One Two academy | Inverse Trigonometry Functions

Maximum Mark: 25 **Mathematics** **Time: 50 minutes**

Choose the correct answer: **3 x 1 = 3**

1. If $\sin^{-1} x + \sin^{-1} y = \frac{\pi}{3}$, then $\cos^{-1} x + \cos^{-1} y$ is

(a) $\frac{2\pi}{3}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{6}$ (d) π

2. The domain of the function f(x) = $\sin^{-1}\sqrt{x-1}$ is

(a) [1,2] (b) [-1,1] (c) [0,1] (d) [-1,0]

3. The equation $\tan^{-1} x - \cot^{-1} x = \tan^{-1}(\frac{1}{\sqrt{3}})$ has

(a) no solution (b) unique solution (c) two solutions (d) infinite many solutions

Answer the following: **3 x 2 = 6**

4. Find the value of $\sec^{-1}\left(-\frac{2\sqrt{3}}{3}\right)$.

5. Find the value of $\sin^{-1}[\sin 5]$.

6. Write $\tan^{-1}\left(\frac{\cos x}{1-sinx}\right)$ in the simplest form.

Answer any two of the following: **2 x 3 = 6**

7. Prove that $\sin^{-1} x + \cos^{-1} x = \frac{\pi}{2}, x \in [-1,1]$

8. Find the value of $\cos^{-1}[\frac{1}{2}\cos^{-1}(\frac{1}{8})]$

9. Find the value of $\cos^{-1}\left(\boldsymbol{cos}\frac{\boldsymbol{\pi}}{\boldsymbol{7}}\ \boldsymbol{cos}\frac{\boldsymbol{\pi}}{\boldsymbol{17}} - \boldsymbol{sin}\frac{\boldsymbol{\pi}}{\boldsymbol{7}}\ \boldsymbol{sin}\frac{\boldsymbol{\pi}}{\boldsymbol{17}}\right)$.

Answer the following: **2 x 5 = 10**

10. Draw the graph of y = cos x in $[0, \pi]$ and hence draw the graph for y = $\cos^{-1} x$.

11. Prove that $\sin^{-1}\left(\frac{3}{5}\right) - \cos^{-1}\left(\frac{12}{13}\right) = \sin^{-1}\left(\frac{16}{65}\right)$.

OR

Solve: $\cot^{-1} x + \cot^{-1}(x+2) = \frac{\pi}{12}, x > 0$.

All the Best

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Answer Key attached in the next page !!!

This page is to prevent seeing answer key

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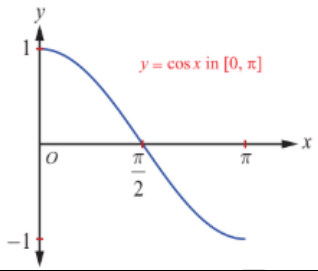
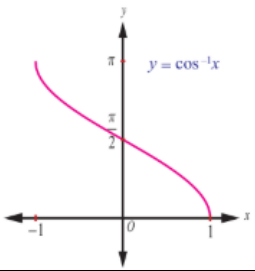
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Answer Key

Q.no	Solution	Marks
1.	(a) $\frac{2\pi}{3}$	**1**
2.	(a) [1,2]	**1**
3.	(b) unique soution	**1**
4.	$5\frac{\pi}{6}$	**2**
5.	$\boldsymbol{5-2\pi}$	**2**
6.	$\boldsymbol{\frac{\pi}{4}+\frac{x}{2}}$	**2**
7.	Here, $x\in[-1,1]$. Let $\sin^{-1}x=\theta$. Then $\theta\in\left[-\frac{\pi}{2},\frac{\pi}{2}\right]$ and $\sin\theta=x$. Note that $-\frac{\pi}{2}\le\theta\le\frac{\pi}{2}\Leftrightarrow 0\le\frac{\pi}{2}-\theta\le\pi$. So, $\cos\left(\frac{\pi}{2}-\theta\right)=\sin\theta=x$, which gives $\cos^{-1}x=\frac{\pi}{2}-\theta=\frac{\pi}{2}-\sin^{-1}x$. Hence, $\cos^{-1}x+\sin^{-1}x=\frac{\pi}{2}$, $\lvert x\rvert\le 1$.	**3**
8.	$\frac{3}{4}$	**3**
9.	$\frac{24\pi}{119}$.	**3**
10.	 x | y -1 | π $-\frac{\sqrt{2}}{2}$ | $\frac{3\pi}{4}$ 0 | $\frac{\pi}{2}$ $\frac{\sqrt{2}}{2}$ | $\frac{\pi}{4}$ 1 | 0 	**5**
11.	**Correct proof**	**5**
	OR	**5**
	$\boldsymbol{x=\sqrt{3}}$	