The value of $\cos^{-1}\left(\cos\left(\frac{33\pi}{5}\right)\right)$ is

(a) $\frac{3\pi}{5}$ $\cos^{-1}\left[\cos\left\{6\pi + \frac{3\pi}{5}\right\}\right]$

(b) $\frac{-3\pi}{5}$

(c) $\frac{\pi}{10}$ $\cos^{-1}\left\{\cancel{\cos}\frac{3\pi}{5}\right\}$

(d) $\frac{-\pi}{10}$

$\frac{33 \times \cancel{180}^{36}}{\cancel{5}}$

$\frac{33 \times 36}{}$

$\frac{3 \times \cancel{180}^{36}}{\cancel{5}} = 108^\circ$ $(0, \pi)$

$\pi/2 - \cot^{-1} x + \frac{\pi}{2} - \cot^{-1} y = 4\pi/5$

If $\tan^{-1}x + \tan^{-1}y = \frac{4\pi}{5}$,

then $\cot^{-1}x + \cot^{-1}y$ equals

$\pi - \frac{4\pi}{5} = \cot^{-1} x + \cot^{-1} y$

(a) $\frac{\pi}{5}$ (b) $\frac{2\pi}{5}$

(c) $\frac{3\pi}{5}$ (d) π

$\pi/5$

The value of $\tan\left(\frac{1}{2}\cos^{-1}\frac{\sqrt{5}}{3}\right)$ is

(a) $\frac{3+\sqrt{5}}{2}$ $\tan\left[\frac{1}{2}\theta\right]$

(b) $\frac{3-\sqrt{5}}{2}$

(c) $\frac{\sqrt{5}}{6}$ $\tan\left(\theta/2\right)$

(d) None of these

$\cos^{-1}\frac{\sqrt{5}}{3} = \theta$ (let)

$\cos\theta = \frac{\sqrt{5}}{3}$

$\sin\theta = \sqrt{1-\frac{5}{9}} = \frac{2}{3}$

$\cos 2\theta = 1 - 2\sin^2\theta$

$2\sin^2\theta = 1 - \cos 2\theta$

$2\sin^2\theta/2 = 1 - \cos\theta$

$$\frac{\sin\theta/2}{\cos\theta/2} = \frac{2\times\sin\theta/2\times\sin\theta/2}{2\times\cos\theta/2\times\sin\theta/2} = \frac{2\sin^2\theta/2}{\sin\theta} = \frac{1-\cos\theta}{\sin\theta}$$

$$= \frac{1-\sqrt{5}/3}{2/3} = \frac{3-\sqrt{5}}{2}$$

$\tan^{-1}(x+1) + \tan^{-1}\left(\frac{1}{x-1}\right)$

$\cos\theta = B/H$

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If $\tan^{-1}(x+1) + \cot^{-1}(x-1) = \sin^{-1}\frac{4}{5} + \cos^{-1}\frac{3}{5}$, then x has the value :

$\Rightarrow \sin^{-1}\frac{4}{5} = \tan^{-1}\frac{4}{3}$

& $\cos^{-1}\frac{3}{5} = \tan^{-1}\frac{4}{3}$

$\cos\theta = \frac{3}{5} \begin{matrix}\to B \\ \to H\end{matrix} \Big] \to P = 4$

$\tan\theta = \frac{P}{B} = \frac{4}{3}$

$\sqrt{\frac{2\times 2\times 2\times 3\times 2}{7}}$

$4\sqrt{3/7}$

(a) $4\sqrt{\frac{3}{7}}$ (b) $4\sqrt{\frac{7}{3}}$

(c) $14\sqrt{3}$ (d) $6\sqrt{7}$

by Ans:- $\tan^{-1}\left[\frac{\frac{x+1}{1} + \frac{1}{x-1}}{1-(x+1)\left(\frac{1}{x-1}\right)}\right] = \left[\tan^{-1}\frac{4}{3} + \tan^{-1}\frac{4}{3} = 2\tan^{-1}\frac{4}{3} = \tan^{-1}\left(\frac{2\times 4/3}{1-16/9}\right)\right]$

$\cancel{\tan^{-1}}\left[\frac{x^2-\cancel{x}+\cancel{x}}{\cancel{x}-1-(\cancel{x}+1)}\right] = \cancel{\tan^{-1}}\left(\frac{8}{\cancel{3}}\times\frac{\cancel{9}\,3}{-7}\right) \Rightarrow \frac{x^2}{\cancel{-}2} = \frac{24}{\cancel{-}7} \Rightarrow x^2 = \frac{24\times 2}{7}$

$x = \sqrt{\frac{24\times 2}{7}}$

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$\cos(\cos^{-1}x + \cos^{-1}x + \sin^{-1}x)$

The value of $\cos\left(2\cos^{-1}x + \sin^{-1}x\right)$ at $x = \frac{1}{5}$ is

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

$\left[\cos[90+\theta] = -\sin\theta\right]$

(a) $-\frac{2\sqrt{6}}{5}$ (b) $-2\sqrt{6}$

$\sin^2\theta + \cos^2\theta = 1$

$-\sin\left[\sin^{-1}\sqrt{1-x^2}\right]$

$-\sqrt{1-x^2}$

(c) $-\frac{\sqrt{6}}{5}$ (d) None of these

$-\sqrt{1-\left(\frac{1}{5}\right)^2} = -\sqrt{1-\frac{1}{25}}$

$-\frac{\sqrt{2\times2\times2\times3}}{5}$

$-\frac{2}{5}\sqrt{6}$

$-\sqrt{\frac{24}{25}} = -\frac{\sqrt{24}}{5}$

Principal value of $\tan^{-1}1+\cos^{-1}\left(\frac{-1}{2}\right)+\sin^{-1}\left(\frac{-1}{2}\right)$ is equal to $\frac{\pi}{4}+\frac{2\pi}{3}-\frac{\pi}{6}=$

(a) $\frac{2\pi}{3}$

(b) $\frac{3\pi}{4}$

(c) $\frac{\pi}{2}$

(d) 6π

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The value of $\overset{A}{\tan^{-1}\left(\frac{1}{2}\right)} + \overset{B}{\tan^{-1}\left(\frac{1}{3}\right)}$ $= \tan^{-1}\left[\frac{\frac{1}{2}+\frac{1}{3}}{1-\frac{1}{2}\times\frac{1}{3}}\right] = \tan^{-1}\left[\frac{5/\cancel{6}}{\frac{6-1}{\cancel{6}}}\right]$

$+ \tan^{-1}\left(\frac{7}{8}\right)$ is

$\tan^{-1}\left[\cancel{5}/\cancel{5}\right]$

(a) $\tan^{-1}\left(\frac{7}{8}\right)$

(b) $\cot^{-1}(15)$

$\tan^{-1}(1) + \tan^{-1}(7/8)$

(c) $\tan^{-1}(15)$

(d) $\tan^{-1}\left(\frac{25}{24}\right)$

$\tan^{-1}\left[\frac{1+7/8}{1-1\cdot 7/8}\right]$

$\tan^{-1}\left[\frac{15/\cancel{8}}{1/\cancel{8}}\right]$

If $\tan^{-1}(x-1) + \tan^{-1}x + \tan^{-1}(x+1) = \tan^{-1}3x$, then the value of x are

(a) $\pm\frac{1}{2}$ $x = 0$

(b) $0, \frac{1}{2}$

(c) $0, -\frac{1}{2}$

(d) $0, \pm\frac{1}{2}$

$\Rightarrow \tan^{-1}(x-1) + \tan^{-1}(x+1) = \tan^{-1}3x - \tan^{-1}x$

$\Rightarrow \cancel{\tan^{-1}}\left[\frac{(x-\cancel{1})+(x+\cancel{1})}{1-(x-1)(x+1)}\right] = \cancel{\tan^{-1}}\left(\frac{3x-x}{1+3x \cdot x}\right)$

$\Rightarrow \frac{\cancel{2x}}{1-(x^2-1)} = \frac{\cancel{2x}}{1+3x^2} \Rightarrow \cancel{1}+3x^2 = 1-x^2+\cancel{1}$

$3x^2 = 1-x^2$

$4x^2 = 1$

$x^2 = 1/4$

$x = \pm 1/2$

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$$\cot^{-1}\left(\frac{ab+1}{a-b}\right)+\cot^{-1}\left(\frac{bc+1}{b-c}\right)+\cot^{-1}\left(\frac{ca+1}{c-a}\right)$$

is equal to ...

(a) 0

(b) $\frac{\pi}{4}$

(c) 1

(d) 5

$$\tan^{-1}\left(\frac{a-b}{1+ab}\right)+\tan^{-1}\left(\frac{b-c}{1+bc}\right)+\tan^{-1}\left(\frac{c-a}{1+ca}\right)$$

$$\cancel{\tan^{-1}a}-\cancel{\tan^{-1}b}+\cancel{\tan^{-1}b}-\cancel{\tan^{-1}c}+\cancel{\tan^{-1}c}-\cancel{\tan^{-1}a}$$

If $A = \tan^{-1}\left(\dfrac{x\sqrt{3}}{2k-x}\right)$ and $B = \tan^{-1}\left(\dfrac{2x-k}{k\sqrt{3}}\right)$,

then the value of A–B is

(a) 10°

(b) 45°

(c) 60°

(d) 30°

$\tan^{-1}\left(\frac{1}{\sqrt{3}}\right) = \tan^{-1}[\tan 30] = 30°$ Ans

$$\tan^{-1}\left(\frac{x\sqrt{3}}{2k-x}\right) - \tan^{-1}\left(\frac{2x-k}{k\sqrt{3}}\right)$$

$$\Rightarrow \tan^{-1}\left[\frac{\dfrac{x\sqrt{3}}{2k-x} - \dfrac{2x-k}{k\sqrt{3}}}{1 + \dfrac{x\sqrt{3}}{2k-x} \times \dfrac{(2x-k)}{k\sqrt{3}}}\right]$$

$$\Rightarrow \tan^{-1}\left[\frac{x\sqrt{3}\cdot k\sqrt{3} - (2k-x)(2x-k)}{(2k-x)k\sqrt{3} + x\sqrt{3}(2x-k)}\right]$$

$$\Rightarrow \tan^{-1}\left[\frac{3xk - [4kx - 2k^2 - 2x^2 + kx]}{2\sqrt{3}k^2 - kx\sqrt{3} + 2\sqrt{3}x^2 - kx\sqrt{3}}\right]$$

$$\Rightarrow \tan^{-1}\left[\frac{-2kx + 2k^2 + 2x^2}{-2\sqrt{3}kx + 2\sqrt{3}k^2 + 2\sqrt{3}x^2}\right]$$

$$\tan^{-1}\left[\frac{\cancel{2}\,\cancel{[-kx + k^2 + x^2]}}{\cancel{2}\sqrt{3}\,\cancel{[-kx + k^2 + x^2]}}\right]$$