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Where Minds Pollinate

Class 12
Mathematics

Chapter 9
Exercise 9.2
Handwritten Solution

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$$\omega = \tan^{-1}\left(\frac{3}{4}\right) \Rightarrow \omega = 36.8^\circ$$

A

4m

B

Exercise: 9.2

Q1) (i) $\cos \theta = \frac{1}{2}$; $\theta \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

Solution:-

θ	-90°	-60°	-30°	0°	30°	60°	90°
$y = \cos \theta$	0	0.5	0.86	1	0.86	0.5	0

let $y = \frac{1}{2}$ & $y = \cos \theta$

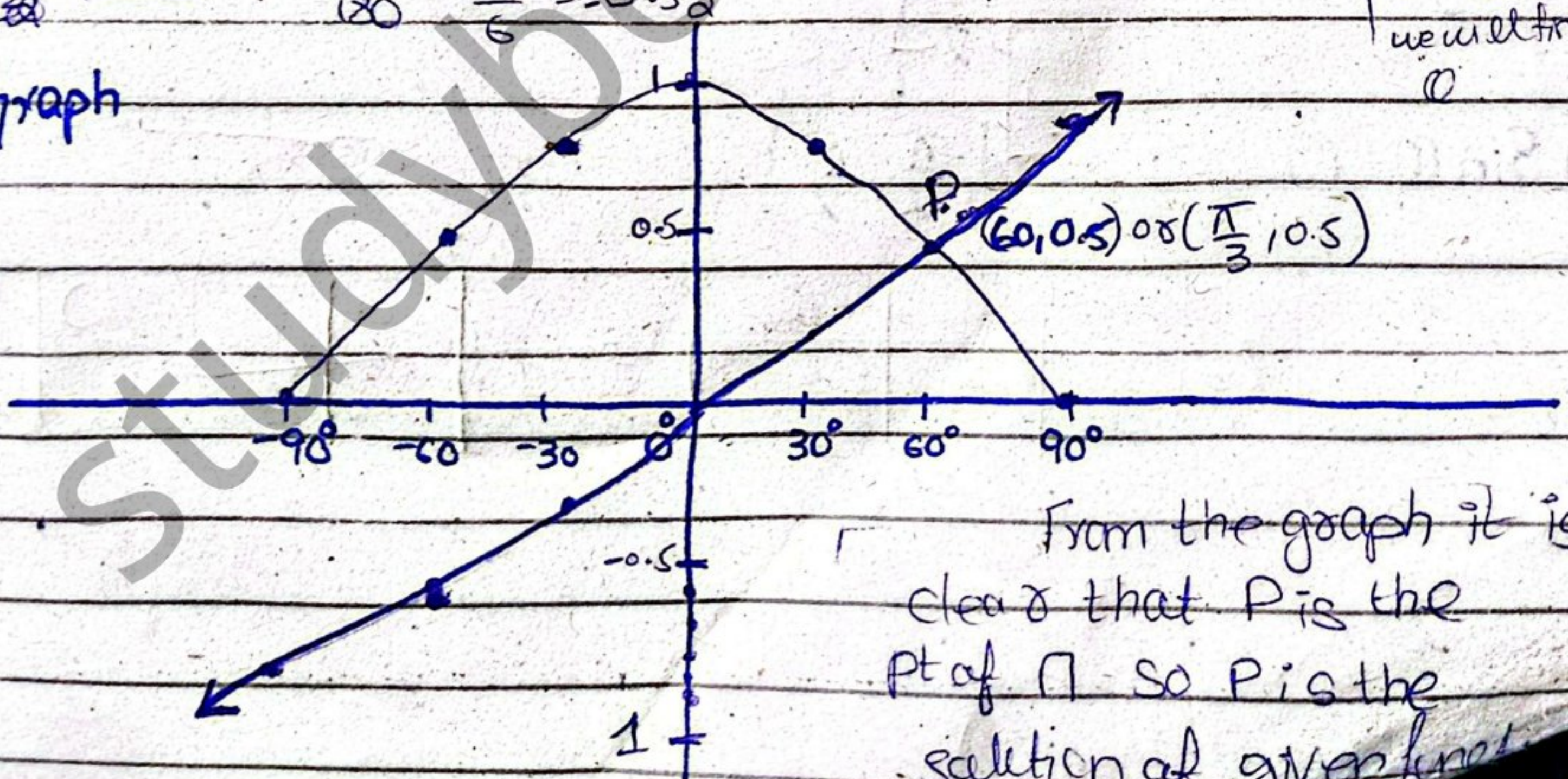
θ	-90°	-60°	-30°	0°	30°	60°	90°
$y = \frac{1}{2}$	-0.78	-0.52	-0.26	0	0.26	0.52	0.78

$$\therefore \frac{1}{2} = \frac{-90}{2} = \frac{-45^\circ \times \pi}{180} = \frac{-\pi}{4} = \boxed{-0.785}$$

$$\frac{60}{2} = \boxed{-30^\circ} = \frac{-30 \times \pi}{180} = \frac{-\pi}{6} = -0.52$$

S. Set = $\left\{\frac{\pi}{3}\right\}$ or $\{1.04\}$
we will find 0

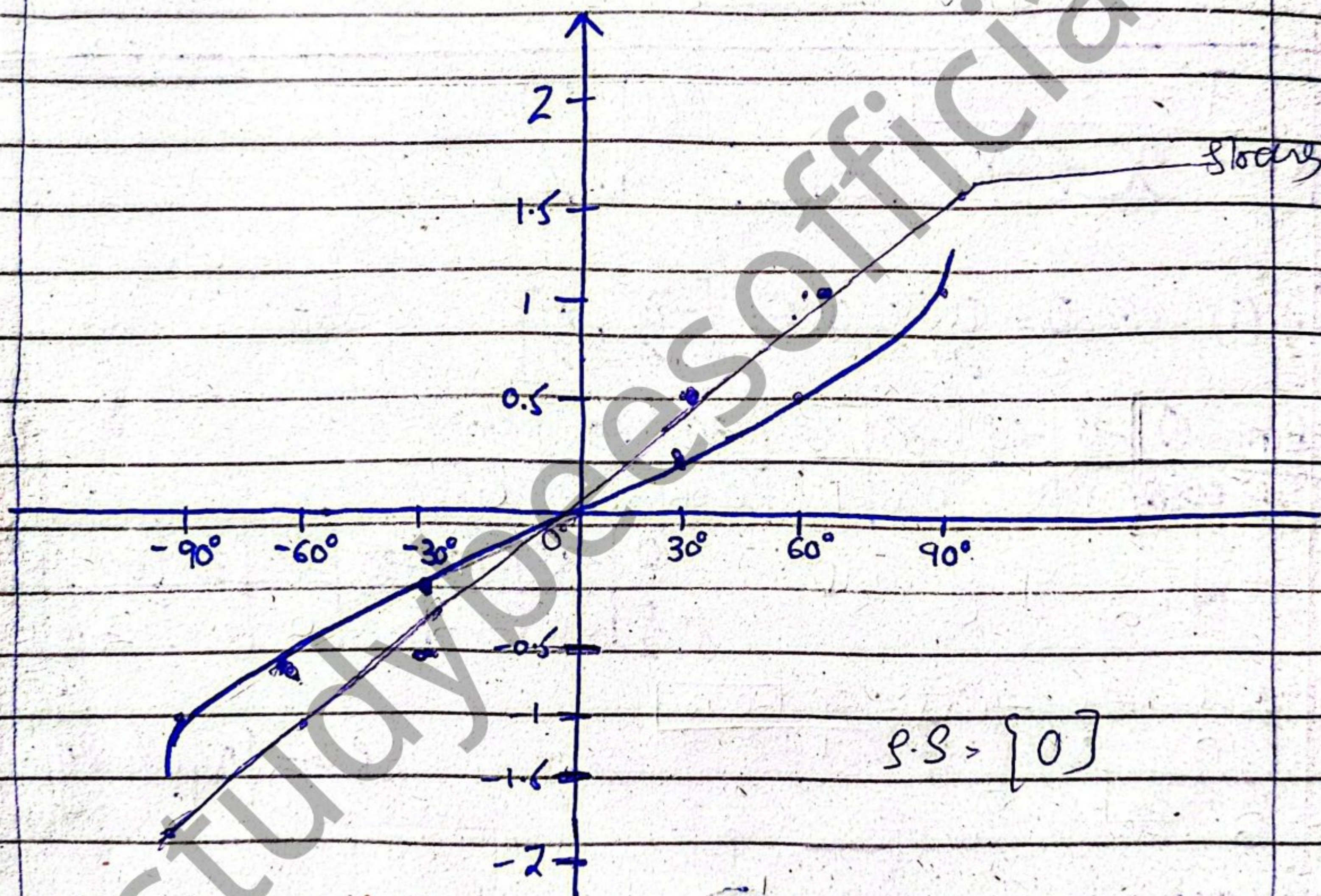
Graph



From the graph it is clear that P is the Pt of π . So P is the solution of given function.

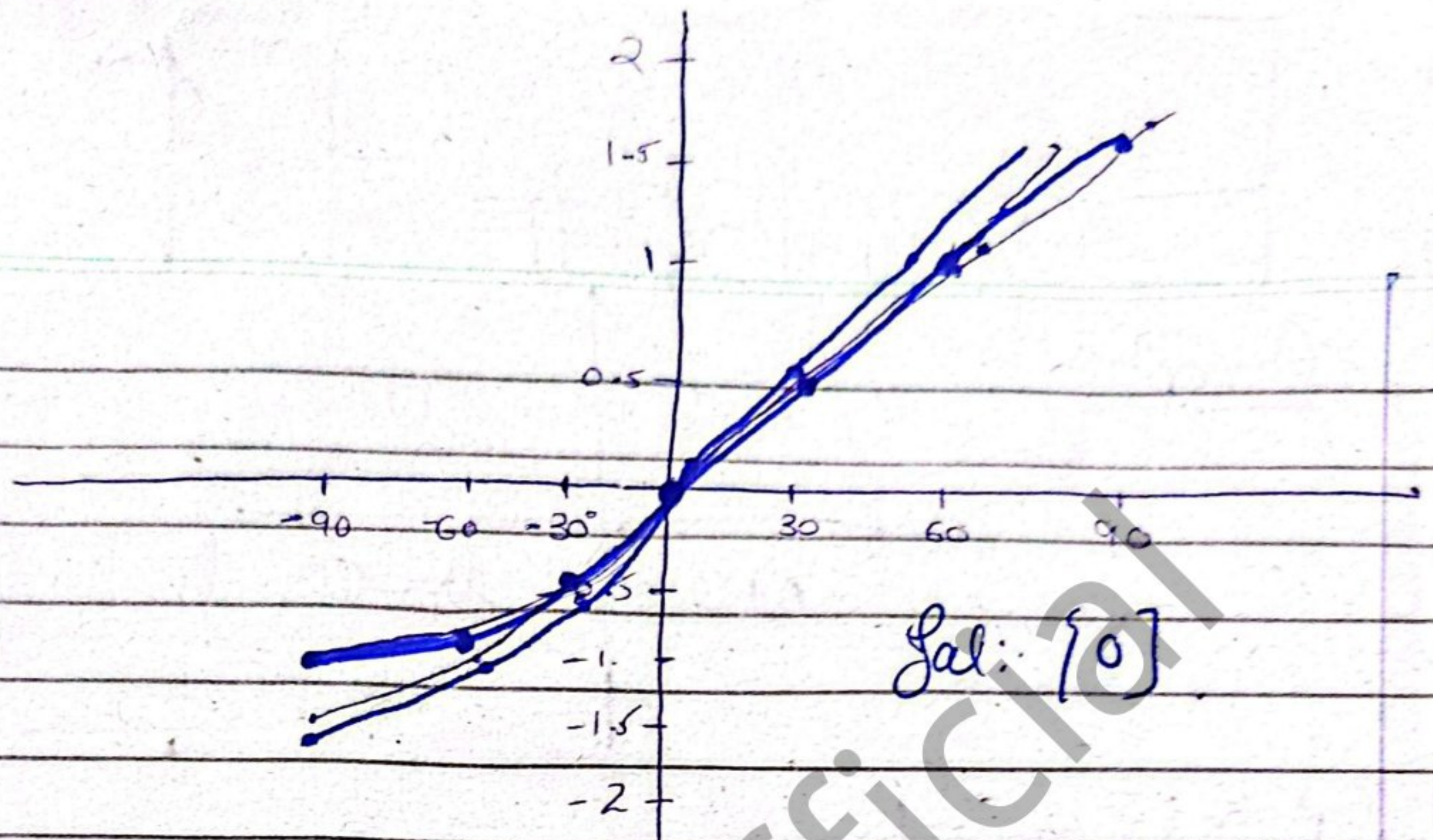
Q1) ix) $\tan \frac{\theta}{2} = 0$

θ	-90	-60	-30	0°	30	60	90°
$y = \tan \frac{\theta}{2}$	-1	-0.57	-0.26	0	0.26	0.57	1
$y = \theta$	-1.57	-1.04	-0.52	0	0.52	1.04	1.57



iii) $\sin \theta = 0 \quad : \in \left[-\frac{\pi}{2}, \frac{\pi}{2} \right]$

x	-90	-60	-30	0	30	60	90
y	-1	-0.86	-0.5	0	0.5	0.86	1
	-1.57	-1.04	-0.52	0	0.52	1.04	1.57



Sol: $\{0\}$

Xii) $\sin \theta = \tan \theta$, $[0, \pi]$

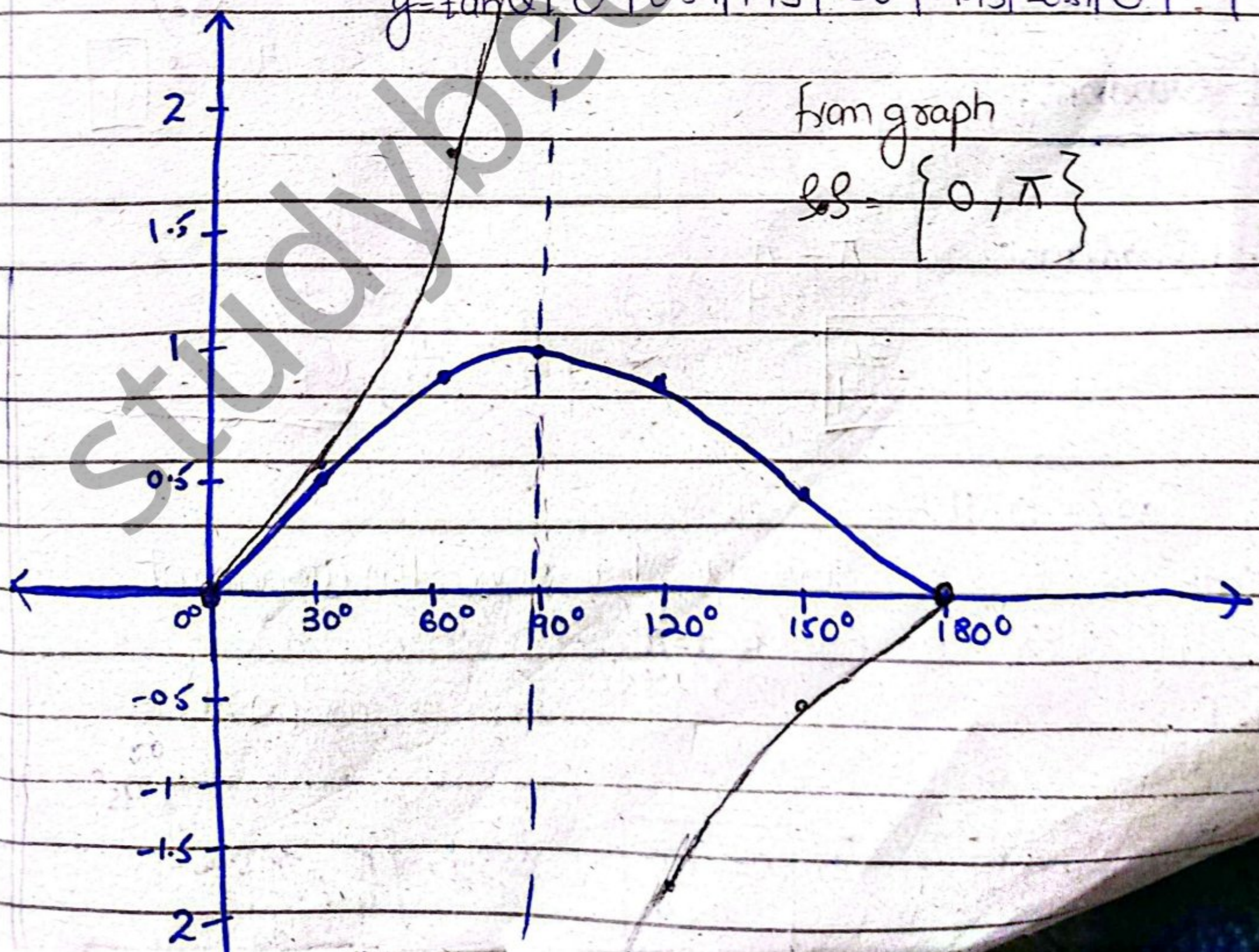
Let $y = \sin \theta$

$y = \tan \theta$

θ	0°	30°	60°	90°	120°	150°	180°
$y = \sin \theta$	0	0.5	0.86	1	0.86	0.5	0
$y = \tan \theta$	0	0.57	1.73	$\pm \infty$	-1.73	-0.57	0

from graph

S.S. = $\{0, \pi\}$

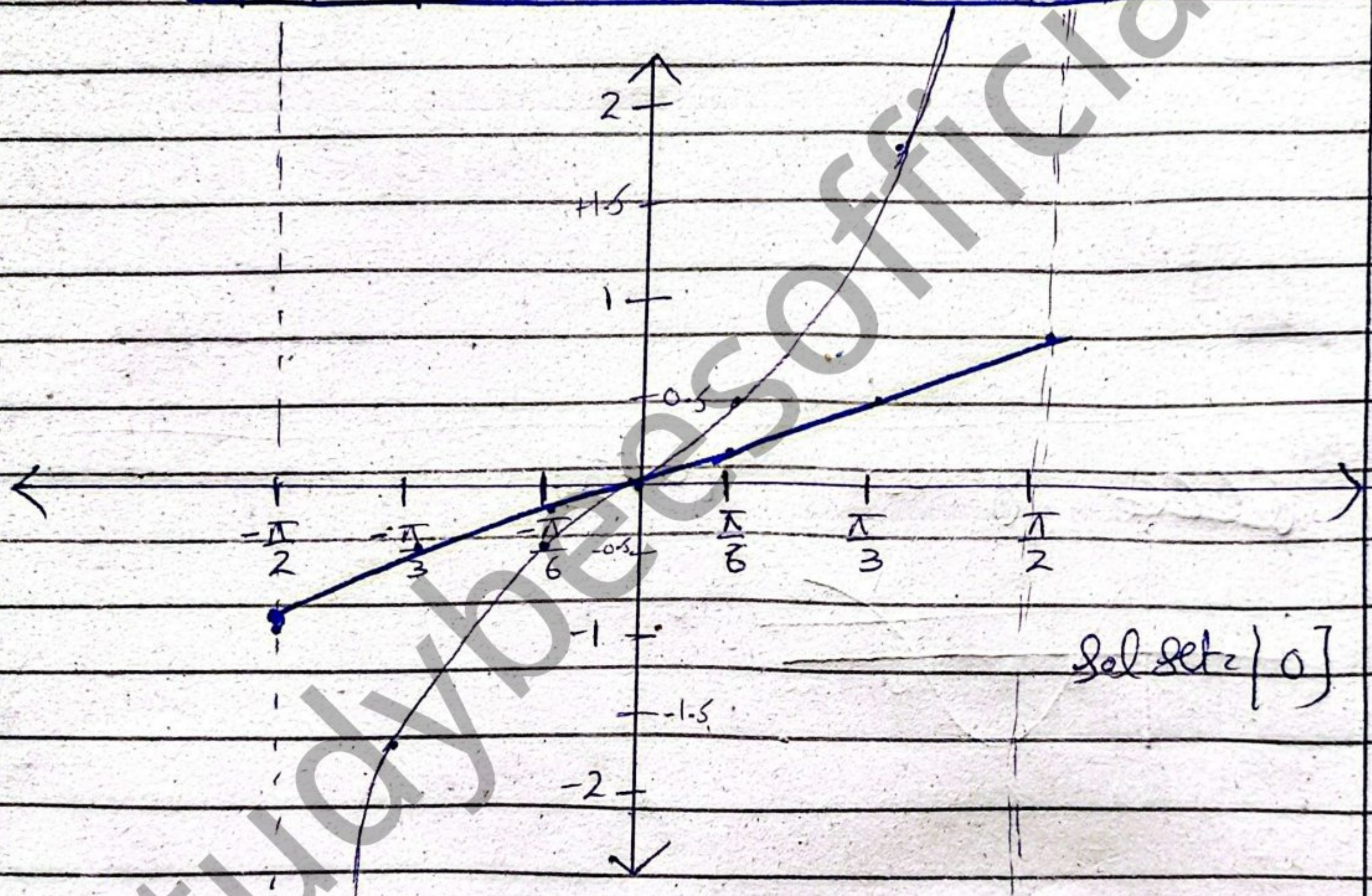


Exercise # 9.2

ii) $\tan \theta = \frac{\theta}{2}, \theta \in [-\frac{\pi}{2}, \frac{\pi}{2}]$

Solution:-

θ	$-\frac{\pi}{2}$	$-\frac{\pi}{3}$	$-\frac{\pi}{6}$	0	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\tan \theta$	∞	-1.73	-0.5	0	0.5	1.7	error
$\frac{\theta}{2}$	-0.78	-0.5	-0.2	0	0.2	0.5	0.7

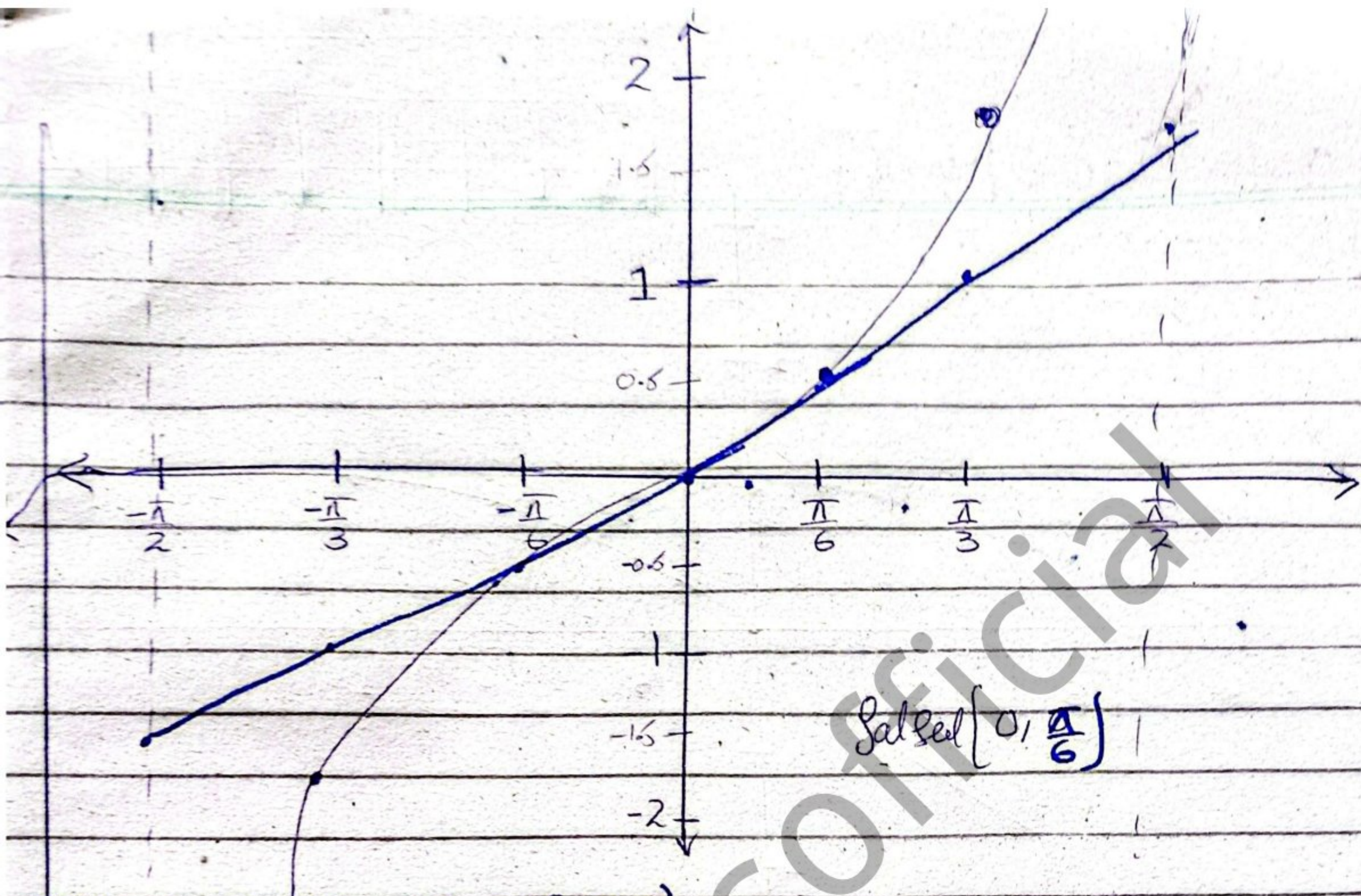


iv) $\tan \theta = \theta ; \theta \in [-\frac{\pi}{2}, \frac{\pi}{2}]$

Solution:-

θ	$-\frac{\pi}{2}$	$-\frac{\pi}{3}$	$-\frac{\pi}{6}$	0	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\tan \theta$	∞	-1.73	-0.5	0	0.5	1.7	∞
θ	-1.5	-1	-0.5	0	0.5	1.04	1.5

Graph →

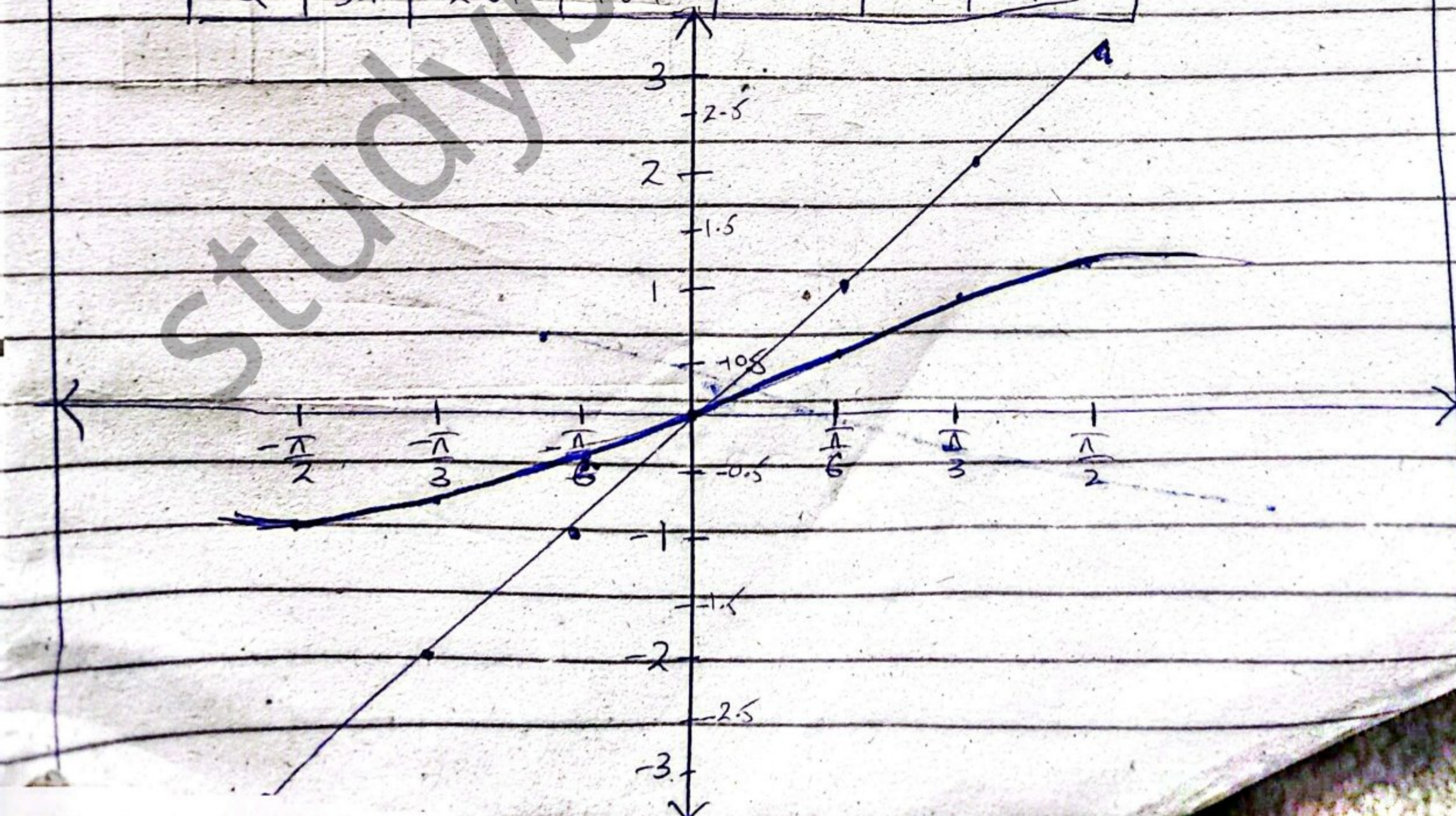


Tangent at $(\frac{\pi}{6}, 0.5)$

(v) $\sin Q = 2Q; Q \in [-\frac{\pi}{2}, \frac{\pi}{2}]$

for

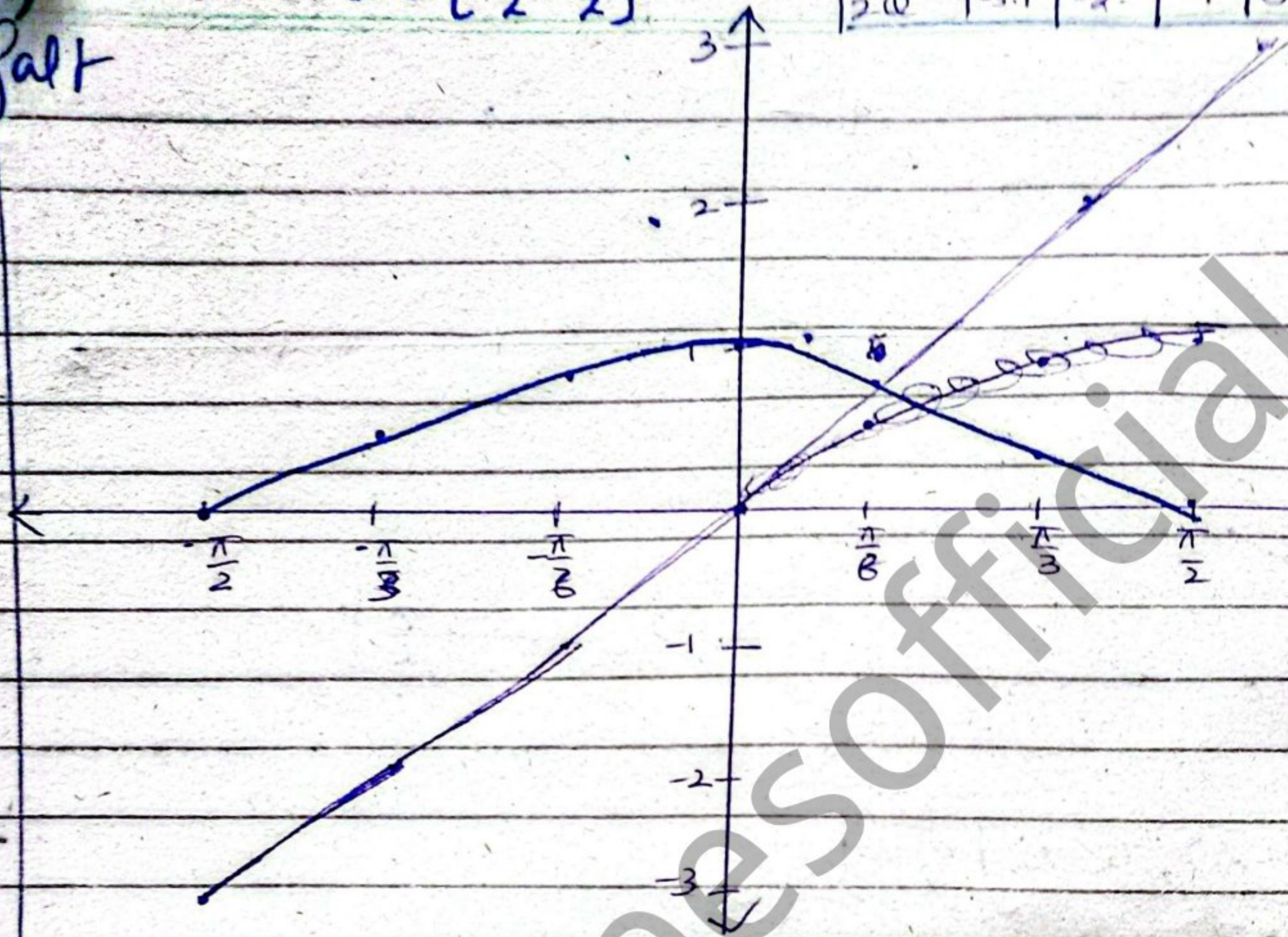
x	$-\frac{\pi}{2}$	$-\frac{\pi}{3}$	$-\frac{\pi}{6}$	0	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\sin Q$	-1	-0.8	-0.5	0	0.5	0.8	1
$2Q$	-3.1	-2.09	-1.04	0	1.04	2.09	3.1



vi) $\cos Q = 2Q, Q \in [-\frac{\pi}{2}, \frac{\pi}{2}]$

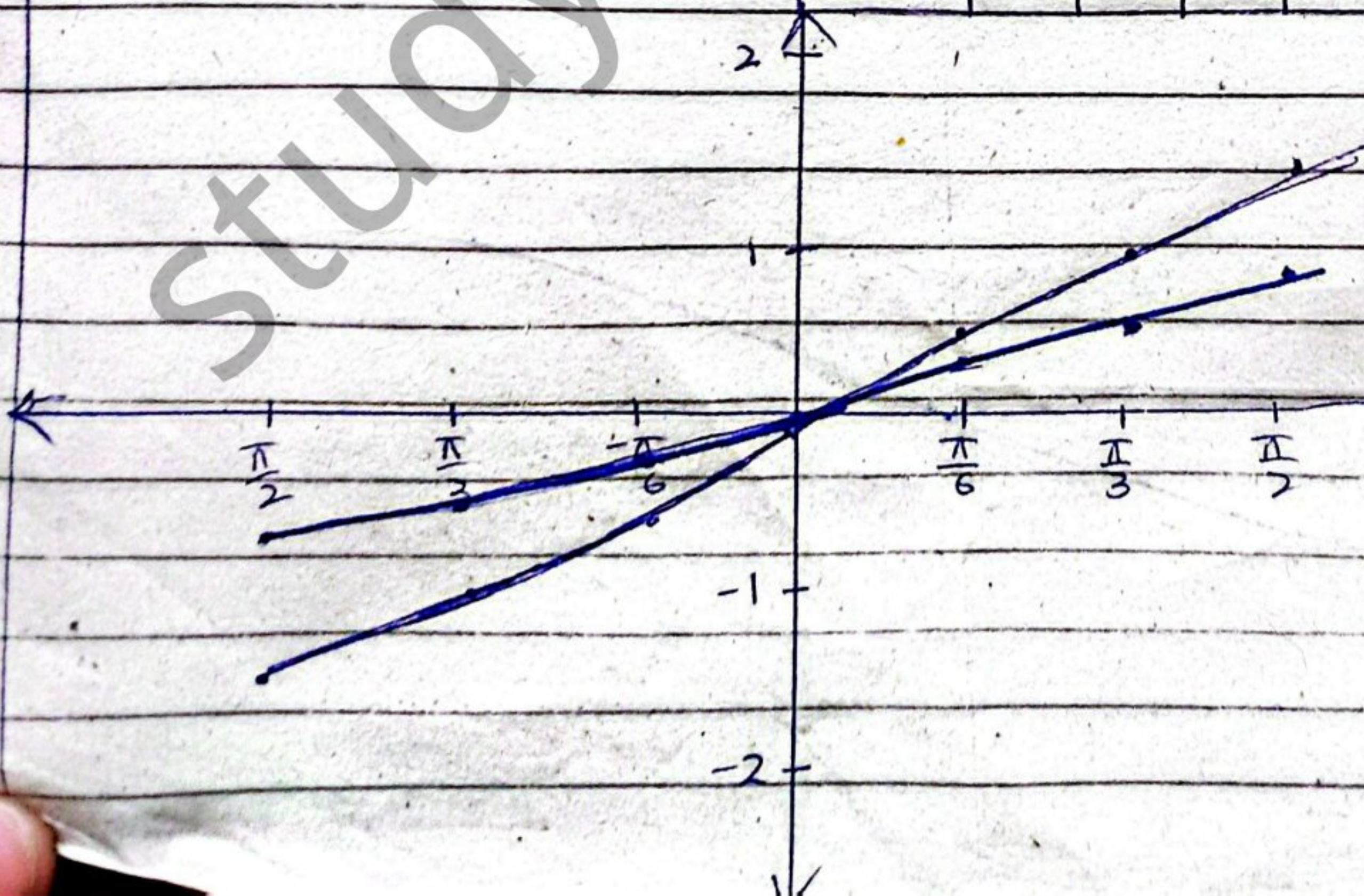
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x	$-\frac{\pi}{2}$	$-\frac{\pi}{3}$	$-\frac{\pi}{6}$	0	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\cos Q$	0	0.5	0.8	1	0.8	0.5	0
$2Q$	-3.1	-2	-1	0	1	2	3.1



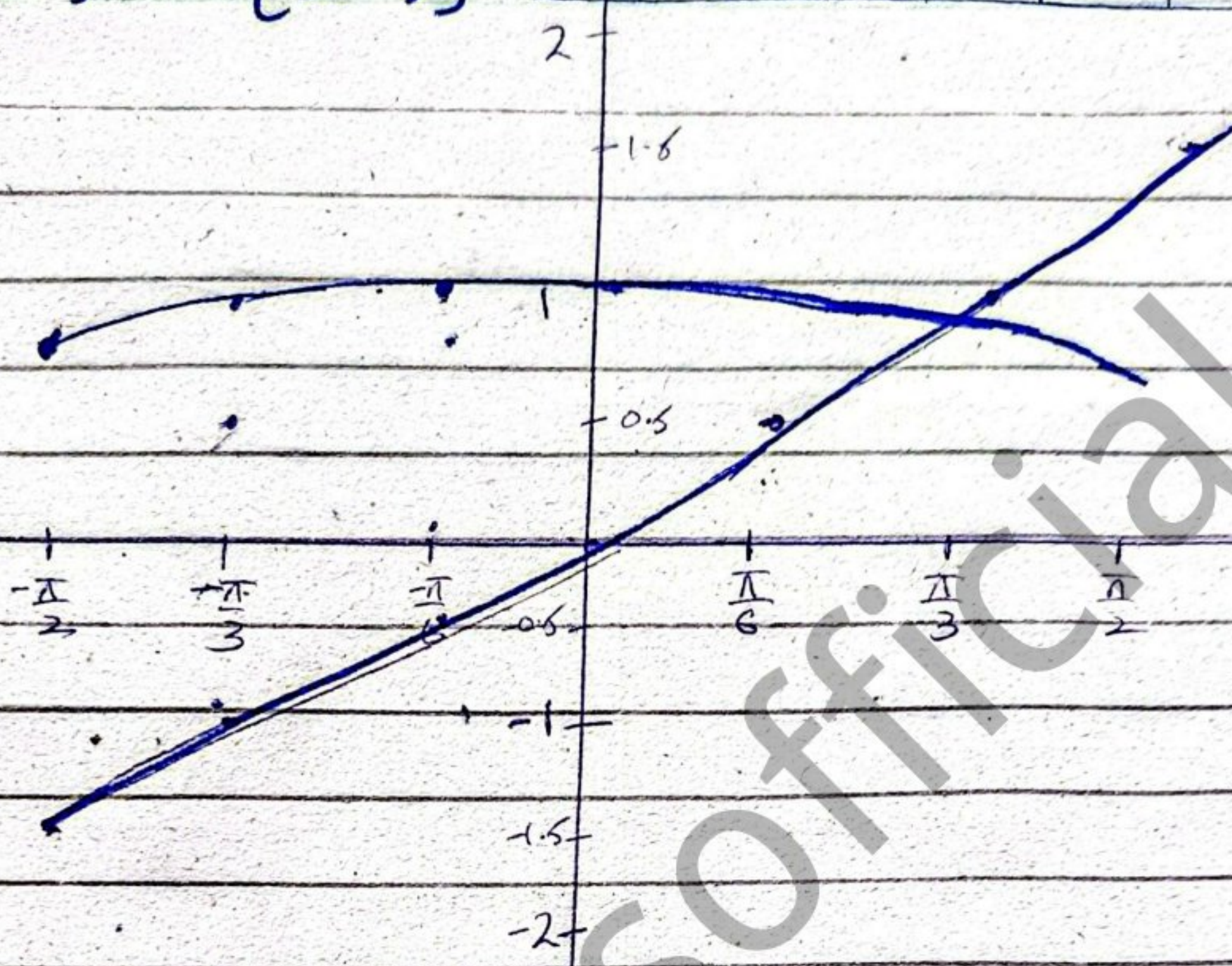
vii) $\sin(\frac{Q}{2}) = Q; Q \in [-\frac{\pi}{2}, \frac{\pi}{2}]$

x	$-\frac{\pi}{2}$	$-\frac{\pi}{3}$	$-\frac{\pi}{6}$	0	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\sin \frac{Q}{2}$	-0.7	-0.5	-0.2	0	0.2	0.5	0.7
Q	-1.5	-1	-0.5	0	0.5	1	1.5



viii) $\cos\left(\frac{\theta}{2}\right) = Q ; Q \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

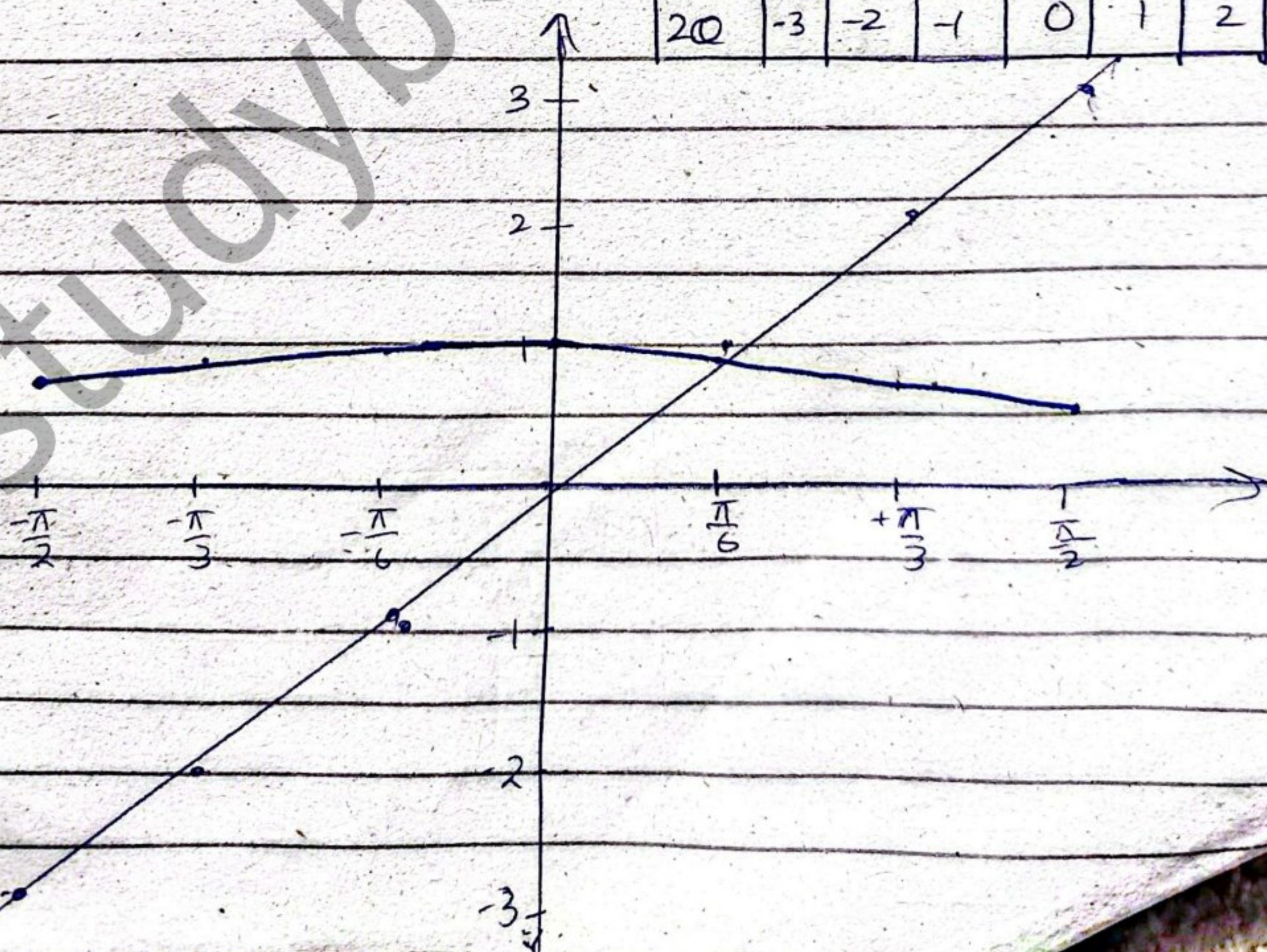
$\cos x$	$-\frac{\pi}{2}$	$-\frac{\pi}{3}$	$-\frac{\pi}{6}$	0	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\cos \frac{\theta}{2}$	0.7	0.8	0.9	1	0.9	0.8	0.7
Q	-1.5	-1	-0.5	0	0.5	1	1.5



x) $\cos\left(\frac{\theta}{2}\right) = 2Q ; Q \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

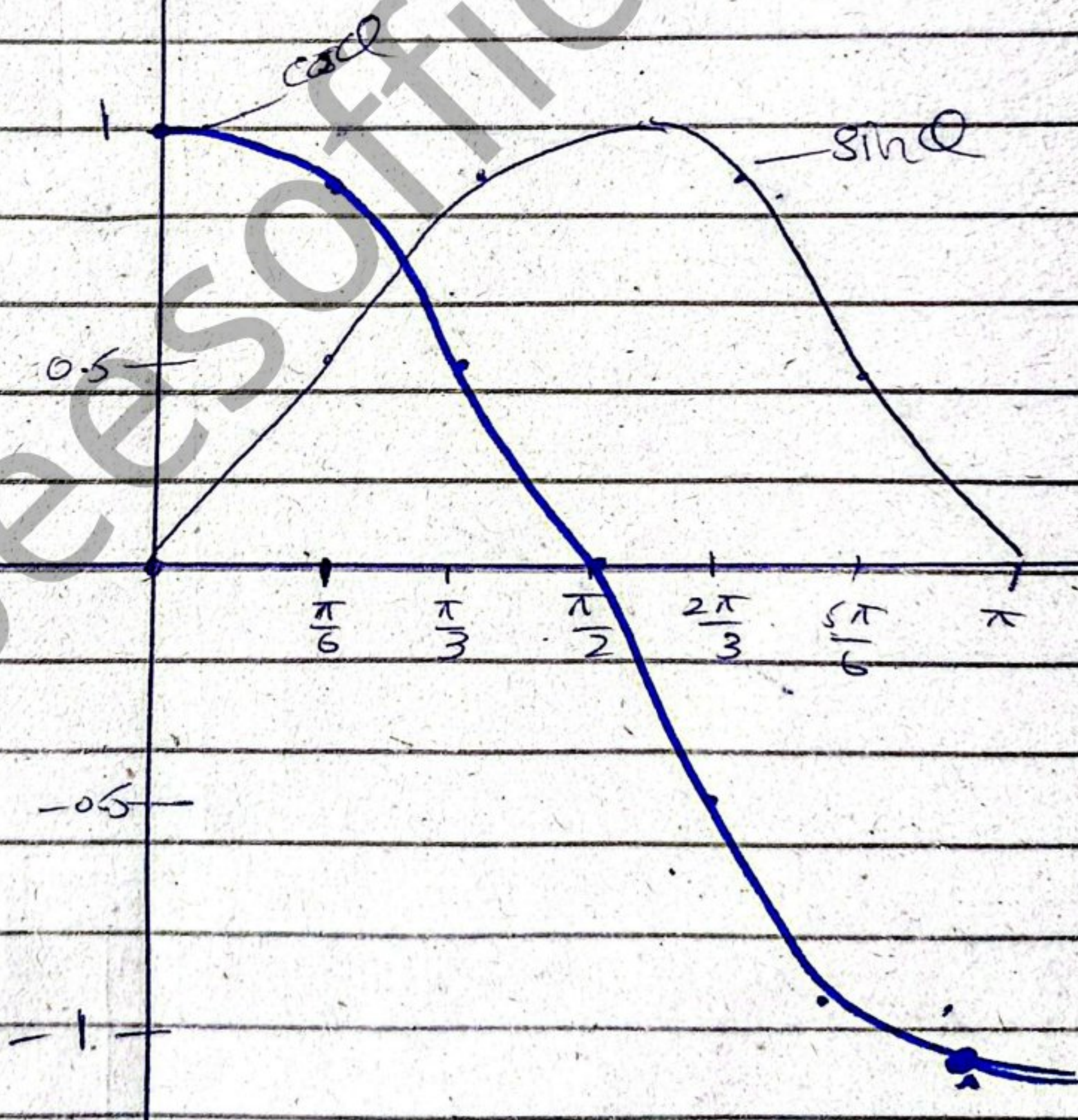
sol:-

x	$-\frac{\pi}{2}$	$-\frac{\pi}{3}$	$-\frac{\pi}{6}$	0	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\cos \frac{\theta}{2}$	0.7	0.8	0.9	1	0.9	0.8	0.7
$2Q$	-3	-2	-1	0	1	2	3



xi) $\sin \theta = \cos \theta ; \theta \in [0, \pi]$
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x	0	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{5\pi}{6}$	π
$\sin \theta$	0	0.5	0.8	1	0.8	0.5	0
$\cos \theta$	1	0.8	0.5	0	-0.5	-0.8	-1



Exercise 9.1