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Where Minds Pollinate

Class 12
Mathematics

Chapter 8
Exercise 8.2
Handwritten Solution

Follow Our Socials



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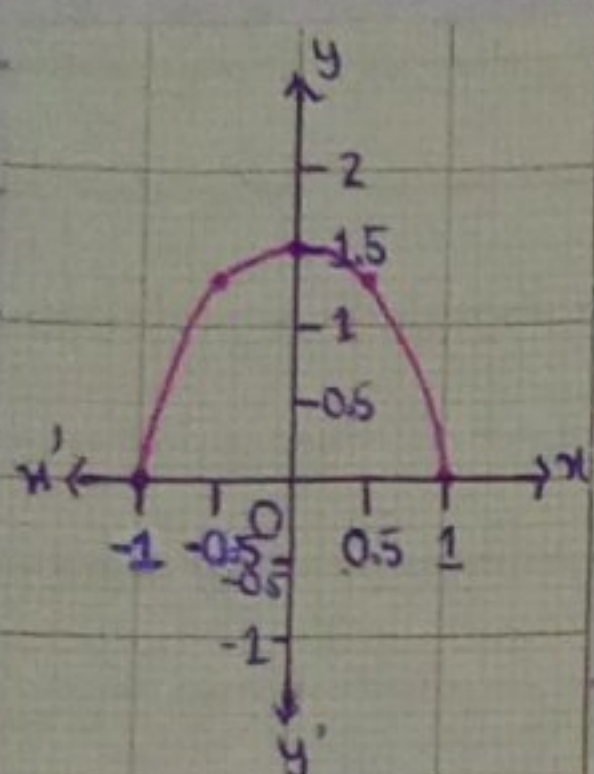
Exercise 8.2

Q1

(i) $y = \cos^{-1}(x^2)$ for $x \in [-1, 1]$

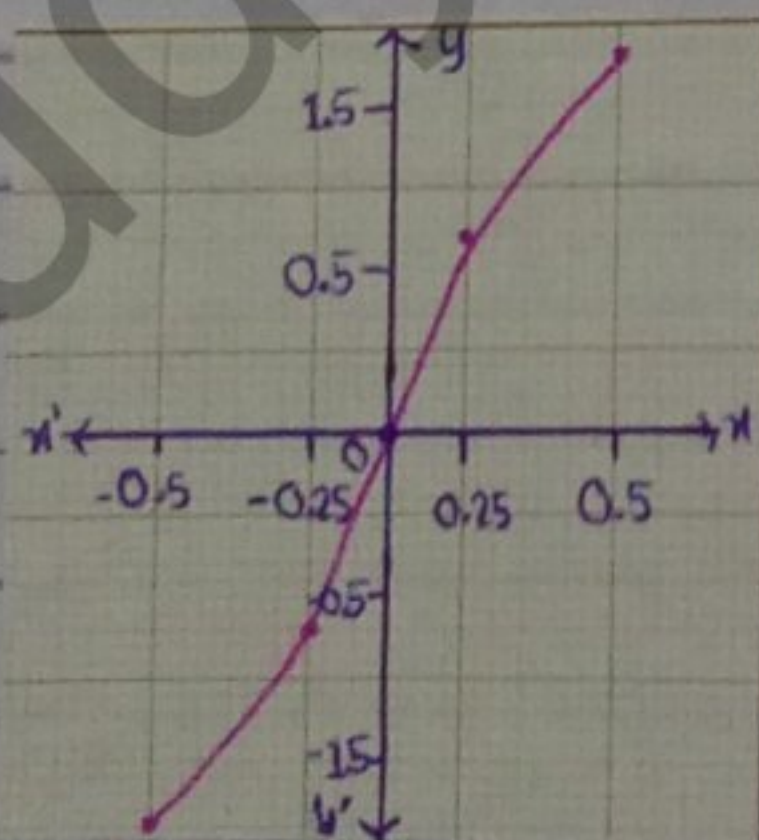
x	-1	-0.5	0	0.5	1
y	0	1.32	1.57	1.32	0

1st - Set calc to Radian
2nd - Fix calc to 2d.p
3rd - $\cos^{-1}((-1)^2)$ write like this in the calc



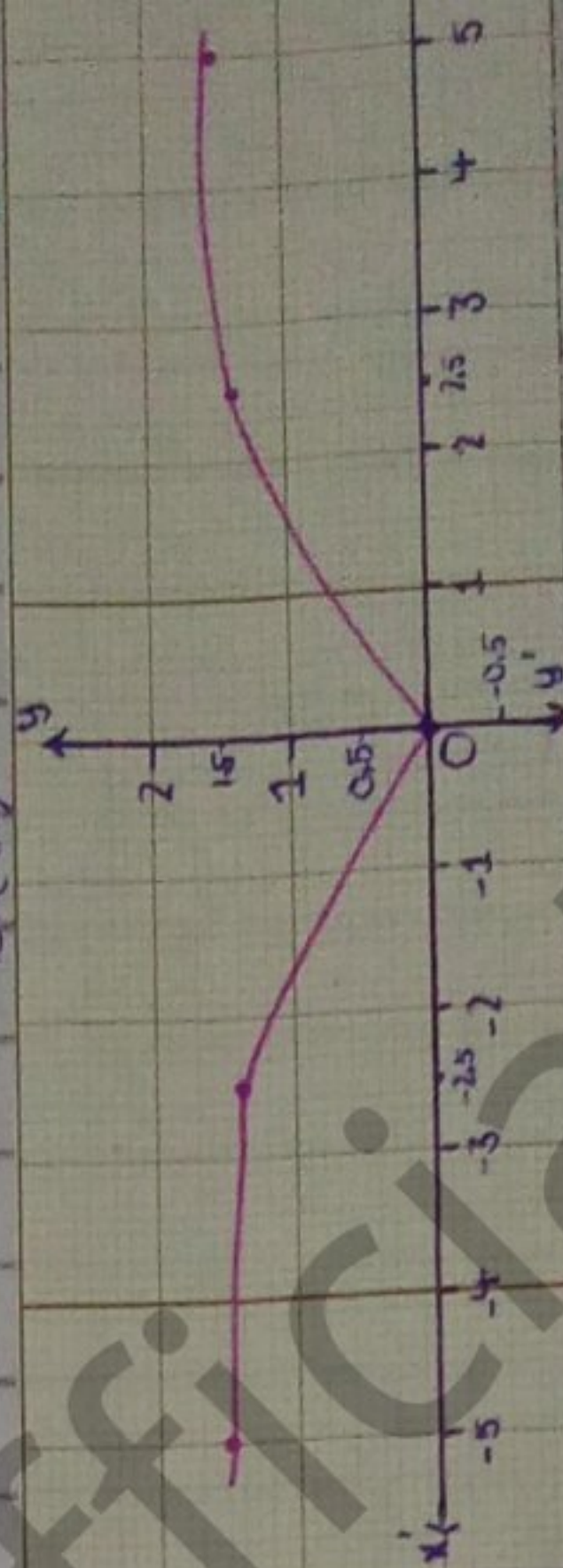
(ii) $y = \sin^{-1}(2x)$ for $x \in [-\frac{1}{2}, \frac{1}{2}]$

x	-0.5	-0.25	0	0.25	0.5
y	-1.57	-0.52	0	0.52	1.57



(iii) $y = \tan^{-1}(x^2)$ for $x \in \mathbb{R}$

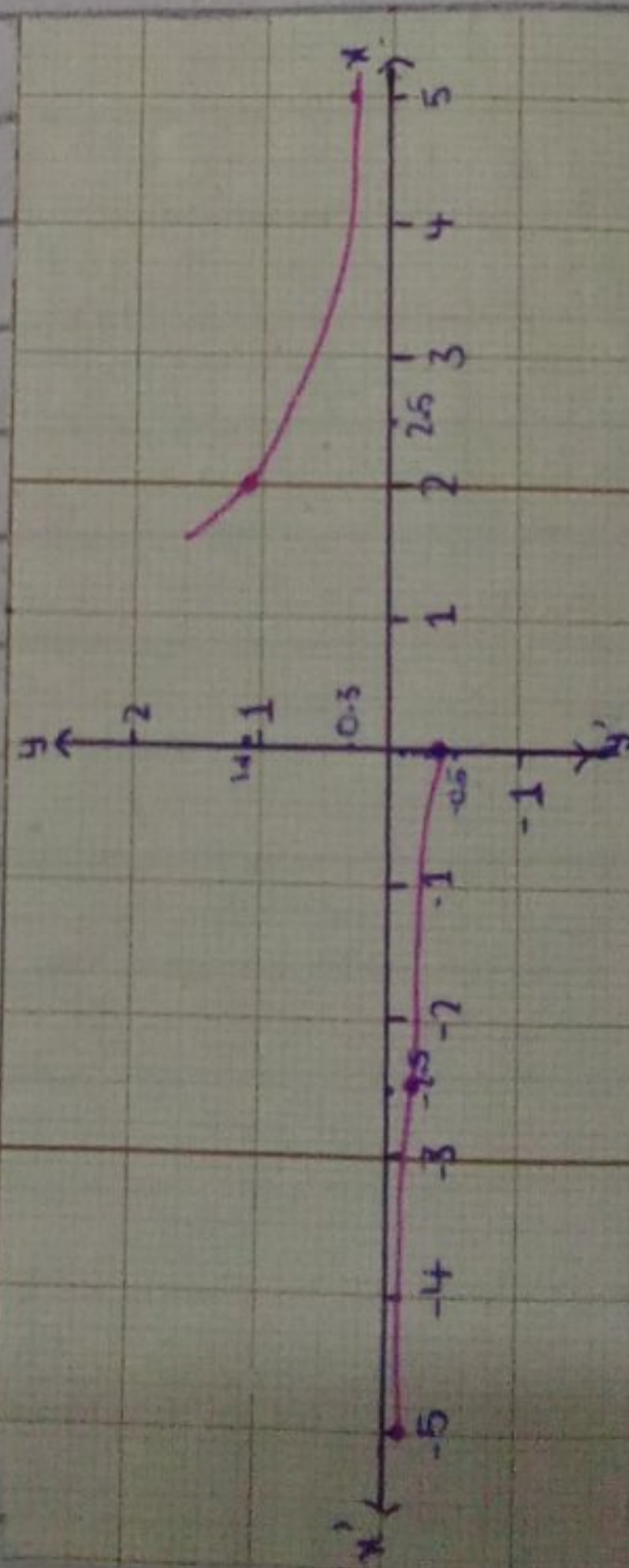
x	-5	-2.5	0	2.5	5
y	1.53	1.41	0	1.41	1.53



(iv) $y = \cot^{-1}(x-2)$ for $x \in \mathbb{R}$

x	-5	-2.5	0	2.5	5
y	-0.14	-0.22	-0.46	1.01	0.32

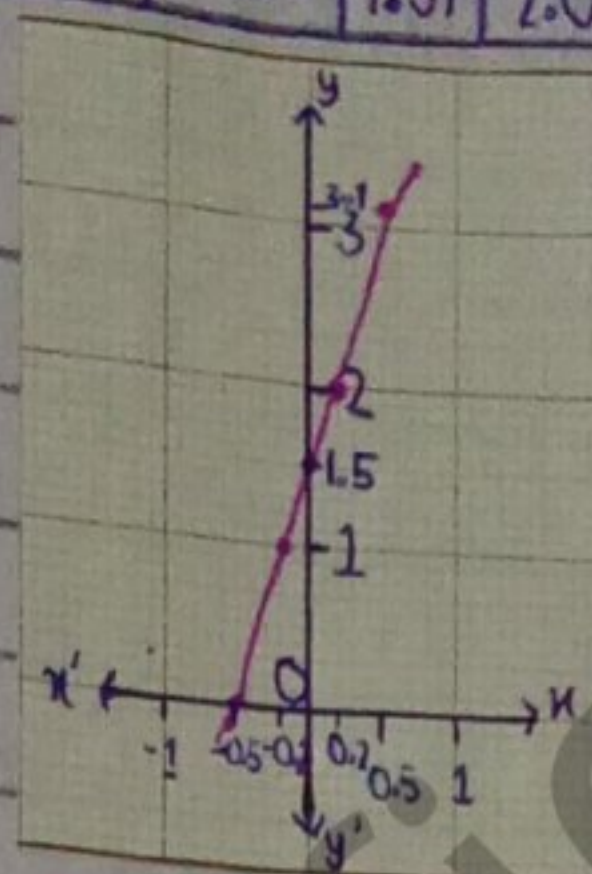
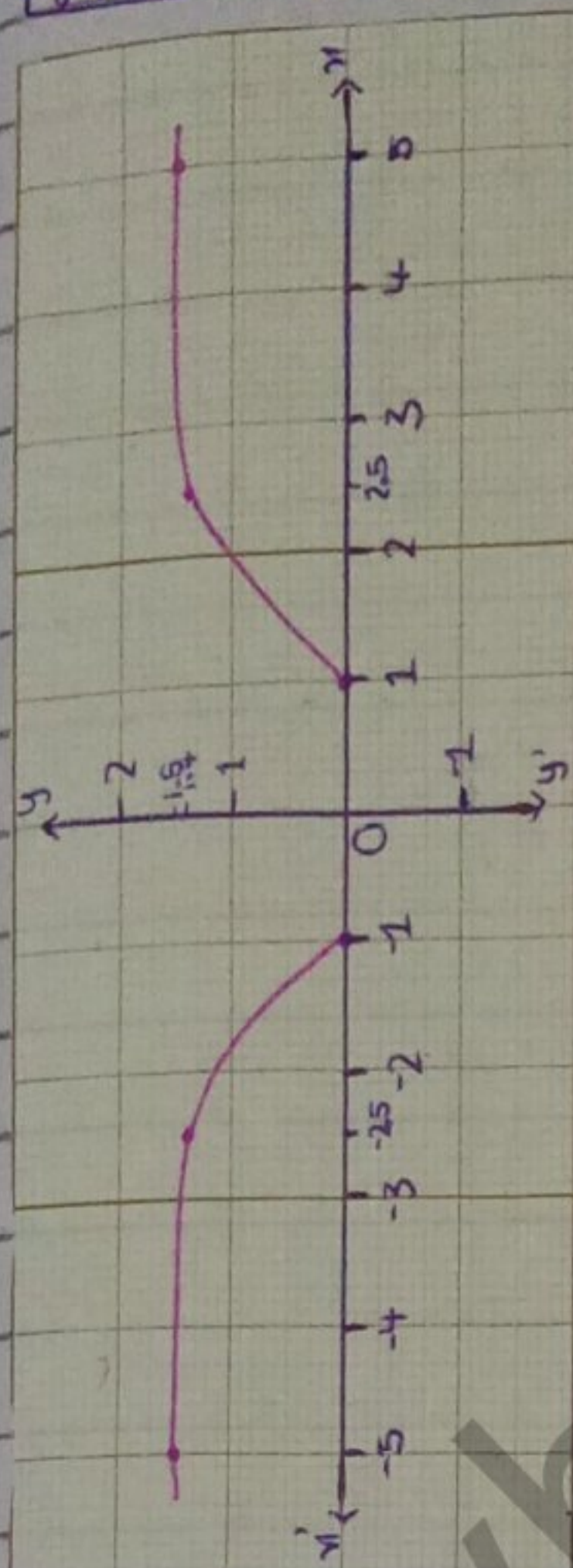
9n calc write it like this $\tan^{-1}(\frac{1}{-5-2})$



(vi) $y = \sec^{-1}(x)$ for $x \in (-\infty, -1] \cup [1, \infty)$ (vii) $y = \cos^{-1}(-x)$ for $x \in [-\frac{1}{2}, \frac{1}{2}]$

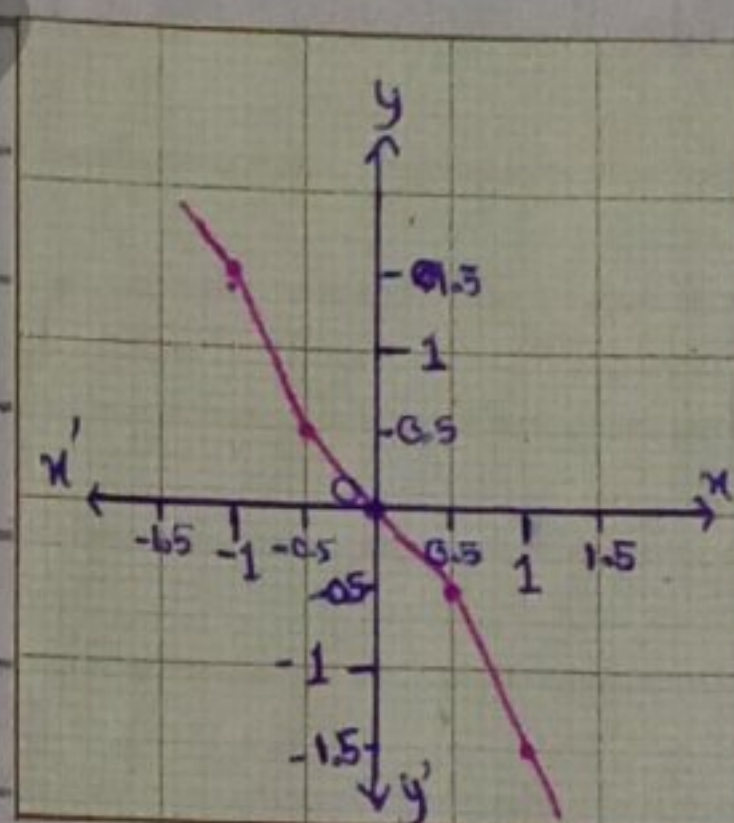
x	-5	-2.5	-1	1	2.5	5
y	1.53	1.41	0	0	1.41	1.53

x	-0.5	-0.25	0	0.25	0.5
y	0	1.05	1.57	2.09	3.14



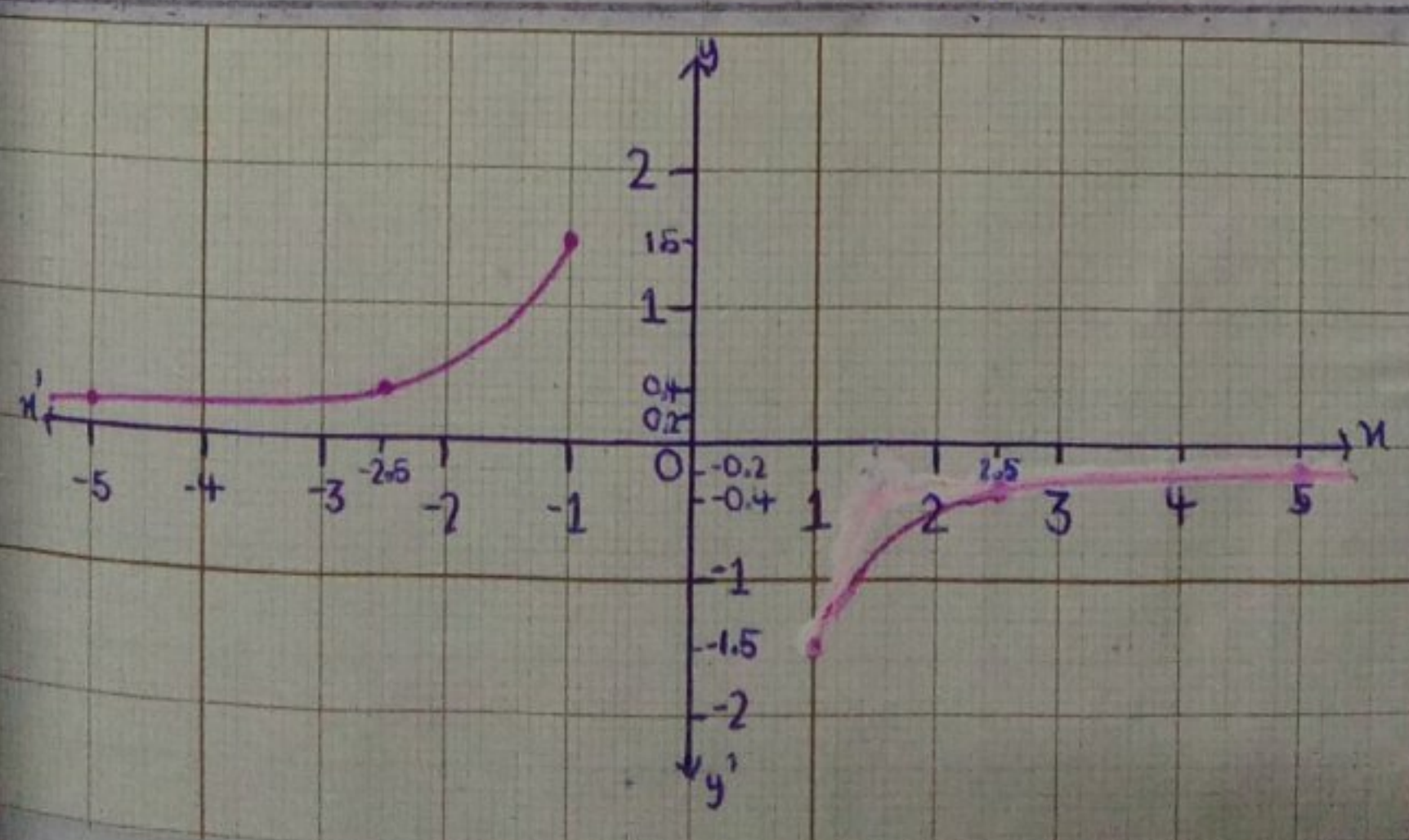
(viii) $y = \sin^{-1}(-x)$ for $x \in [-1, 1]$

x	-1	-0.5	0	0.5	1
y	1.57	0.52	0	-0.52	-1.57



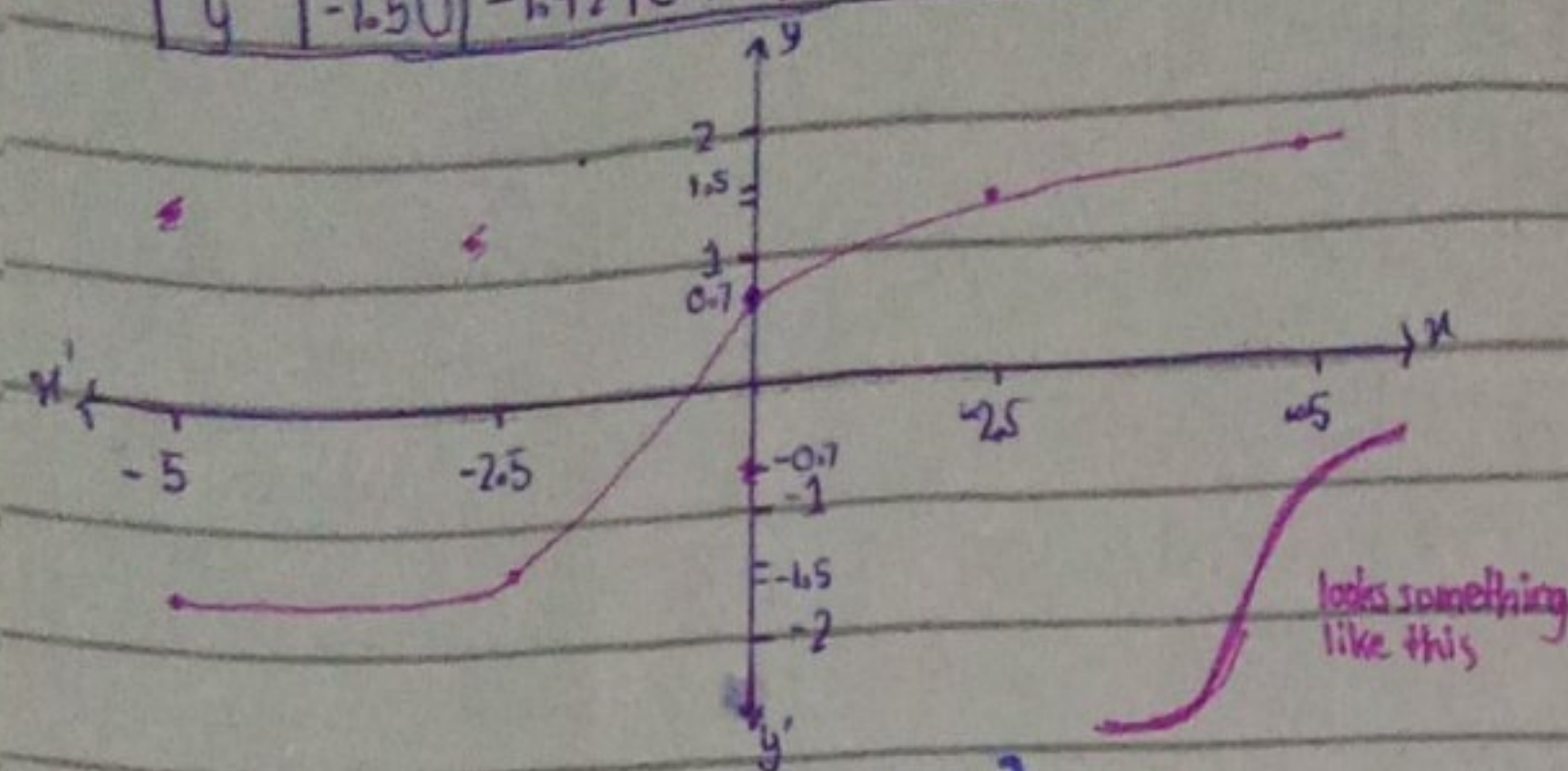
(vi) $y = \csc^{-1}(x)$ for $x \in (-\infty, -1] \cup [1, \infty)$

x	-5	-2.5	-1	1	2.5	5
y	0.20	0.41	1.57	-1.57	-0.41	-0.20



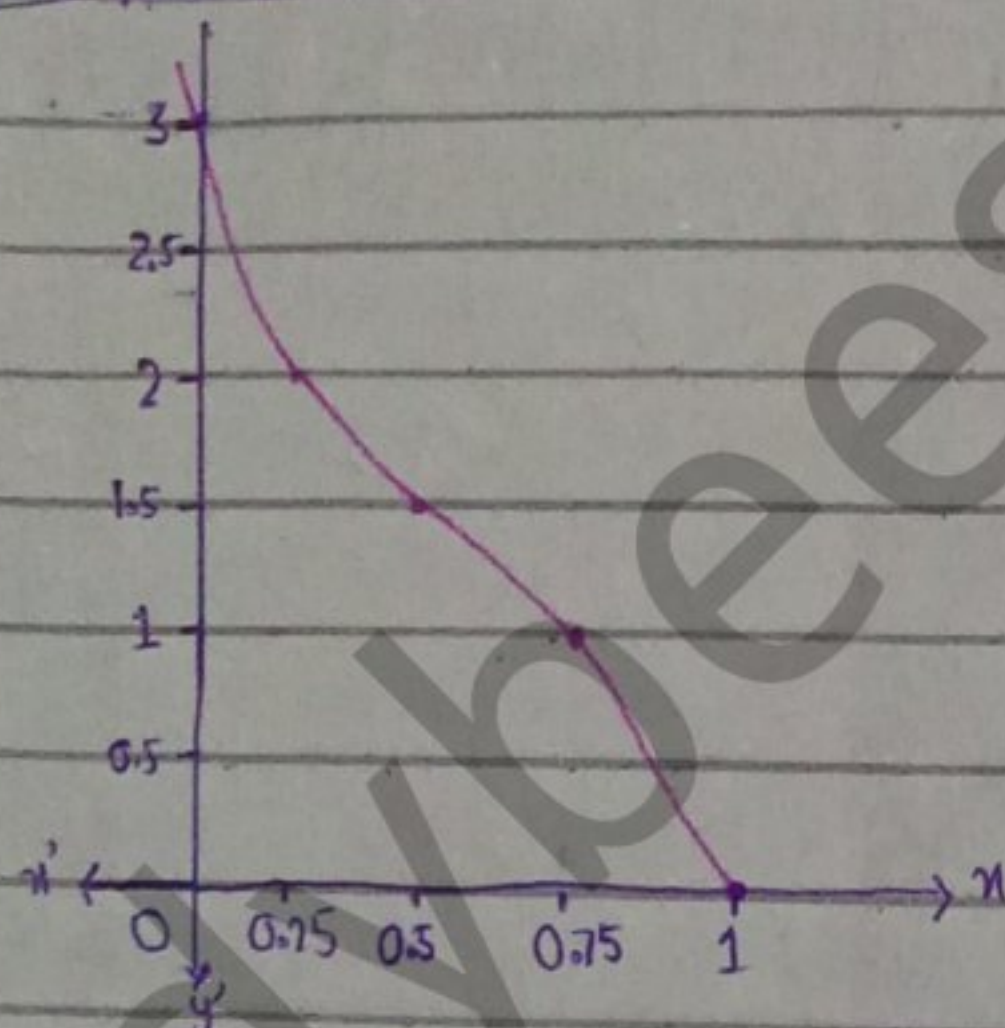
(ix) $y = \tan^{-1}(3x+1)$ for $x \in \mathbb{R}$

x	-5	-2.5	0	2.5	5
y	-1.50	-1.42	0.79	1.45	1.51



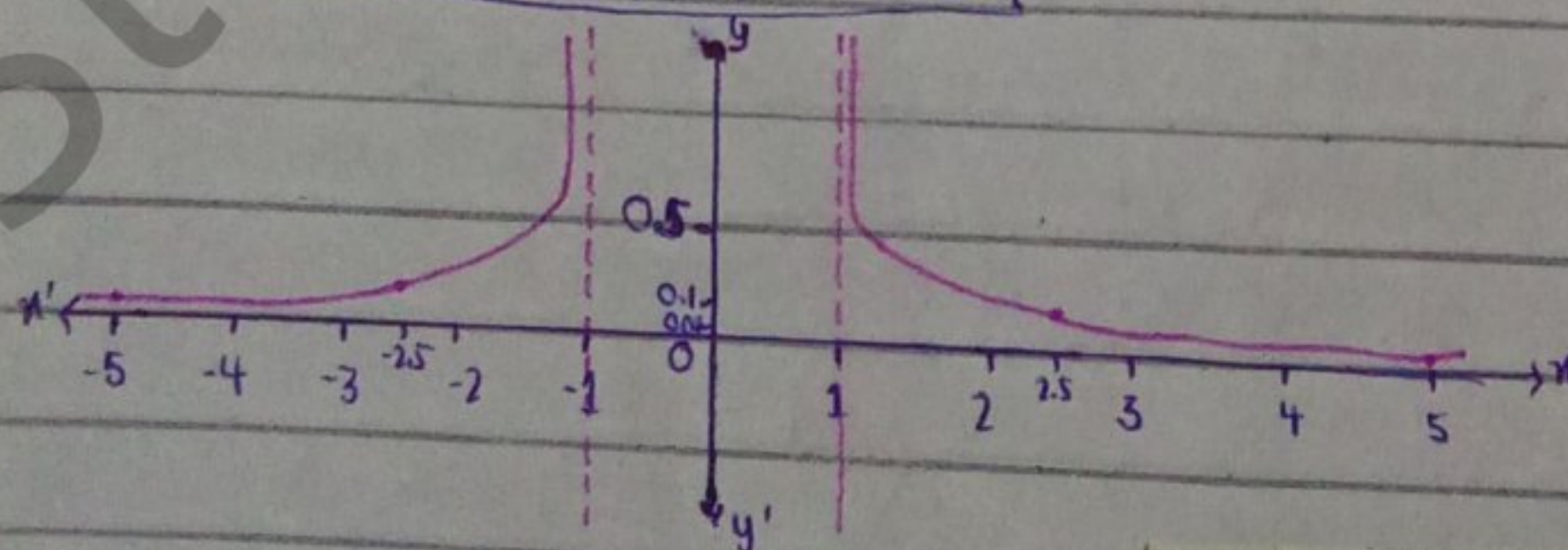
(x) $y = \cos^{-1}(2x-1)$ for $x \in [0, 1]$

x	0	0.25	0.50	0.75	1
y	3.14	2.09	1.57	1.05	0



(xi) $y = \cot^{-1}(x^2-1)$ for $x \in \mathbb{R}$

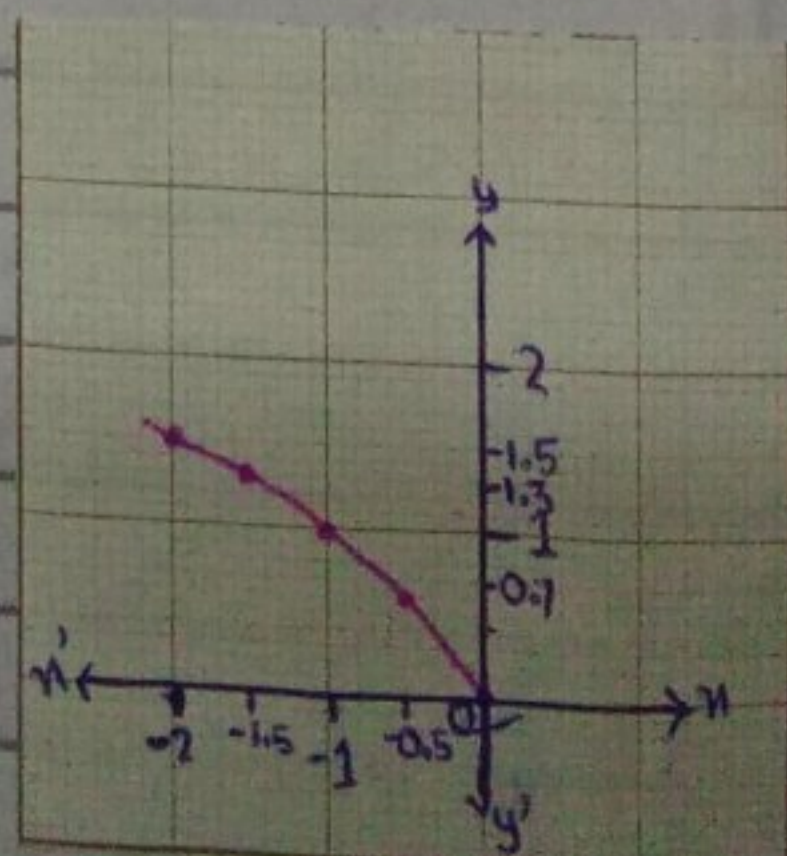
x	-5	-2.5	-1	1	2.5	5
y	0.04	0.19	∞	∞	0.19	0.04



Q2 Draw graph

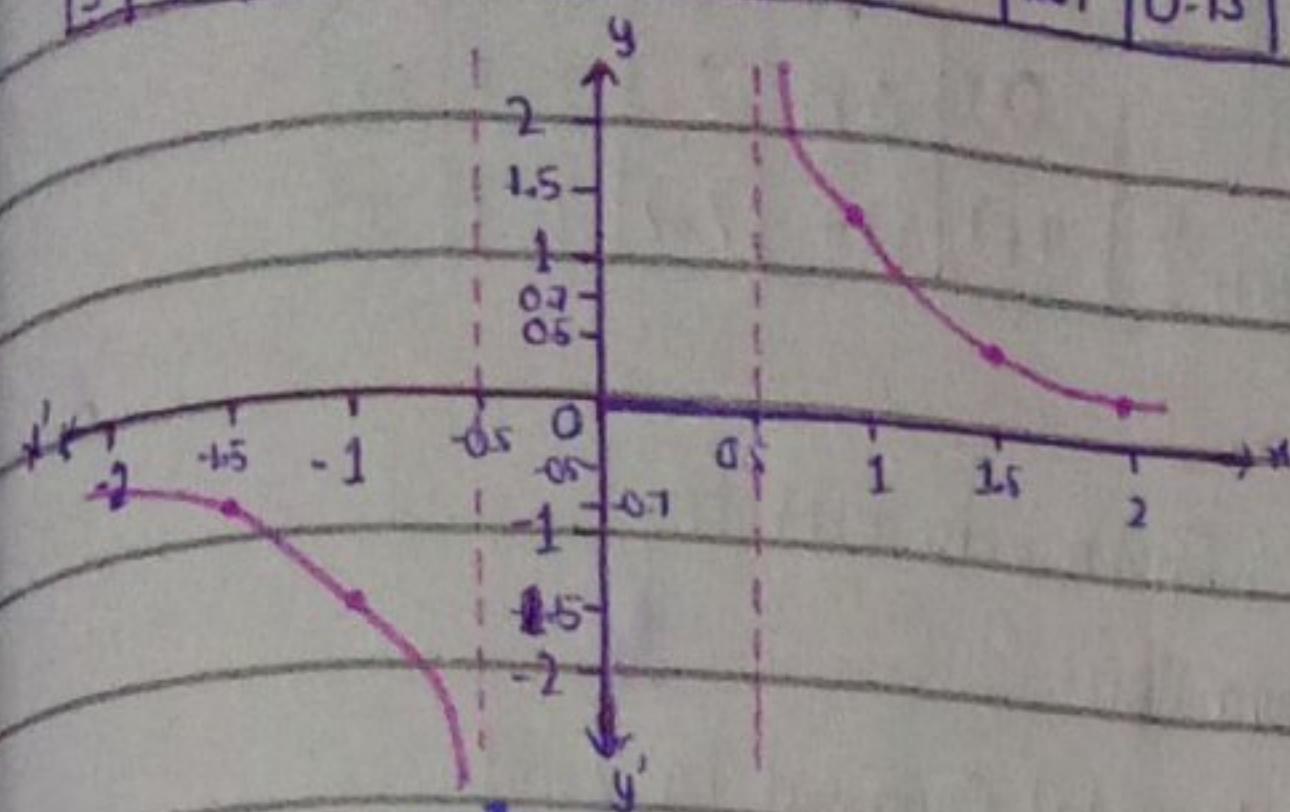
(i) $y = \cos^{-1}\left(\frac{x+2}{2}\right)$ for $x \in [-2, 0]$

x	-2	-1.5	-1	-0.5	0
y	1.57	1.32	1.04	0.72	0



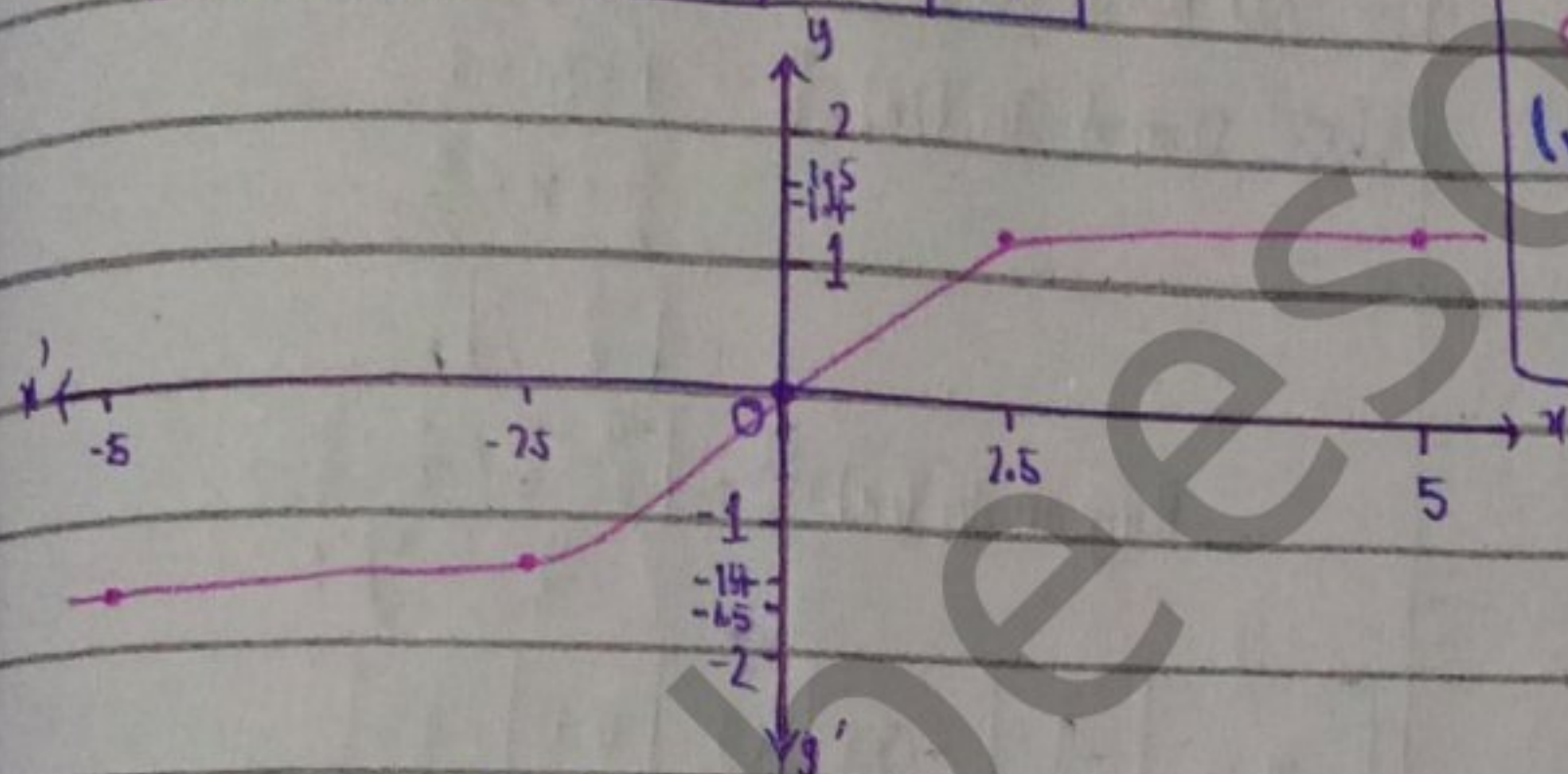
(ii) $y = \sin^{-1}(\frac{x}{2})$ for $x \in [-2, 2]$

x	-2	-1.5	-1	-0.5	0	0.5	1	1.5	2
y	-0.52	-0.73	-1.57	∞	∞	∞	1.57	0.73	0.52



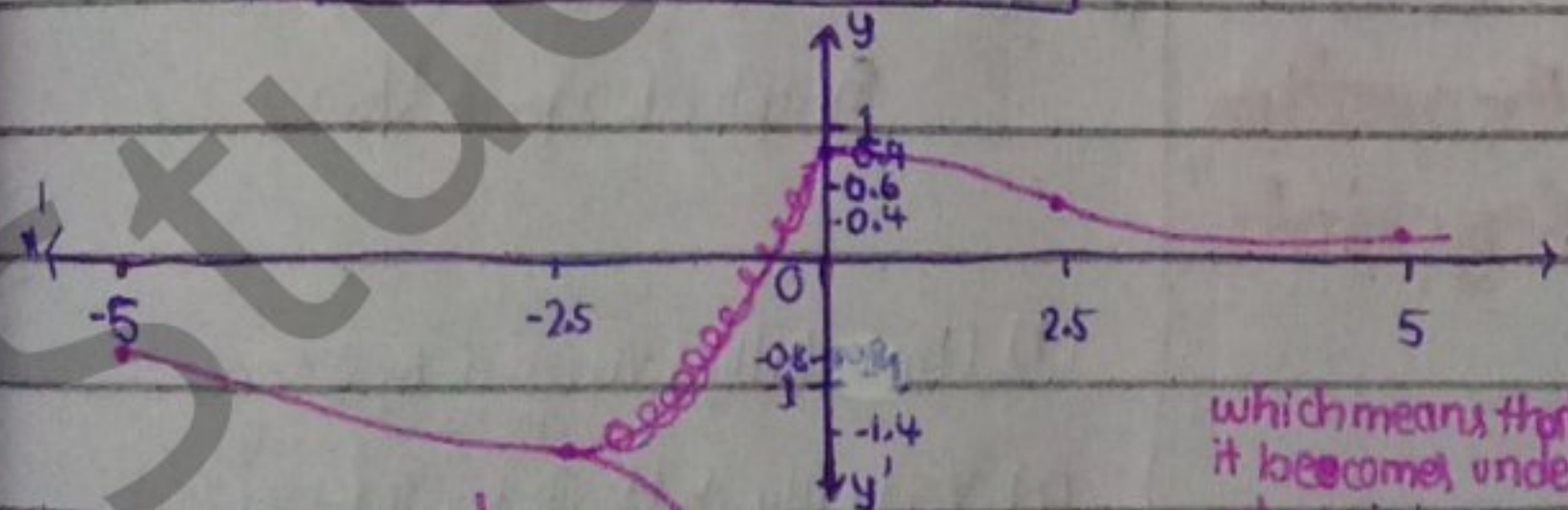
(iii) $y = \tan^{-1}(\frac{x}{2})$ for $x \in \mathbb{R}$

x	-5	-2.5	0	2.5	5
y	-1.55	-1.44	0	1.44	1.55



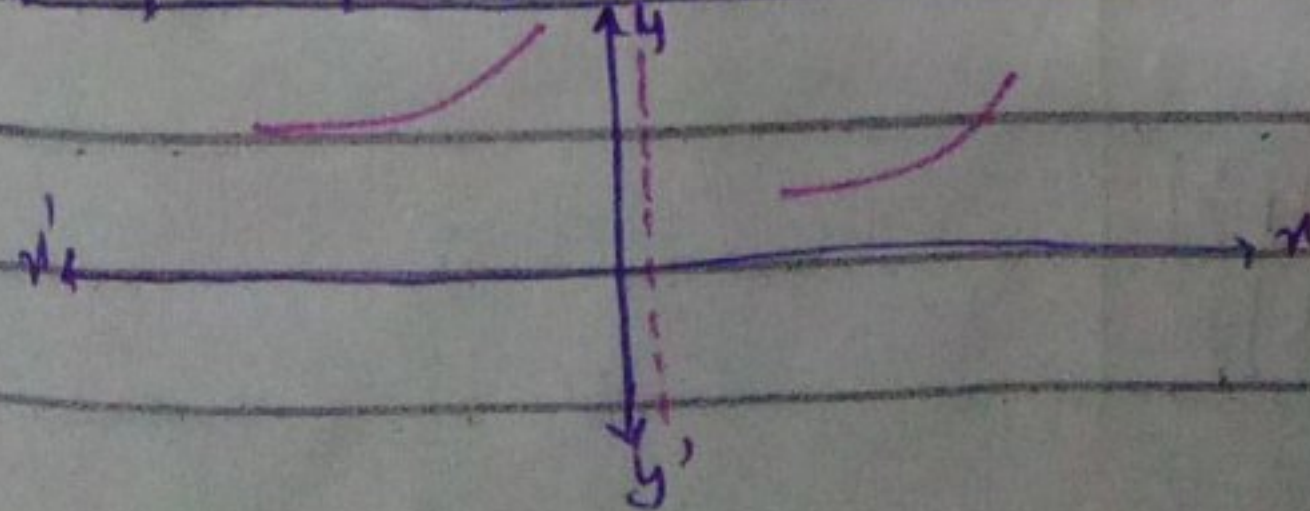
(iv) $y = \cot^{-1}(\frac{x+2}{3})$ for $x \in \mathbb{R}$

x	-5	-2.5	0	2.5	5
y	-0.8	-1.41	0.98	0.6	0.40



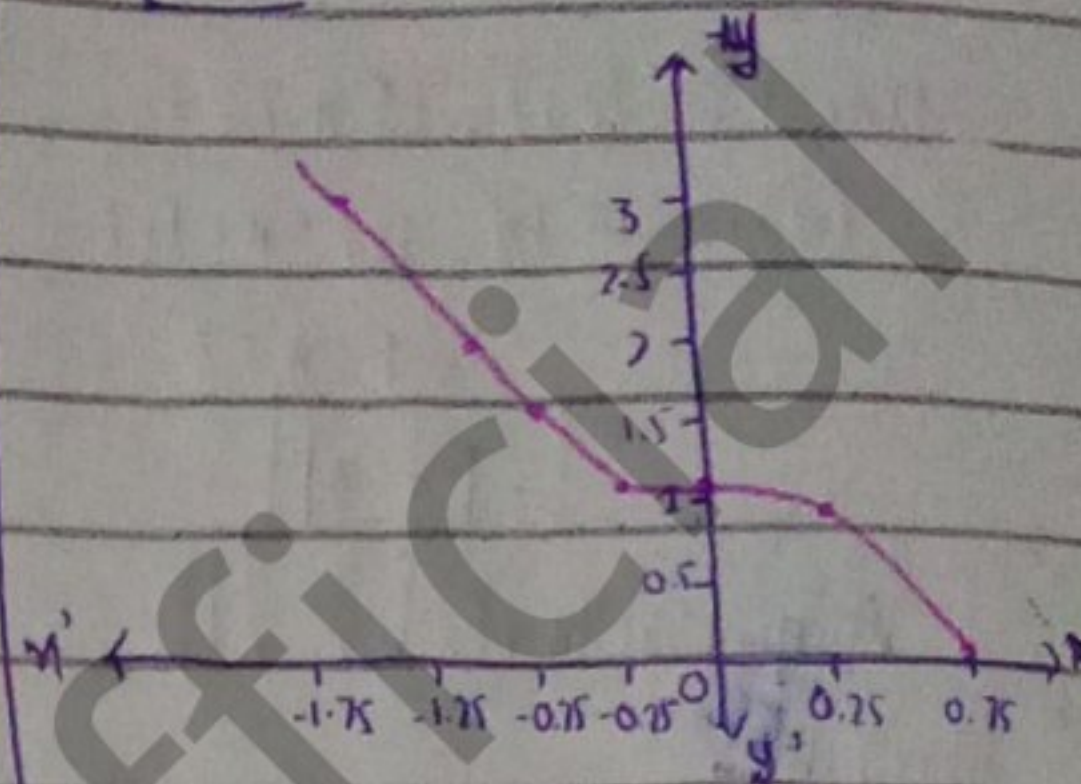
(v) $y = \sec^{-1}(\frac{3x-2}{2})$ for $x \in (-\infty, -\frac{2}{3}] \cup [\frac{2}{3}, \infty)$

x	-5	-2.5	-2/3 or -0.67	2/3 or 0.67	2.5	5
y	1.69	1.78	2.09	∞	1.20	1.42



(vi) $y = \cos^{-1}(\frac{4x+2}{5})$ for $x \in [-\frac{7}{4}, \frac{3}{4}]$

x	-1.75	-1.25	-0.75	-0.25	0	0.25
y	3.14	2.21	1.77	1.36	1.16	0.93
					0.75	
					0	



(vii) $y = \sin^{-1}(\frac{x-2}{3})$ for $x \in [-2, 4]$

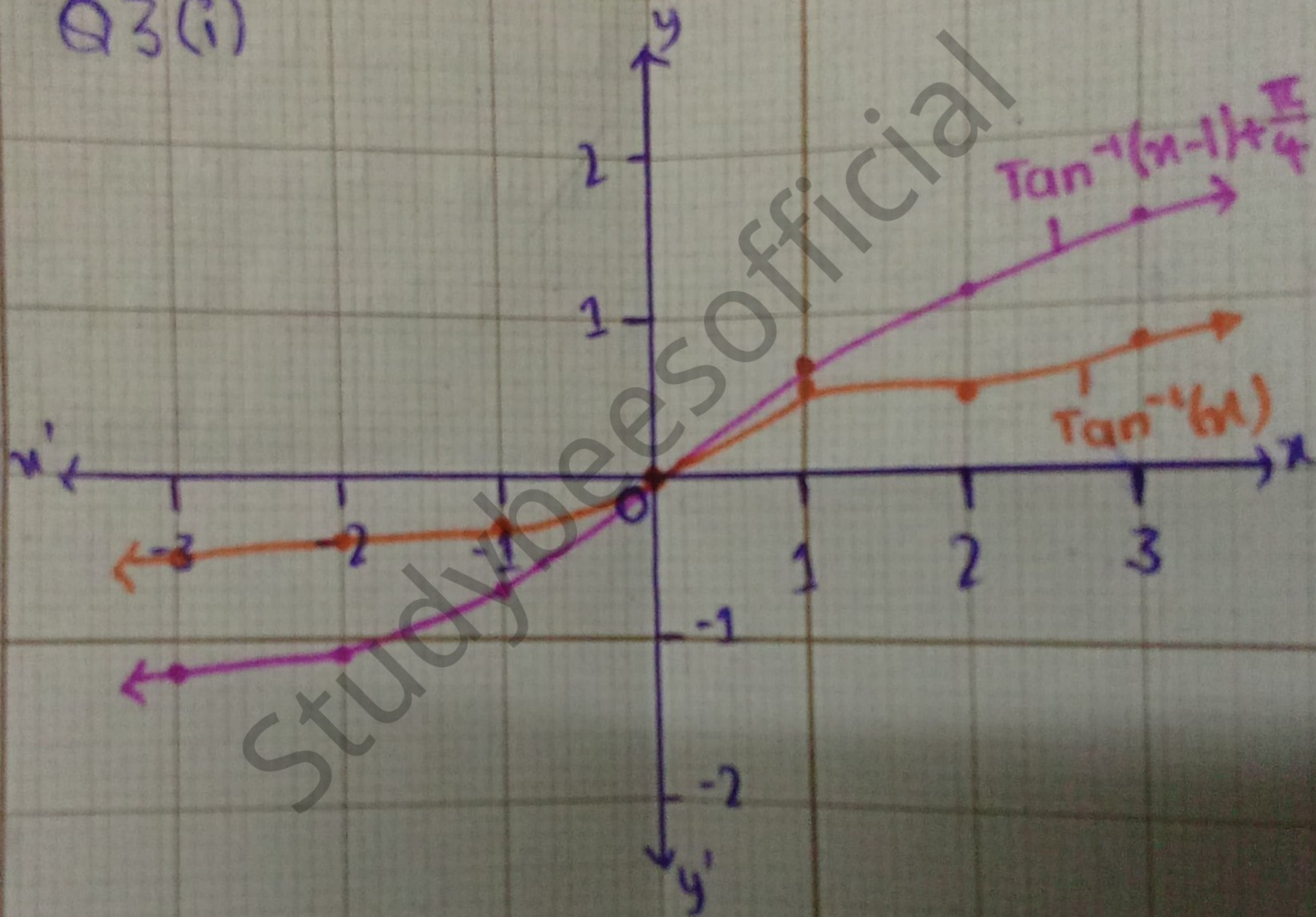
(viii) $y = \tan^{-1}(3x + \frac{1}{2})$ for $x \in \mathbb{R}$

Q3 (i)

x	-3	-2	-1	0	1	2
$y = \tan^{-1}x$	-1.1	-1.1	-0.79	0	0.79	1.1
$y = \tan^{-1}(x-1) + \frac{\pi}{4}$	-0.54	-0.46	-0.32	0	0.79	1.57
	3					
	1.25					
	1.89					

The graph $y = \tan^{-1}(x-1) + \frac{\pi}{4}$ has been translated by 1 unit right side and $\frac{\pi}{4}$ upward, from the basic graph of $y = \tan^{-1}(x)$

Q3(i)



(ii)

x	1	1.5	2	2.5	3
y	-1.57	-0.52	0	0.52	1.57

Before the tables

Dom of $\sin^{-1} = [-1, 1]$

Range of $\sin^{-1} = \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

Dom of $\sin^{-1}(x-2) = -1 \leq x-2 \leq 1$

(add +2 on all sides) $= -1+2 \leq x \leq 1+2$

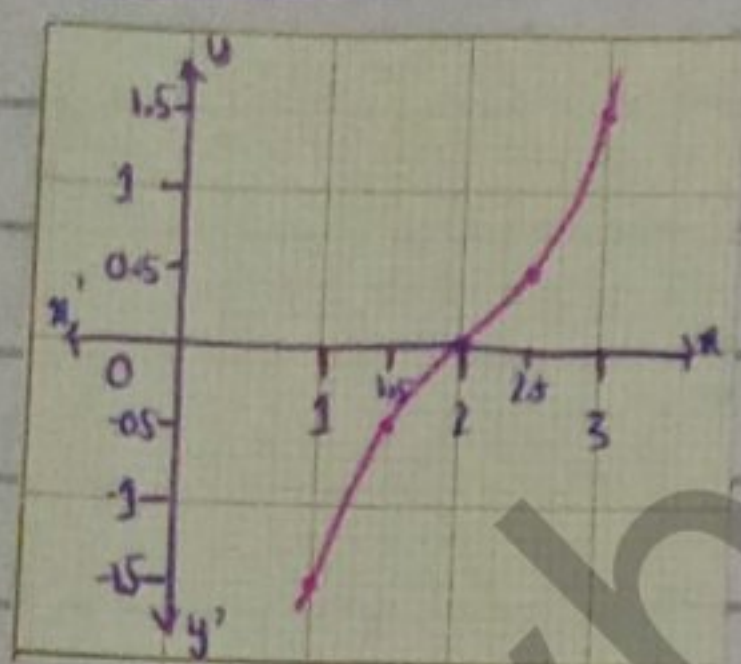
$= 1 \leq x \leq 3$

$= [1, 3]$

Range of $\sin^{-1}(x-2) = \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

Then Tables

After Tables



Keypoints:

(1) Start

(2) End

(3) Midpoint

(4) Curve Both

These are the points to look for when the question asks for "Key points"

So Keypoints:

$(1, -1.57), (3, 1.57), (2, 0), (2.5, 0.52), (1.5, -0.52)$

(iii) Domain of $\cos^{-1}x = [-1, 1]$

Range of $\cos^{-1}x = [0, \pi]$

So, Dom of $\cos^{-1}2x = -1 \leq 2x \leq 1$

($\div 2$ on all sides) $= \frac{-1}{2} \leq x \leq \frac{1}{2}$

$= \left[-\frac{1}{2}, \frac{1}{2}\right]$

Range of $\cos^{-1}2x + \frac{\pi}{3} = \left[0 + \frac{\pi}{3}, \pi + \frac{\pi}{3}\right]$

$= \left[\frac{\pi}{3}, \frac{4\pi}{3}\right]$

x	-1	-0.5	0	0.5	1
y = $\cos^{-1}(x)$	3.14	2.09	1.57	1.05	0

x	-0.5	-0.25	0	0.25	0.5
y = $\cos^{-1}(2x) + \frac{\pi}{3}$	4.19	3.14	2.62	2.09	1.05

Graph video se dekhlo

Transformation:

(1) Horizontal Compressed by 2 unit

(2) Vertical shift upward by $\frac{\pi}{3}$ unit

(3) Dom $\cos^{-1}(2x) + \frac{\pi}{3} = \left[-\frac{1}{2}, \frac{1}{2}\right]$

(4) Range $\cos^{-1}(2x) + \frac{\pi}{3} = \left[\frac{\pi}{3}, \frac{4\pi}{3}\right]$

(iv) Dom of $\sin^{-1}(2x) + \frac{\pi}{6} = -1 \leq 2x \leq 1$

$= \frac{-1}{2} \leq x \leq \frac{1}{2}$

$= \left[-\frac{1}{2}, \frac{1}{2}\right]$

Range of $\sin^{-1}(2x) + \frac{\pi}{6} = \left[\frac{-\pi}{2} + \frac{\pi}{6}, \frac{\pi}{2} + \frac{\pi}{6}\right]$
 $= \left[-\frac{\pi}{3}, \frac{2\pi}{3}\right]$

x	-1	-0.5	0	0.5	1
y = $\sin^{-1}(x)$	-1.57	-0.52	0	0.52	1.57

x	-0.5	-0.25	0	0.25	0.5
y = $\sin^{-1}(2x) + \frac{\pi}{6}$	-1.05	0	0.52	1.05	2.09

Graph video pe dekhlo

(1) Horizontally Compressed by 2 unit

(2) Vertically shift ~~downward~~ upward by $\frac{\pi}{6}$ unit

(3) Domain of $\sin^{-1}(2x) + \frac{\pi}{6} = \left[-\frac{1}{2}, \frac{1}{2}\right]$

(4) Range of " $= \left[-\frac{\pi}{3}, \frac{2\pi}{3}\right]$