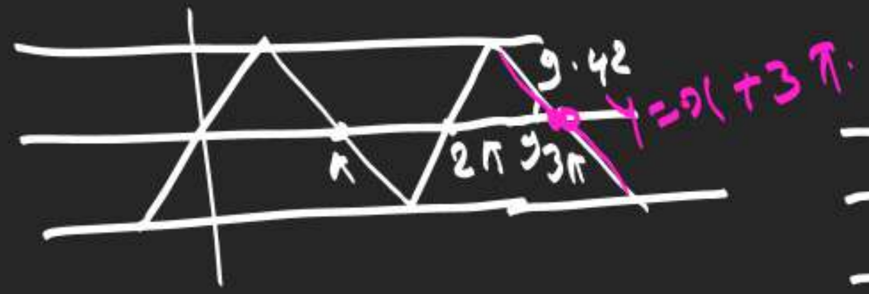
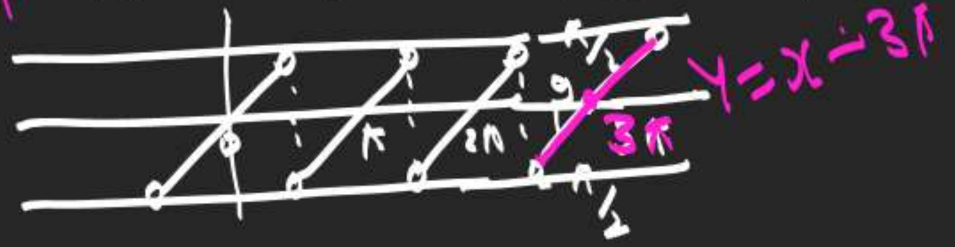
Nishant Jindal

Q. If $x^2+2x+n > \sin^{-1}(\sin 9) + \tan^{-1}(\tan 9) + 10$ for all real x then n can be.



11 12 13 14.



$$x^2+2x+n > -\cancel{9}+\cancel{3\pi}+\cancel{9}-\cancel{3\pi}+10$$

$$x^2+2x+n-10>0 \rightarrow QE>0$$

$$D<0$$

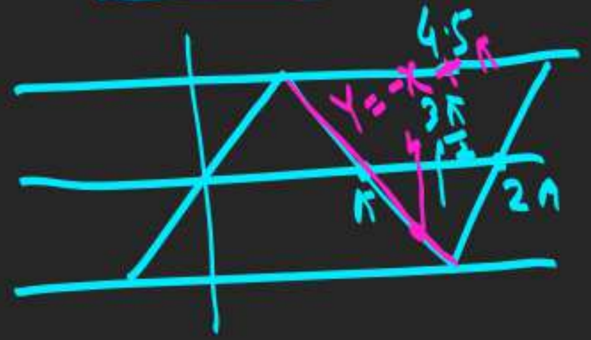
$$(2)^2-4\times1\times(n-10)<0$$

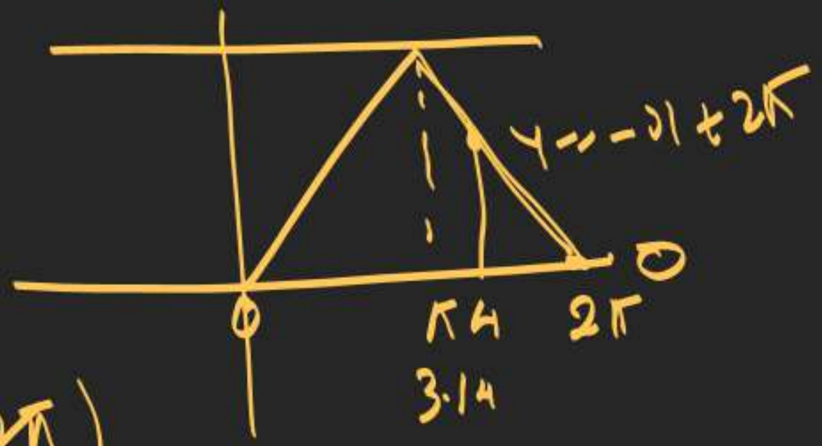
$$1-n+10<0$$

$$n>11$$

Nishant Jindal

Q $3x^2+8x < 2\sin^{-1}(\sin 4) - \cos^{-1}(\cos 4)$ find Integral sol. ?





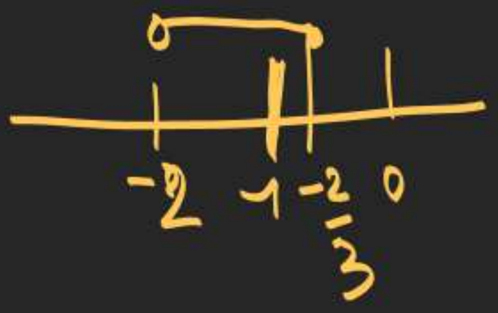
$$3x^2+8x < 2(-4+\pi) - (-4+2\pi)$$

$$3x^2+8x < -4$$

$$3x^2+8x+4 < 0$$

$$3x^2+6x+2x+4 < 0$$

$$(3x+2)(x+2) < 0$$



$$-\frac{2}{3} < x < -2 \Rightarrow x = -1 \text{ is the only Integer.}$$

Nishant Jindal

Q $\sin^{-1}\left(\sin\frac{33\pi}{7}\right)+\cos^{-1}\left(\cos\frac{46\pi}{7}\right)=\frac{a\pi}{b}$ find $|a-b|=?$

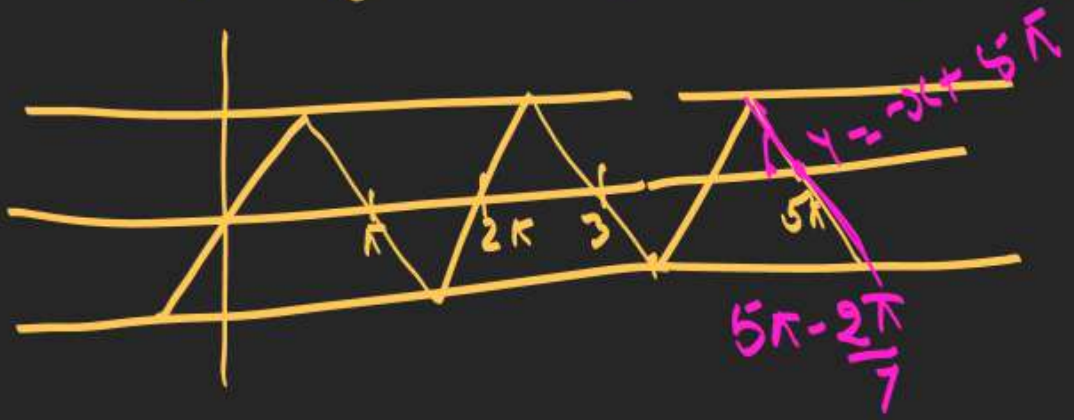
$\frac{49\pi-3\pi}{7}=7\pi-\frac{3\pi}{7}$

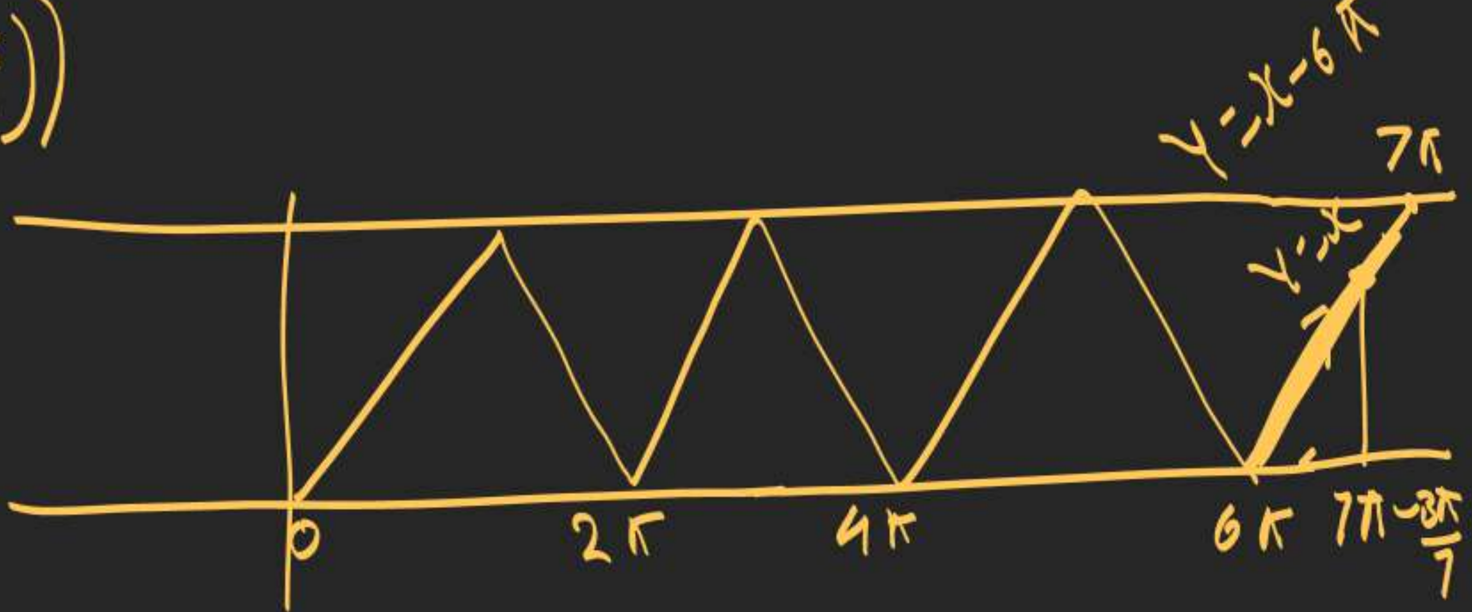
$a=6,\ b=7$

$|6-7|=1$

$\sin^{-1}\left(\sin\left(\frac{35\pi-2\pi}{7}\right)\right)+\cos^{-1}\left(\cos\left(\frac{42\pi+4\pi}{7}\right)\right)$

$\sin^{-1}\left(\sin\left(5\pi-\frac{2\pi}{7}\right)\right)+\cos^{-1}\left(\cos\left(7\pi-\frac{3\pi}{7}\right)\right)$





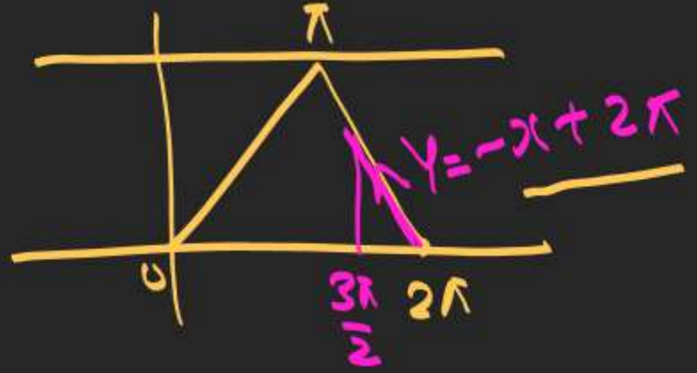
$-\frac{33\pi}{7}+5\pi+\frac{46\pi}{7}-6\pi$

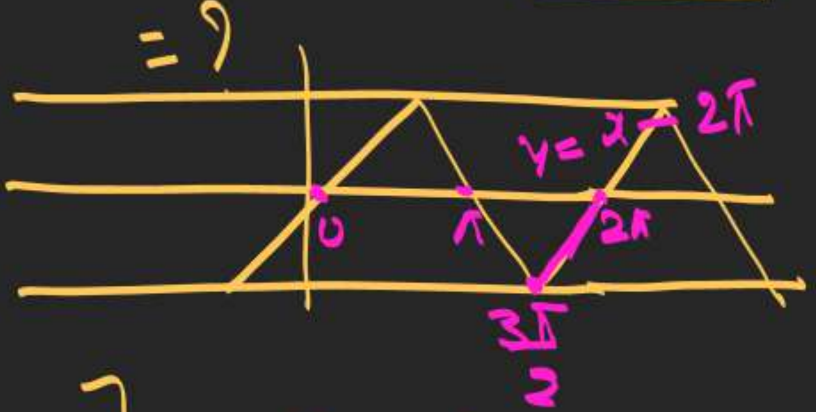
$-\pi-\frac{33\pi}{7}+\frac{46\pi}{7}=-\pi+\frac{46\pi-33\pi}{7}=-\pi+\frac{13\pi}{7}=\frac{-7\pi+13\pi}{7}$

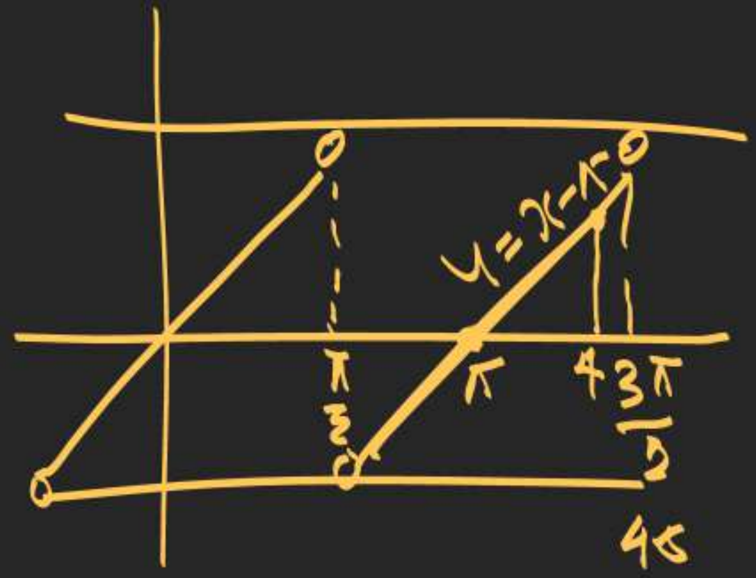
$=\frac{6\pi}{7}=\frac{a\pi}{b}$

Q $\sin^{-1}\left[\cos\left(\boxed{\cos^{-1}(\cos x)} + \sin^{-1}(\sin x)\right)\right]$; $x \in \left(\frac{3\pi}{2}, 2\pi\right)$

$= ?$







Khtam Nasht

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

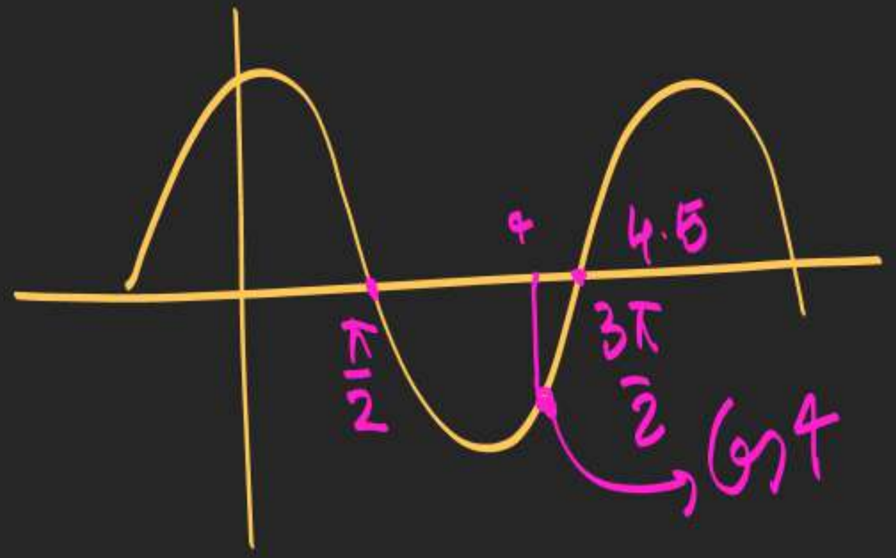
40%

Q $\cos(\tan^{-1}(\tan 4))$ is +ve or -ve?

$\cos(4-\pi) = \cos(\pi-4) = -\cos 4$

$= -(-ve)$

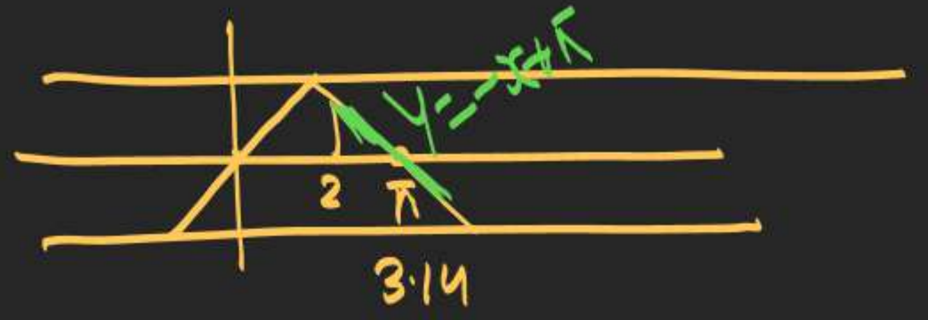
$= +ve$



Nishant Jindal

$x \in (-1,1)$

Q Solve $\sin\left(f_m\left(\boxed{\frac{2x^2+4}{1+x^2}}\right)\right) < \pi - 3$.



Kai Bar $T^{-1}(T(\ ))$ me Andar x Nhi dia Jata. Kabhi Kabhi fxn de dete hain tab fxn ki Range Nikale aur $T^{-1}(T(\ ))$ ki value find karen.

$$\frac{2x^2+4}{1+x^2} = \frac{2x^2+2+2}{1+x^2} = \frac{2(1+x^2)+2}{1+x^2} = \frac{2\cancel{(1+x^2)}}{\cancel{1+x^2}} + \frac{2}{1+x^2} = 2 + \frac{2}{1+x^2}$$

$$-\frac{2x^2+4}{1+x^2} + \cancel{\pi} < \cancel{\pi} - 3$$

$$\frac{2x^2+4}{1+x^2} > 3 \Rightarrow 2x^2+4 > 3+3x^2$$

$$x^2 - 1 < 0$$

$$(x-1)(x+1) < 0$$

$$-1 < x < 1$$

$$0 \le x^2 < \infty$$

$$1 \le 1+x^2 < \infty$$

$$1 \geq \frac{1}{1+x^2} > 0$$

$$2 \geq \frac{2}{1+x^2} > 0$$

$$4 \geq 2 + \frac{2}{1+x^2} > 2$$

$$\frac{2x^2+4}{1+x^2} \in (2,4]$$

Q $\sin^{-1}\left(\cos\left(\frac{2x^2+10|x|+6-2}{\underbrace{x^2+5|x|+3}_{}}\right)\right) = \cot\left(\cot^{-1}\left(\frac{2-18|x|}{9|x|}\right)\right)+\frac{\pi}{2}$ fnd x?

Adv

$\left[\frac{4}{3}, 2\right)$

Trigo (InverseTrigo)

$\cot(\cot^{-1}(x)) = x$

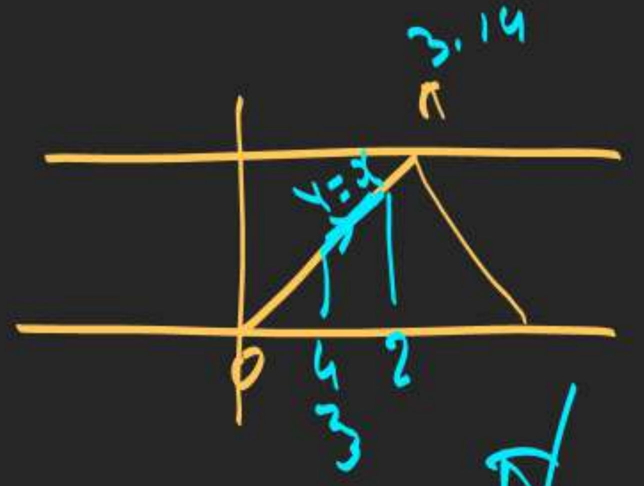
JJHSJJH

$$\frac{\pi}{2} - \cos^{-1}\left(\cos\left(\frac{2(\cancel{x^2+5|x|+3})}{\cancel{x^2+5|x|+3}} - \frac{2}{x^2+5|x|+3}\right)\right)$$

$$\frac{\pi}{2} - \cos^{-1}\left(\cos\left(2-\frac{2}{x^2+5|x|+3}\right)\right)$$

$\geq 0 + \geq 0 + 3$

≥ 3



$\infty > x^2+5|x|+3 \geq 3.$

$0 < \frac{2}{x^2+5|x|+3} \leq \frac{2}{3}$

$0 > \frac{-2}{x^2+5|x|+3} \geq -\frac{2}{3}$

$2 > 2 - \frac{2}{x^2+5|x|+3} \geq \frac{4}{3}$

$$\cancel{\frac{\pi}{2}} - \left(\cancel{2} - \frac{2}{x^2+5|x|+3}\right) = \frac{2}{9|x|} - \cancel{2} + \cancel{\frac{\pi}{2}}$$

$x^2+5|x|+3 = 9|x| \Rightarrow |x|^2-4|x|+3=0$

$(|x|-3)(|x|-1)=0$

$|x|=1, \ |x|=3$

$x=+1,-1,3,-3$

Nishant Jindal

Adv Material.

When $T^{-1}(T)$ has algebric Expression Inside.

$[0,\frac{\pi}{2}] = [0,\frac{\pi}{2}] \to 1 \quad 0$

Q. $\cos^{-1}(2x^2-1) = \begin{cases} 2\cos^{-1}x & 0\le x\le 1 \\ 2\pi - 2\cos^{-1}x & -1\le x<0 \end{cases}$ P.T.

Algebric Exp → feel → $x=\cos\theta \Rightarrow \theta=\cos^{-1}x \to \boxed{0\le\theta\le\pi}$

$LHS = \cos^{-1}(2x^2-1)$

$= \cos^{-1}(2\cos^2\theta-1)$

$= \cos^{-1}(\cos 2\theta)$

$0\le\theta\le\pi$

$0\le 2\theta\le 2\pi$

$0\le 2\theta\le\pi$

$0\le\theta\le\frac{\pi}{2}$

$0\le\cos^{-1}x\le\frac{\pi}{2}$

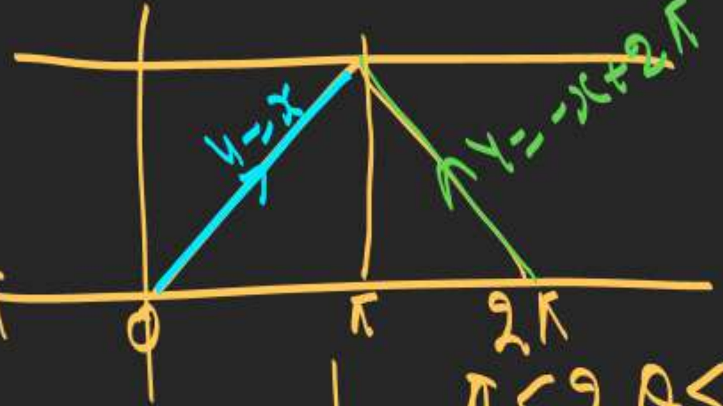
$1\ge x\ge 0$

$Y=2\theta$

$Y=2\cos^{-1}x$

$Y=-2\theta+2\pi$

$Y=-2\cos^{-1}x+2\pi$



$\pi<2\theta\le 2\pi$

$\frac{\pi}{2}<\theta\le\pi$

$\frac{\pi}{2}<\cos^{-1}x\le\pi$

$\boxed{0>x\ge -1}$

Nishant Jindal

Q $\sin^{-1}\left(\frac{2x}{1+x^2}\right) = \begin{cases} -\pi - 2\tan^{-1}x & x<-1 \\ 2\tan^{-1}x & -1\le x\le 1 \\ \pi - 2\tan^{-1}x & x>1 \end{cases}$ P.T.

$-\frac{\pi}{4} \le \tan^{-1}x \le \frac{\pi}{4}$

$-1 \le x \le 1$

ITF me Algebric

$\frac{2x}{1+x^2} \rightarrow$ let

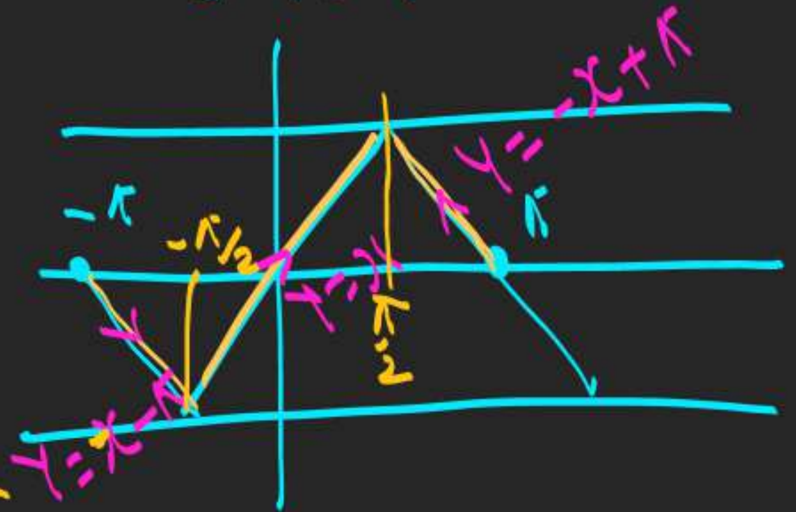
1) $x = \tan\theta \Rightarrow \theta = \tan^{-1}x \in -\frac{\pi}{2} < \theta < \frac{\pi}{2}$

2) $y = \sin^{-1}\left(\frac{2x}{1+x^2}\right) = \sin^{-1}\left(\frac{2\tan\theta}{1+\tan^2\theta}\right)$

$= \sin^{-1}(\sin 2\theta)$

$-\frac{\pi}{2} < \theta < \frac{\pi}{2}$

$-\pi < 2\theta < \pi$



$y = -2\theta - \pi$	$y = 2\theta$	$y = -2\theta + \pi$
$y = -\pi - 2\tan^{-1}x$	$y = 2\tan^{-1}x$	$y = -2\tan^{-1}x + \pi$
$-\pi < 2\theta < -\frac{\pi}{2}$	$-\frac{\pi}{2} \le 2\theta \le \frac{\pi}{2}$	$\frac{\pi}{2} < 2\theta < \pi$
$-\frac{\pi}{2} < \theta < -\frac{\pi}{4}$	$-\frac{\pi}{4} \le \theta \le \frac{\pi}{4}$	$\frac{\pi}{4} < \theta < \frac{\pi}{2}$
$x < -1$	$-1 \le x \le 1$	$x > 1$

Nishant Jindal

Q. $\sin^{-1}(3x-4x^3) = \begin{cases} -\pi - 3\sin^{-1}x & -1 \le x \le -\frac{1}{2} \\ 3\sin^{-1}x & -\frac{1}{2} \le x \le \frac{1}{2} \\ \pi - 3\sin^{-1}x & \frac{1}{2} \le x \le 1 \end{cases}$ P.T

(1) $\underline{x = \sin\theta} \rightarrow \theta = \sin^{-1}x \rightarrow -\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$

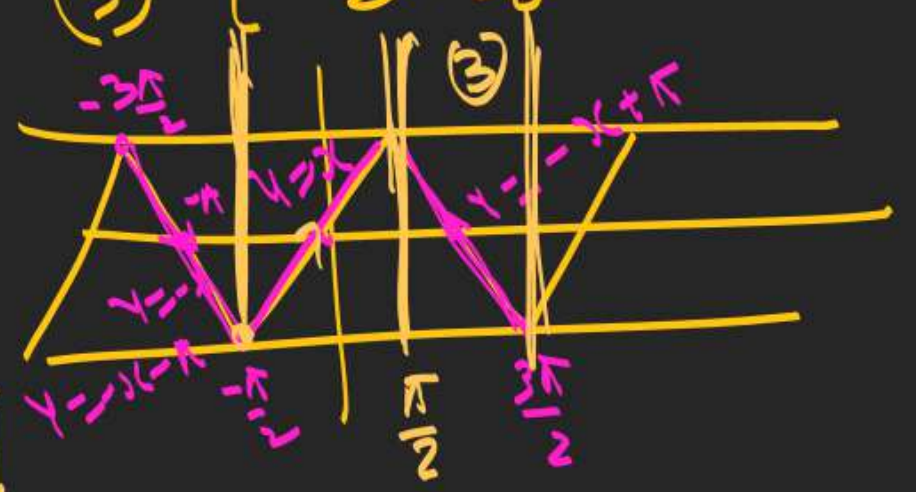
(2) $y = \sin^{-1}(3\sin\theta - 4\sin^3\theta)$

$= \sin^{-1}(\sin 3\theta)$

$-\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$

$-\frac{3\pi}{2} \le 3\theta \le \frac{3\pi}{2}$

(3) $\left[-\frac{3\pi}{2}, \frac{3\pi}{2}\right]$ k bich $\sin^{-1}(\sin x)$ का graph



(4)

$y = -3\theta - \pi$ $y = -3\sin^{-1}x - \pi$	$y = 3\theta$ $y = 3\sin^{-1}x$	$y = -3\theta + \pi$ $y = \pi - 3\sin^{-1}x$

5)

$-\frac{3\pi}{2} \le 3\theta \le -\frac{\pi}{2}$ $-\frac{\pi}{2} \le \theta \le -\frac{\pi}{6}$ $-1 \le x \le -\frac{1}{2}$	$-\frac{\pi}{2} \le 3\theta \le \frac{\pi}{2}$ $-\frac{\pi}{6} \le \theta \le \frac{\pi}{6}$ $-\frac{1}{2} \le x \le \frac{1}{2}$	$\frac{\pi}{2} \le 3\theta \le \frac{3\pi}{2}$ $\frac{\pi}{6} \le \theta \le \frac{\pi}{2}$ $\frac{1}{2} \le x \le 1$

Nishant Jindal

Q a, b find out if $x\in\left[-1,-\frac{1}{2}\right]$ & $\sin^{-1}(3x-4x^3)+\cos^{-1}(4x^3-3x)=a\cos^{-1}x+b$.

$\cos^{-1}(-x)=\pi-\cos^{-1}x$.

1) When 2 diff. algebric fxn are given try to make them L.

$$\frac{\pi}{2}-\cos^{-1}(3x-4x^3)+\cos^{-1}(4x^3-3x)$$

$$\frac{\pi}{2}-\cos^{-1}(-(4x^3-3x))+\cos^{-1}(4x^3-3x)$$

$$\frac{\pi}{2}-\left(\pi-\cos^{-1}(4x^3-3x)\right)+\cos^{-1}(4x^3-3x)$$

$$-\frac{\pi}{2}+2\cos^{-1}(4x^3-3x)$$

$a=6,\ b=-\frac{9\pi}{2}$

Adv

2) $x=\cos\theta \Rightarrow \boxed{\theta=\cos^{-1}x} \Rightarrow 0\le\theta\le\pi$

3) $y=-\frac{\pi}{2}+2\cos^{-1}(4\cos^3\theta-3\cos\theta)$

$$=-\frac{\pi}{2}+2\boxed{\cos^{-1}(\cos 3\theta)}$$

$$=-\frac{\pi}{2}+2(3\theta-2\pi)$$

$$6\cos^{-1}x-\frac{9\pi}{2}$$

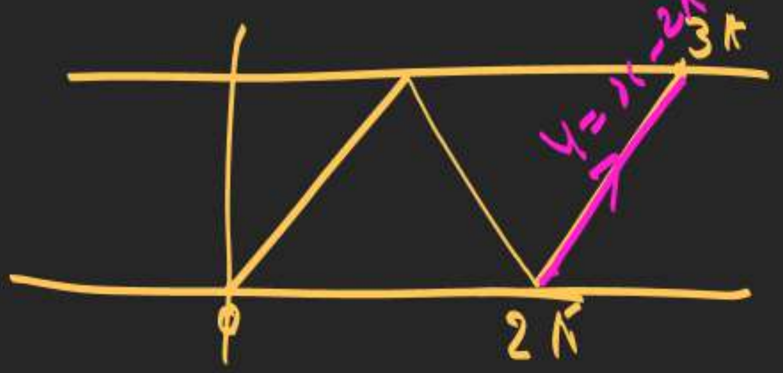
Qs me

$-1\le x\le -\frac{1}{2}$

$-1\le\cos\theta\le-\frac{1}{2}$

$\pi\ge\theta\ge\frac{2\pi}{3}$

$3\pi\ge 3\theta\ge 2\pi$



Adv

Q $\alpha = 2\tan^{-1}\left(\frac{1+x}{1-x}\right)$ & $\beta = \sin^{-1}\left(\frac{1-x^2}{1+x^2}\right)$

then S.T. $\alpha+\beta=\pi$ if $0<x<1$

Limit

35 Min

① α के लिए

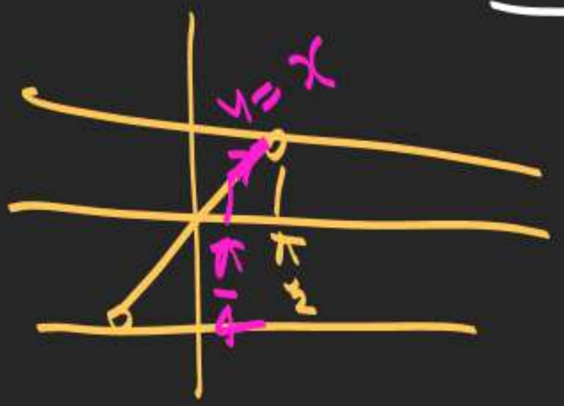
$x=\tan\theta$

$$\alpha = 2\tan^{-1}\left(\frac{1+\tan\theta}{1-\tan\theta}\right)$$

$$=2\left(\tan^{-1}\left(\tan\left(\frac{\pi}{4}+\theta\right)\right)\right)$$

$$0<\theta<\frac{\pi}{4}$$

$$\frac{\pi}{4}<\frac{\pi}{4}+\theta<\frac{\pi}{2}$$



$$\alpha = 2\left(\frac{\pi}{4}+\theta\right)=\frac{\pi}{2}+2\theta$$

β के लिए

$x=\tan\theta$

$$\beta = \sin^{-1}\left(\frac{1-\tan^2\theta}{1+\tan^2\theta}\right)$$

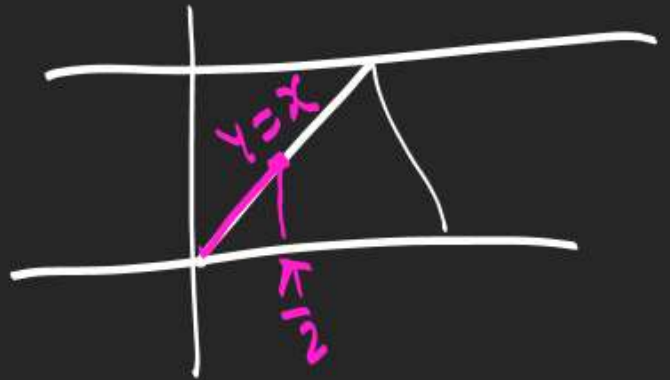
$$=\sin^{-1}(\cos 2\theta)$$

$$\beta = \frac{\pi}{2}-\cos^{-1}(\cos 2\theta)$$

$$0<\theta<\frac{\pi}{4}$$

$$0<2\theta<\frac{\pi}{2}$$

$$\beta = \frac{\pi}{2}-2\theta$$



$$\alpha = \frac{\pi}{2}+2\theta$$

$$\beta = \frac{\pi}{2}-2\theta$$

$$\alpha+\beta=\pi$$

② Sub

$$0<x<1$$

$$0<\tan\theta<1$$

$$0<\theta<\frac{\pi}{4}$$