}$

D. None of these

Q16. A solution of the equation $\tan^{-1}(1+x) + \tan^{-1}(1-x) = \frac{\pi}{2}$ is

- A. $x = 1$
- B. $x = -1$
- C. $x = 0$
- D. $x = \pi$

Q17. The value of $\sin^{-1} \left[\cot \left(\sin^{-1} \sqrt{\frac{2-\sqrt{3}}{4}} + \cos^{-1} \left(\frac{\sqrt{12}}{4} \right) + \sec^{-1}(\sqrt{2}) \right) \right]$ is

- A. 0
- B. $\frac{\pi}{4}$
- C. $\frac{\pi}{6}$
- D. $\frac{\pi}{2}$

Q18. **Directions:** The following question has four choices, out of which ONLY ONE is correct.
A function $f: \mathbb{R} \rightarrow \mathbb{R}$ describes a curve $y = f(x)$. A point $P(x, y)$ lies on the curve and satisfies

the equation $\tan^{-1} x + \tan^{-1} \left(\frac{1}{y} \right) = \tan^{-1} 3$ The number of asymptote(s) of the curve is (are)

- A. 0
- B. 1
- C. 2
- D. None of these

Q19. **Directions:** The answer to the following question is a single digit integer, ranging from 0 to 9. A polygon is obtained by joining the points (taken in order) on the curve

$$|y| = \left| \sin^{-1} \left(\frac{1+x^2}{2|x|} \right) \right|$$

and its area is recorded. Now another polygon is obtained by joining the midpoints of the sides of the above polygon taken in the same order and its area is also recorded. The process continued indefinitely. If A is the sum of all such areas, the value of

$$\left[\frac{A}{2} \right], \text{ where } [.] \text{ denotes g.i.f., is}$$

Q20. Write the principal value of $\left[\cos^{-1} \frac{\sqrt{3}}{2} + \cos^{-1} \left(-\frac{1}{2} \right) \right]$. [Delhi 2013C]

Q21. $\tan^{-1}(\sqrt{3}) - \cot^{-1}(-\sqrt{3})$. [All India 2013]

Q22. $\cos^{-1}\left(\frac{1}{2}\right) - 2 \sin^{-1}\left(-\frac{1}{2}\right)$. [Delhi 2012]

Q23. $\tan^{-1}\sqrt{3} - \sec^{-1}(-2)$. [All India 2012]

Q24. $\sin^{-1} \cdot \frac{\sqrt{3}}{2}$

Q25. If $\tan^{-1}(\sqrt{3}) + \cot^{-1}x = \frac{\pi}{2}$ then find the value of x. [All India 2010C]