



DALMIA HIGHER SECONDARY SCHOOL

DALMIAPURAM - 621651

Std : 12 MATHEMATICS

TIME: 1.50HRS

CHAPTER - 4 TEST -1

MARKS : 50

**2 MARKS : ANSWERS ANY 8 Q      8 X 2 = 16**

1. Find the principal value of  $\sin^{-1}\left(\frac{-1}{2}\right)$  (in radians and degrees).
2. Find the principal value of  $\sin^{-1}(2)$ , if it exists.
3. Find  $\cos^{-1}\left(\cos\left(\frac{7\pi}{6}\right)\right)$
4. Find the principal value of  $\tan^{-1}(\sqrt{3})$
5. Find  $\tan^{-1}(-\sqrt{3})$
6. Find the principal value of  $\operatorname{cosec}^{-1}(-1)$
7. Find the value of  $\sec^{-1}\left(-\frac{2\sqrt{3}}{3}\right)$
8. If  $\cot^{-1}\left(\frac{1}{7}\right) = \theta$ , find the value of  $\cos \theta$ .
9. Simplify (i)  $\cos^{-1}\left(\left(\frac{13\pi}{3}\right)\right)$
10. Simplify  $\sec^{-1}\left(\sec\left(\frac{5\pi}{3}\right)\right)$
11. Find the period and amplitude of  $y = \sin 7x$
12. Find the period and amplitude of  $y = -4\sin(-2x)$ .

**3 MARKS : ANSWERS ANY 8 Q      8 X 3 = 24**

13. Find the domain of  $\sin^{-1}(2 - 3x^2)$
  14. Find the domain of  $\cos^{-1}\left(\frac{2+\sin x}{3}\right)$
  15. Show that  $\cot^{-1}\left(\frac{1}{\sqrt{x^2-1}}\right) = \sec^{-1} x$ ,  $|x| > 1$ .
  16. Prove that  $\frac{\pi}{2} \leq \sin^{-1} x + 2\cos^{-1} x \leq \frac{3\pi}{2}$ .
  17. Prove that  $\tan(\sin^{-1} x) = \frac{x}{\sqrt{1-x^2}}$  for  $|x| < 1$ .
  18. Evaluate  $\sin\left[\sin^{-1}\left(\frac{3}{5}\right) + \sec^{-1}\left(\frac{5}{4}\right)\right]$
  19. Solve  $\sin^{-1} x > \cos^{-1} x$ .
  20. Solve  $\tan^{-1} 2x + \tan^{-1} 3x = \frac{\pi}{4}$ , if  $6x^2 < 1$ .
  21. Solve  $\tan^{-1}\left(\frac{x-1}{x-2}\right) + \tan^{-1}\left(\frac{x+1}{x+2}\right) = \frac{\pi}{4}$
  22. Find the value of  $\sin^{-1}\left(\sin\frac{5\pi}{9}\cos\frac{\pi}{9} + \cos\frac{5\pi}{9}\sin\frac{\pi}{9}\right)$
- 5 MARKS : ANSWERS ANY 2 Q      2 X 5 = 10**
23. Solve:  $\cos\left(\sin^{-1}\left(\frac{x}{\sqrt{1+x^2}}\right)\right) = \sin\left(\cot^{-1}\left(\frac{3}{4}\right)\right)$ .
  24. Solve: (i)  $2\tan^{-1}(\cos x) = \tan^{-1}(2\operatorname{cosec} x)$   
(ii)  $\cot^{-1} x - \cot^{-1}(x+2) = \frac{\pi}{12}$ ,  $x > 0$
  25. Find the number of solution of the equation  $\tan^{-1}(x-1) + \tan^{-1} x + \tan^{-1}(x+1) = \tan^{-1}(3x)$
  26. Draw the graph of  $\tan x$  in  $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$  and  $\tan^{-1} x$  in  $(-\infty, \infty)$
  27. Draw the graph of  $\cos x$  in  $[0, \pi]$  and  $\cos^{-1} x$  in  $[-1, 1]$



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CHAPTER - 4 TEST - 2

MARKS : 50

**2 MARKS : ANSWERS ANY 8 Q 8 X 2 = 20**

- Find the value of  $\sin^{-1}\left(\sin\left(\frac{2\pi}{3}\right)\right)$
- Find the value of  $\sin^{-1}\left(\sin\left(\frac{5\pi}{4}\right)\right)$
- State the reason for  $\cos^{-1}\left[\cos\left(-\frac{\pi}{6}\right)\right] \neq -\frac{\pi}{6}$
- Is  $\cos^{-1}(-x) = \pi - \cos^{-1}(x)$ ? Justify your answer.
- Find the principal value of  $\cos^{-1}\left(\frac{1}{2}\right)$
- Find the value of  $2\cos^{-1}\left(\frac{1}{2}\right) + \sin^{-1}\left(\frac{1}{2}\right)$
- Find the value of  $\cos^{-1}\left(\frac{1}{2}\right) + \sin^{-1}(-1)$
- Find the value of  $\cos\left(\cos^{-1}\left(\frac{4}{5}\right) + \sin^{-1}\left(\frac{4}{5}\right)\right)$
- Find the domain of the following functions:  
 $\tan^{-1}(\sqrt{9-x^2})$
- Find the value of  $\tan^{-1}\left(\tan\frac{5\pi}{4}\right)$
- Find the value of  $\tan\left(\cos^{-1}\left(\frac{1}{2}\right) - \sin^{-1}\left(-\frac{1}{2}\right)\right)$
- Find the value of  $\tan^{-1}(\sqrt{3}) - \sec^{-1}(-2)$

**3 MARKS : ANSWERS ANY 8 QUESTIONS 8 X 3 = 24**

- Find the value of  $\cos^{-1}\left(\cos\frac{\pi}{7}\cos\frac{\pi}{17} - \sin\frac{\pi}{7}\sin\frac{\pi}{17}\right)$
- Find the value of  $\cos^{-1}\left(\cos\left(\frac{4\pi}{3}\right)\right) + \cos^{-1}\left(\cos\left(\frac{5\pi}{4}\right)\right)$
- Find the value of  $\cos\left(\sin^{-1}\left(\frac{4}{5}\right) - \tan^{-1}\left(\frac{3}{4}\right)\right)$
- Find the value of  $\sin^{-1}(-1) - \cos^{-1}\left(\frac{1}{2}\right) + \cot^{-1}(2)$
- Find the value of  $\cot^{-1}(1) + \sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) - \sec^{-1}(-\sqrt{2})$
- Find the value of  $\sin^{-1}\left(\cos\left(\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)\right)\right)$
- Solve:  $\sin^{-1}\frac{5}{x} + \sin^{-1}\frac{12}{x} = \frac{\pi}{2}$

**5 MARKS : ANSWERS ANY 2 Q 2 X 5 = 10**

- Find the value of  $\tan^{-1}(-1) + \cos^{-1}\left(\frac{1}{2}\right) + \sin^{-1}\left(\frac{-1}{2}\right)$ .
- Evaluate:  $\sin\left[\sin^{-1}\left(\frac{3}{5}\right) + \sec^{-1}\left(\frac{5}{4}\right)\right]$
- If  $\cos^{-1}x + \cos^{-1}y + \cos^{-1}z = \pi$  and  $0 < x, y, z < 1$ , show that  $x^2 + y^2 + z^2 + 2xyz = 1$
- If  $a_1, a_2, a_3, \dots, a_n$  is an arithmetic progression with common difference  $d$ , prove that  $\tan\left[\tan^{-1}\left(\frac{d}{1+a_1a_2}\right) + \tan^{-1}\left(\frac{d}{1+a_2a_3}\right) + \dots + \tan^{-1}\left(\frac{d}{1+a_{n-1}a_n}\right)\right] = \frac{a_n - a_1}{1 + a_1a_n}$
- Solve  $\tan^{-1}\left(\frac{x-1}{x-2}\right) + \tan^{-1}\left(\frac{x+1}{x+2}\right) = \frac{\pi}{4}$ .