INVERSE TRIGONOMETRIC FUNCTIONS

PREVIOUS EAMCET BITS

1. $\cos^{-1}\left(\frac{-1}{2}\right)-2\sin^{-1}\left(\frac{1}{2}\right)+3\cos^{-1}\left(\frac{-1}{\sqrt{2}}\right)-4\tan^{-1}(-1)=$ **[EAMCET 2009]**

1) $\frac{19\pi}{12}$ 2) $\frac{35\pi}{12}$ 3) $\frac{47\pi}{12}$ 4) $\frac{43\pi}{12}$

Ans: 4

Sol. $\frac{2\pi}{3}-2\times\frac{\pi}{6}+3\times\frac{3\pi}{4}+4\times\frac{\pi}{4}=\frac{43\pi}{12}$

2. If $\sin^{-1}\left(\frac{3}{x}\right)+\sin^{-1}\left(\frac{4}{x}\right)=\frac{\pi}{2}$ then $x=$ **[EAMCET 2008]**

1) 3 2) 5 3) 7 4) 11

Ans: 2

Sol. $\sin^{-1}\left(\frac{3}{x}\right)+\sin^{-1}\left(\frac{4}{x}\right)=\frac{\pi}{2}\Rightarrow\sin^{-1}\frac{3}{x}=\cos^{-1}\frac{4}{x}$

$\Rightarrow\sin^{-1}\frac{3}{x}=\sin^{-1}\sqrt{1-\frac{16}{x^2}}\Rightarrow\frac{9}{x^2}=1-\frac{16}{x^2}\Rightarrow x^2=25$

3. The value of x where $x>0$ and $\tan\left(\sec^{-1}\left(\frac{1}{x}\right)\right)=\sin\left(\tan^{-1}2\right)$ is **[EAMCET 2007]**

1) $\sqrt{5}$ 2) $\frac{\sqrt{5}}{3}$ 3) 1 4) $\frac{2}{3}$

Ans: 2

Sol. $\tan\left(\sec^{-1}\frac{1}{x}\right)=\sin\left(\tan^{-1}2\right)$

$\tan\left(\tan^{-1}\frac{\sqrt{1-x^2}}{x}\right)=\sin\left(\sin^{-1}\frac{2}{\sqrt{5}}\right)$

$\Rightarrow\frac{\sqrt{1-x^2}}{x}=\frac{2}{\sqrt{5}}\Rightarrow x=\frac{\sqrt{5}}{3}$

4. $\sin^{-1}\frac{4}{5}+2\tan^{-1}\frac{1}{3}=$ **[EAMCET 2005]**

1) $\frac{\pi}{3}$ 2) $\frac{\pi}{4}$ 3) $\frac{\pi}{2}$ 4) 0

Ans: 3

Sol. $\sin^{-1}\frac{4}{5}+2\tan^{-1}\frac{1}{3}=\sin^{-1}\frac{4}{5}+\tan^{-1}\frac{3}{4}$

$=\sin^{-1}\frac{4}{5}+\cos^{-1}\frac{4}{5}=\frac{\pi}{2}$

5. $\sin^{-1}x+\sin^{-1}(1-x)=\cos^{-1}x\Rightarrow x\in$ **[EAMCET 2004]**

1) $\{1,0\}$ 2) $\{-1,1\}$ 3) $\left\{0,\frac{1}{2}\right\}$ 4) $\{2,0\}$

Ans: 3

Sol. $\sin^{-1}(1-x)=\frac{\pi}{2}-2\sin^{-1}(x)$

$1-x=1-2x^2 \Rightarrow x=0,\frac{1}{2}$

6. $\cos\left[\cos^{-1}\left(\frac{1}{7}\right)+\sin^{-1}\left(-\frac{1}{7}\right)\right]=$…….. **[EAMCET 2003]**

1) $-\frac{1}{3}$ 2) 0 3) $\frac{1}{3}$ 4) $\frac{4}{9}$

Ans: 2

Sol. $\cos\left[\cos^{-1}\left(-\frac{1}{7}\right)+\sin^{-1}\left(-\frac{1}{7}\right)\right]$

$=\cos\frac{\pi}{2}=0\left[\because\ \sin^{-1}x+\cos^{-1}x=\frac{\pi}{2}\right]$

7. If $\sin^{-1}x-\cos^{-1}x=\frac{\pi}{6}$, then x = **[EAMCET 2002]**

1) $\frac{1}{2}$ 2) $\frac{\sqrt{3}}{2}$ 3) $\frac{-1}{2}$ 4) $\frac{-\sqrt{3}}{2}$

Ans: 2

Sol. By verification $x=\sqrt{3}/2$

8. $\sec^2\left(\tan^{-1}2\right)+\cos ec^2\left(\cot^{-1}3\right)=$ **[EAMCET 2001]**

1) 5 2) 10 3) 15 4) 20

Ans: 3

Sol. Let $\tan^{-1}(2)=\alpha$ and $\cot^{-1}(3)=\beta$

$\tan\alpha=2;\ \cot\beta=3$

$\Rightarrow \sec\alpha=\sqrt{5};\cos ec\beta=\sqrt{10}$

$\therefore\ \sec^2\alpha+\cos ec^2\beta=5+10=15$

9. If $\tan^{-1}3+\tan^{-1}x=\tan^{-}8$, then x = **[EAMCET 2000]**

1) 5 2) 1/5 3) 5/14 4) 14/5

Ans: 2

Sol. $\tan^{-1}3+\tan^{-1}x=\tan^{-1}8$

$\frac{3+x}{1-3x}=8\Rightarrow x=\frac{1}{5}$