INVERSE TRIGONOMETRIC FUNCTIONS

PREVIOUS EAMCET BITS

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

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

    Ans: 4

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

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

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

    Ans: 2

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

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

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

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

    Ans: 2

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

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

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

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

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

    Ans: 3

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

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

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

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

Ans: 3

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

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

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

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

Ans: 2

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

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

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

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

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

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

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