



# JAYAM TUITION CENTRE.

VETTAVALAM. TIRUVANNAMALAI-DT.

STD: 12  
SUB: MATHS  
MARKS: 25

## EXERCISE TEST - 12 (EX:4-5)

### 2 Mark Questions

5 X 2 = 10

- Solve :  $\tan^{-1} \left( \frac{x-1}{x-2} \right) + \tan^{-1} \left( \frac{x+1}{x+2} \right) = \frac{\pi}{4}$ .
- Solve :  $\cos \left( \sin^{-1} \left( \frac{x}{\sqrt{1+x^2}} \right) \right) = \sin \left\{ \cot^{-1} \left( \frac{3}{4} \right) \right\}$ .
- Find the value of the expression in terms of  $x$ , with the help of a reference triangle.  
 $\tan \left( \sin^{-1} \left( x + \frac{1}{2} \right) \right)$ .
- Prove that  $\frac{\pi}{2} \leq \sin^{-1} x + 2 \cos^{-1} x \leq \frac{3\pi}{2}$ .
- Evaluate  $\sin \left[ \sin^{-1} \left( \frac{3}{5} \right) + \sec^{-1} \left( \frac{5}{4} \right) \right]$ .

### 5 Mark Questions

3 X 5 = 15

- Prove that  
$$\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \tan^{-1} \left[ \frac{x+y+z-xyz}{1-xy-yz-zx} \right]$$
- If  $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = \pi$  and  $0 < x, y, z < 1$ , then 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  $d$ , then prove that  
$$\tan \left[ \tan^{-1} \left( \frac{d}{1+a_1 a_2} \right) + \tan^{-1} \left( \frac{d}{1+a_2 a_3} \right) + \dots + \tan^{-1} \left( \frac{d}{1+a_n a_{n-1}} \right) \right] = \frac{a_n - a_1}{1+a_1 a_n}$$