

General Directions For Students :Whatever be the notes provided , everything must be copied in the maths copy and then do the homework in the same copy

Chapter 2: Inverse Trigonometric Function (Part -4)

Topic : Exercise 2.2 (continued)

Q.12.iv) solve for x : $\cos(\sin^{-1} x) = \frac{1}{9}$

$$\cos(\sin^{-1} x) = \sqrt{1-x^2} = \frac{1}{9} \quad \because \cos(\sin^{-1} x) = \sqrt{1-x^2}$$

$$\Rightarrow \sqrt{1-x^2} = \frac{1}{9} \Rightarrow 1-x^2 = \frac{1}{81}$$

$$\Rightarrow x^2 = \frac{80}{81} \Rightarrow x = \pm \frac{4\sqrt{5}}{9} \quad \because |x| \leq 1$$

Q.13.i) Find the value of : $\sin(\sin^{-1} x + \cos^{-1} x)$, $|x| \leq 1$

$$\sin(\sin^{-1} x + \cos^{-1} x) = \sin \frac{\pi}{2} = 1 \quad \because \cos^{-1} x + \sin^{-1} x = \frac{\pi}{2}$$

15.ii) $\cos\left(\tan^{-1} \frac{3}{4}\right) = \cos\left(\cos^{-1} \frac{1}{\sqrt{1+\left(\frac{3}{4}\right)^2}}\right) \quad \because \tan^{-1} x = \cos^{-1} \frac{1}{\sqrt{1+x^2}}$

$$\Rightarrow \cos\left(\cos^{-1} \frac{1}{\sqrt{1+\frac{9}{16}}}\right) = \cos\left(\cos^{-1} \frac{1}{\sqrt{\frac{25}{16}}}\right)$$

$$\Rightarrow \cos\left(\cos^{-1} \frac{4}{5}\right)$$

$$\Rightarrow \frac{4}{5} \quad \because \cos(\cos^{-1} x) = x, |x| \leq 1$$

Q.16.ii) simplify: $\tan^{-1}\left(\frac{x}{\sqrt{1-x^2}}\right), |x| \leq 1$

Let $x = \sin y \Rightarrow \sin^{-1} x = y$

$$\text{so } \tan^{-1}\left(\frac{x}{\sqrt{1-x^2}}\right) = \tan^{-1}\left(\frac{\sin y}{\sqrt{1-\sin^2 y}}\right) = \tan^{-1}\left(\frac{\sin y}{\cos y}\right) = \tan^{-1}(\tan y)$$

$$\Rightarrow \tan^{-1}(\tan y) = y$$

$$\Rightarrow y = \sin^{-1} x$$

Homework:

Ex 2.2 Q.12.iii), vii), Q.13.ii), Q.15.i),Q.17ii)19.i)

Please note: Solutions of Q.11, Q.12.i),ii),v),vi), Q.16.i) , Q.17.iv) Q.19.ii) from Exercise 2.2 is discussed in the video link given to you with this assignment.