



Assignment No : 01

Submitted To:

Faculty Name: MR. F.M. ARIFUR RAHMAN

(Senior Lecturer, Department of Mathematical & Physical Sciences)

Submitted By:

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ID: 2022-3-60-109

Course Title : Differential & Integral Calculus

Course Code : MAT101

Section : 05

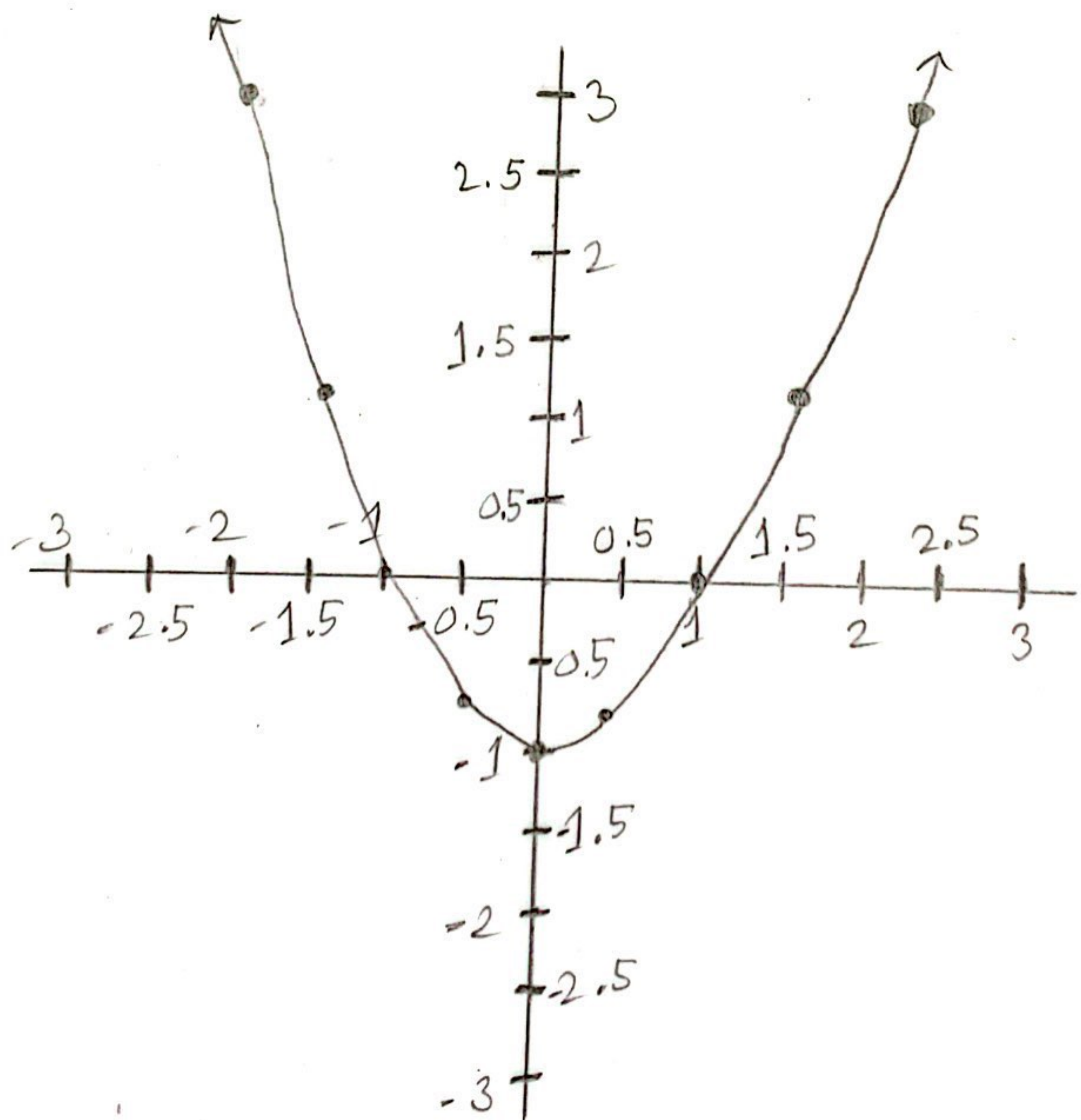
Semester : Fall 2022

Date of Submission: 4th November, 2022

Q.No:1:

$$y = x^2 - 1$$

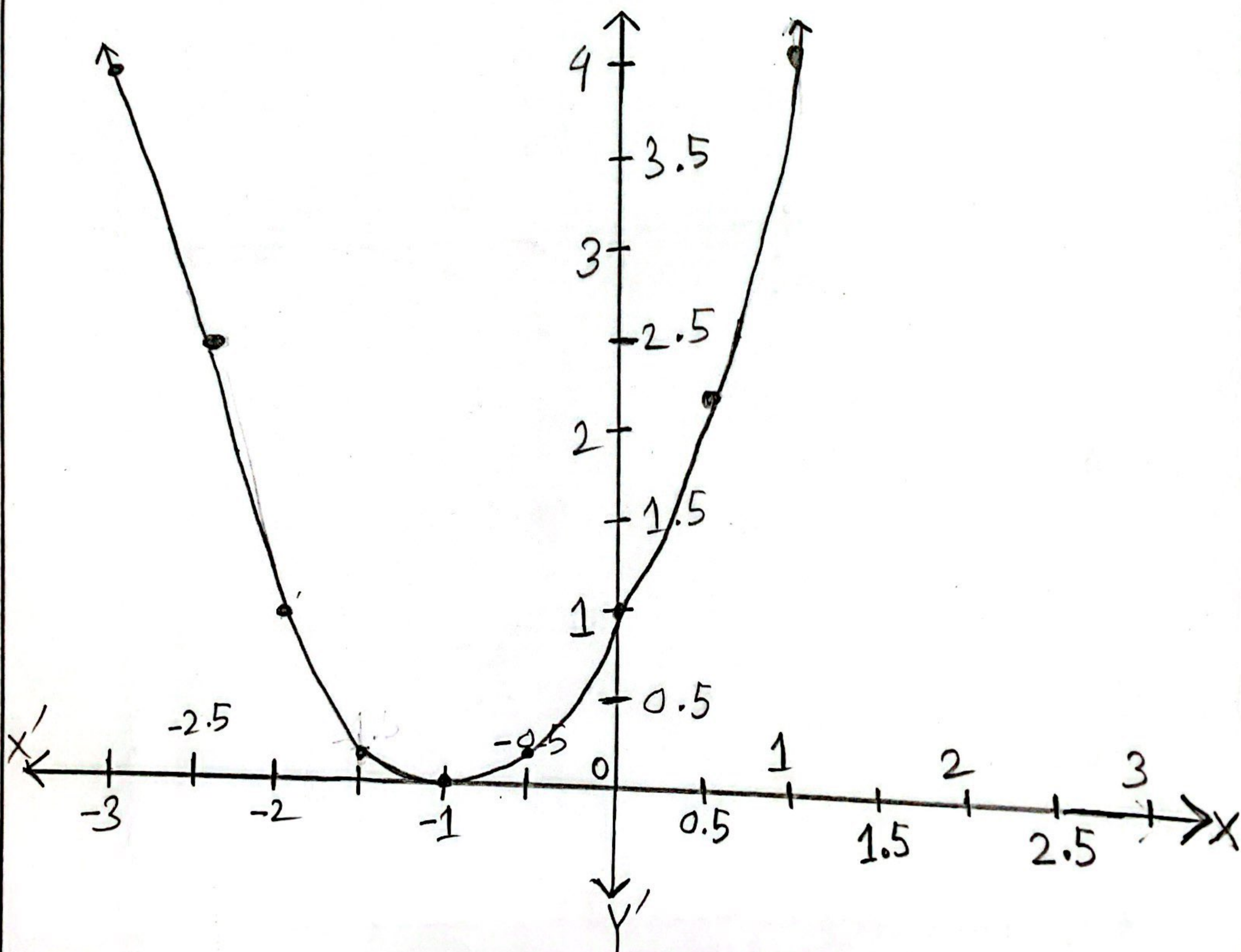
x	-2	-1.5	-1	-0.5	0	0.5	1	1.5	2
y	3	1.25	0	-0.75	-1	-0.75	0	1.25	3



Q. NO:2

$$y = (x+1)^2$$

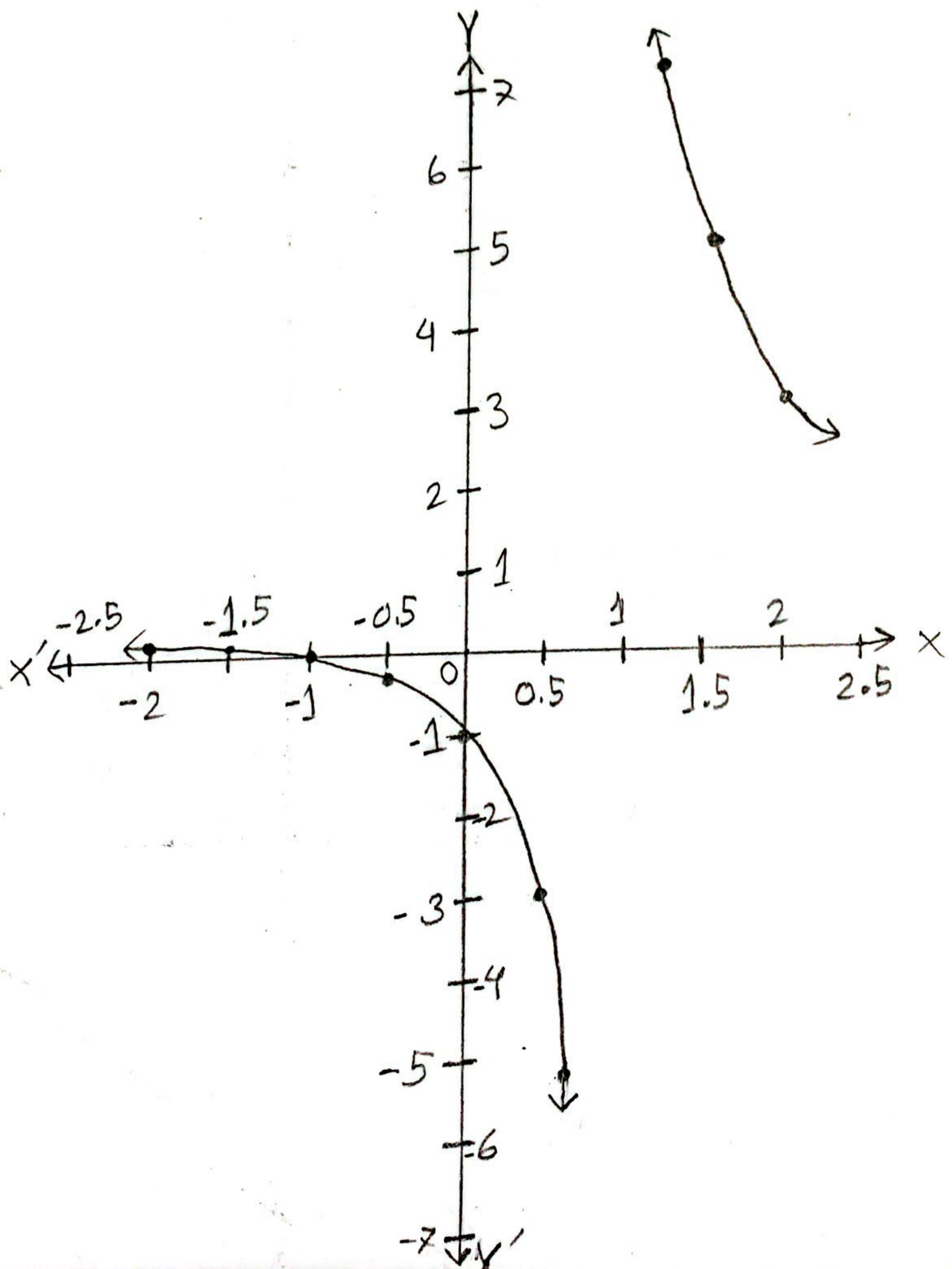
x	-3	-2.5	-2	-1.5	-1	-0.5	0	0.5	1
y	4	2.25	1	0.25	0	0.25	1	2.25	4



Q. No: 3

$$y = \frac{x+1}{x-1}$$

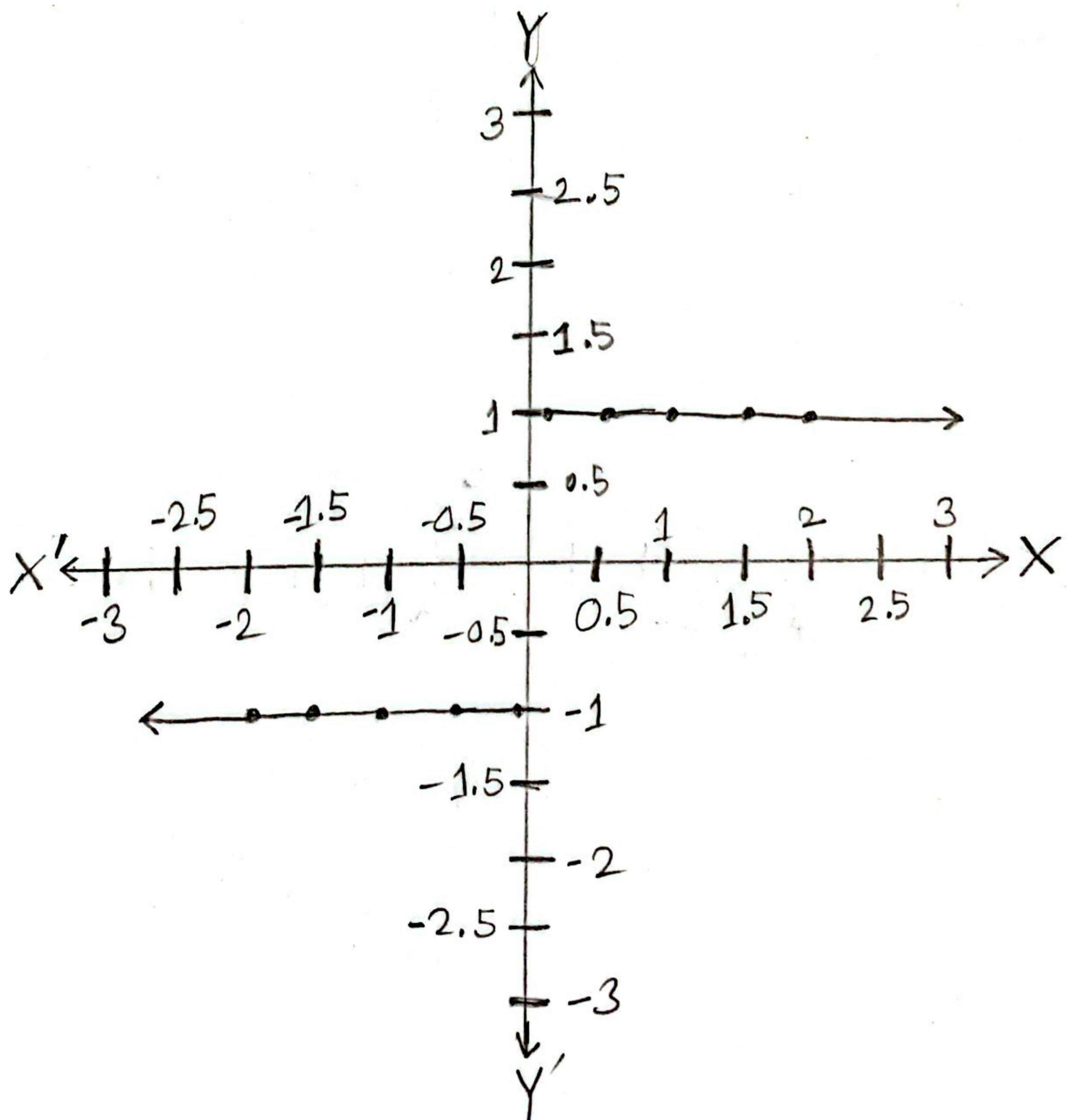
x	-2	-1.5	-1	-0.5	0	0.5	0.7		1.3	1.5	2
y	0.33	0.2	0	-0.33	-1	-3	-5.67		7.67	5	3



Q. No: 4

$$y = \frac{x}{|x|}$$

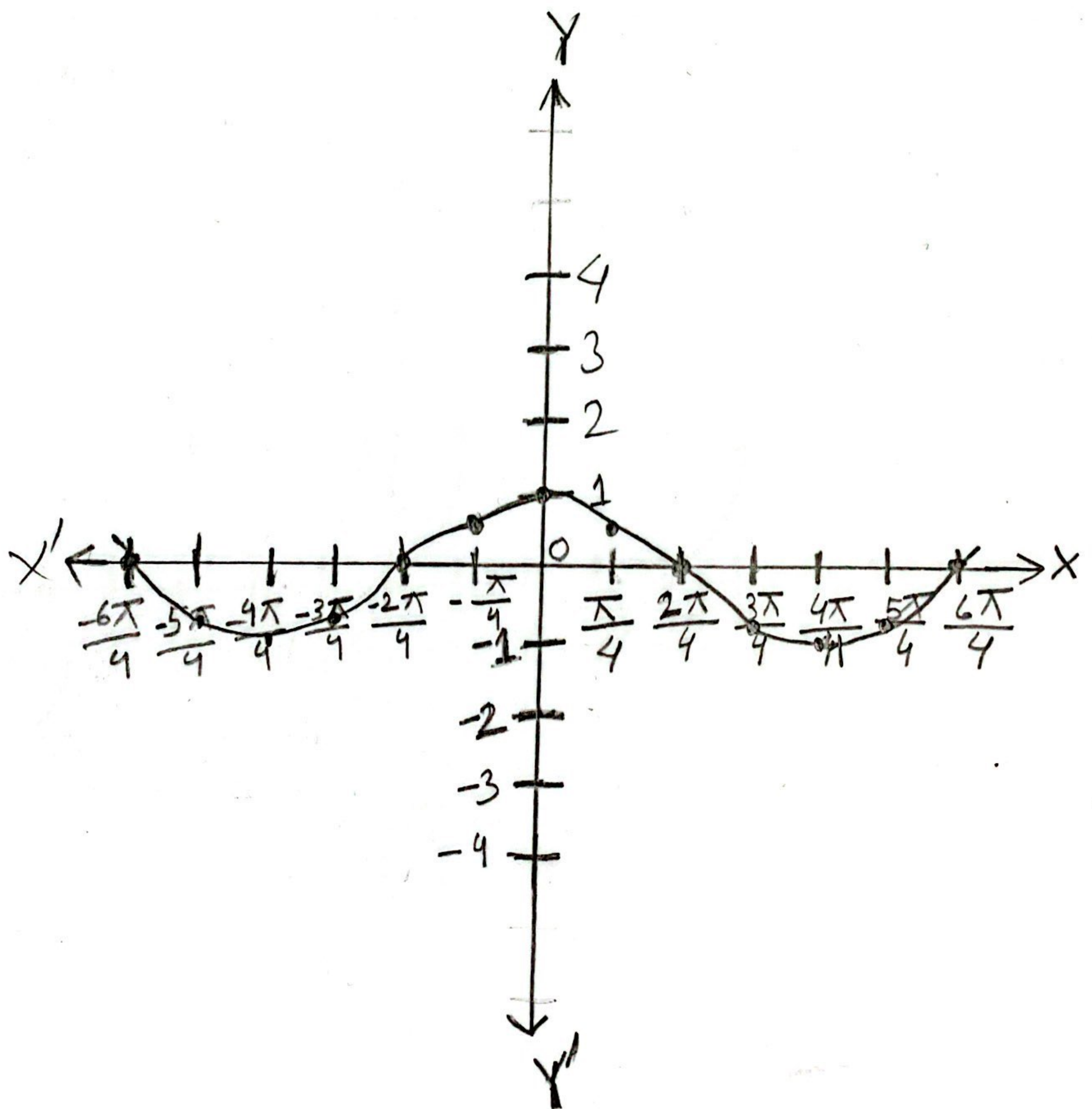
x	-2	-1.5	-1	-0.5	-0.01		0.01	0.5	1	1.5	2
y	-1	-1	-1	-1	-1		1	1	1	1	1



Q. No:5

$$y = f(x) = \cos x$$

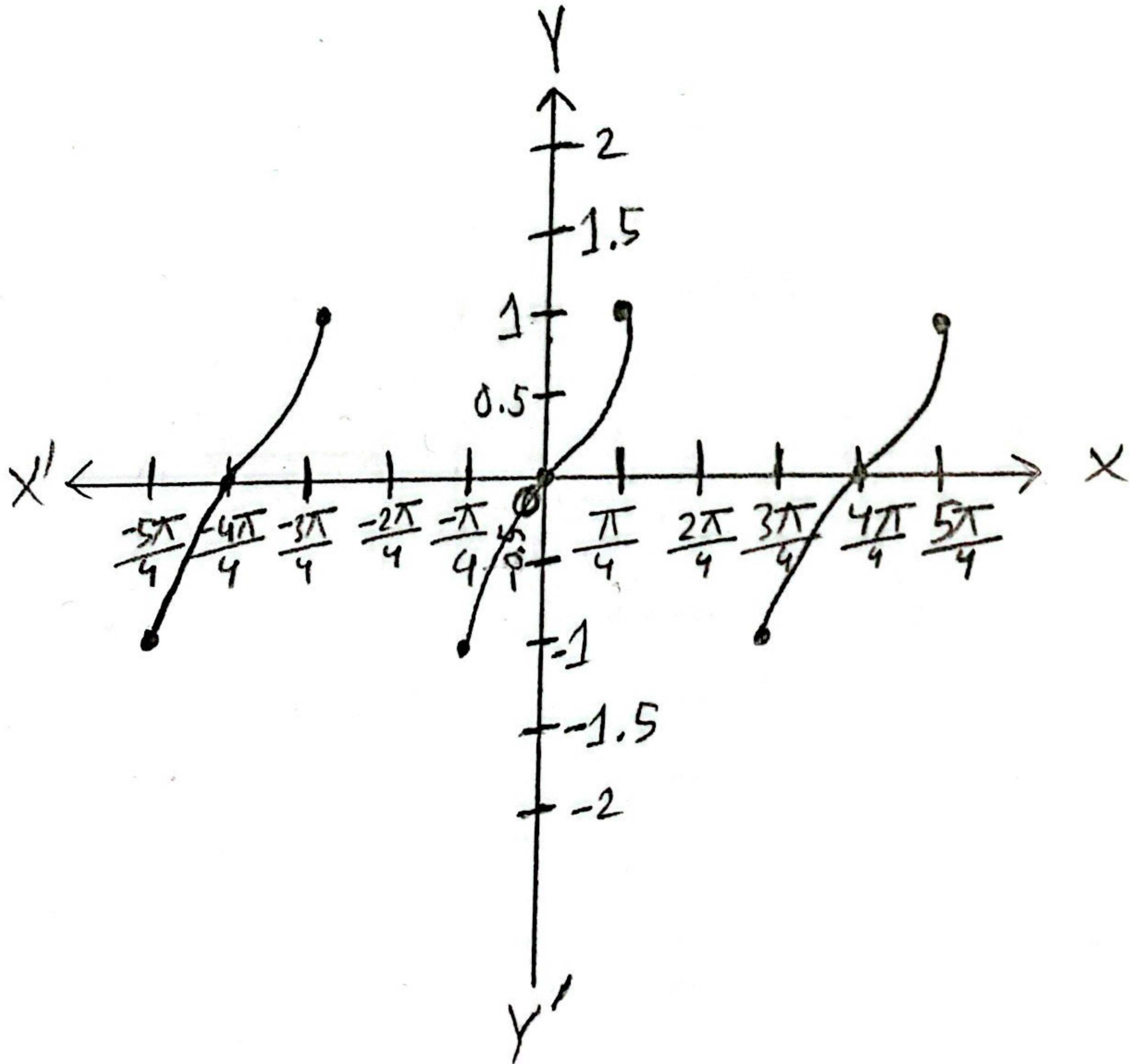
x	$-\frac{6\pi}{4}$	$-\frac{5\pi}{4}$	$-\frac{4\pi}{4}$	$-\frac{3\pi}{4}$	$-\frac{2\pi}{4}$	$-\frac{\pi}{4}$	0	$\frac{\pi}{4}$	$\frac{2\pi}{4}$	$\frac{3\pi}{4}$	$\frac{4\pi}{4}$	$\frac{5\pi}{4}$	$\frac{6\pi}{4}$
$f(x)$	0	-0.707	-1	-0.707	0	0.707	1	0.707	0	-0.707	-1	-0.707	0



Q. NO: 6

$$f(x) = \tan x$$

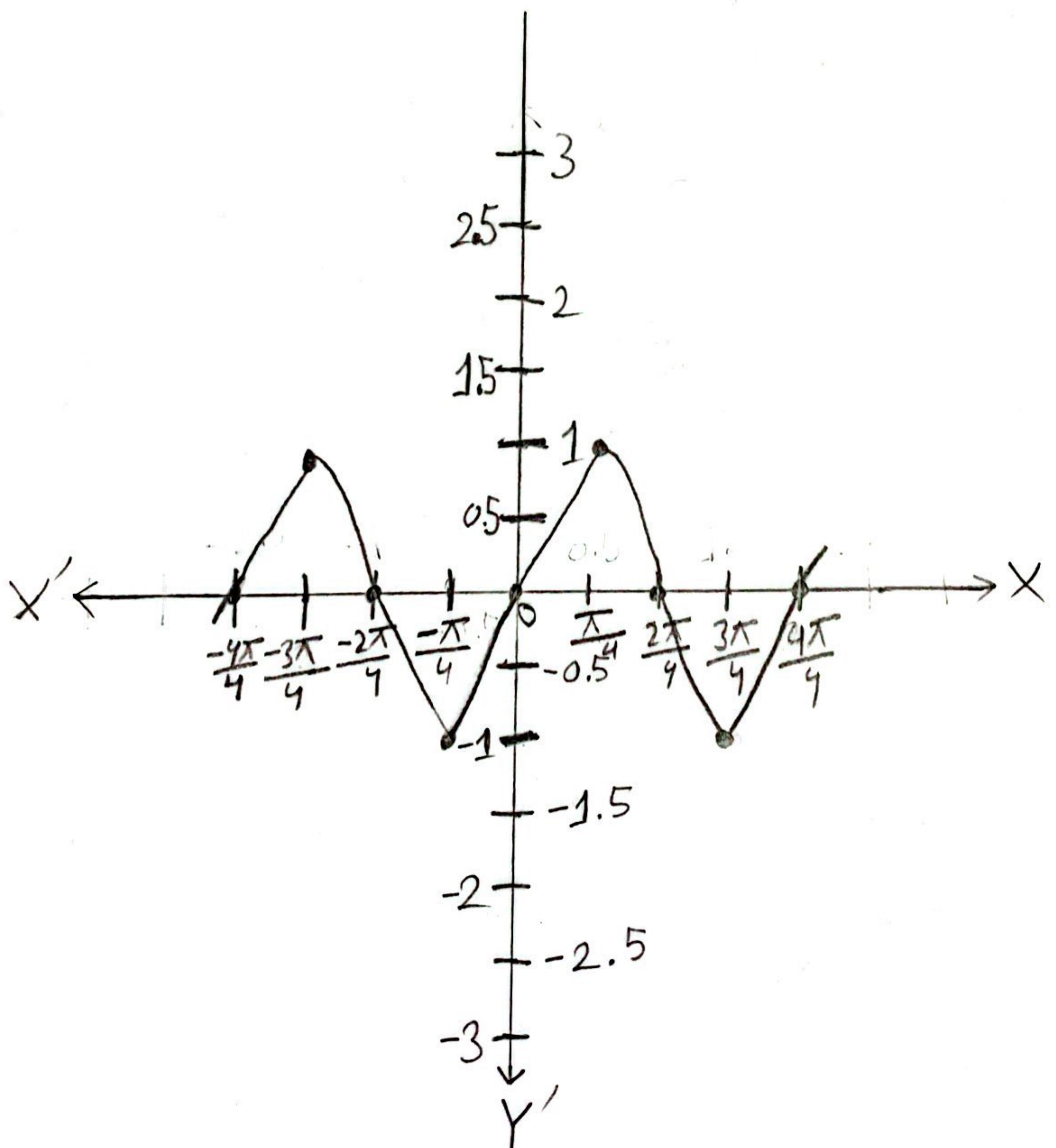
x	$-\frac{5\pi}{4}$	$-\frac{4\pi}{4}$	$-\frac{3\pi}{4}$		$-\frac{\pi}{4}$	0	$\frac{\pi}{4}$		$\frac{3\pi}{4}$	$\frac{4\pi}{4}$	$\frac{5\pi}{4}$
$\tan x$	-1	0	1		-1	0	1		-1	0	1



Q. No: 2:

$$f(x) = y = \sin(2x)$$

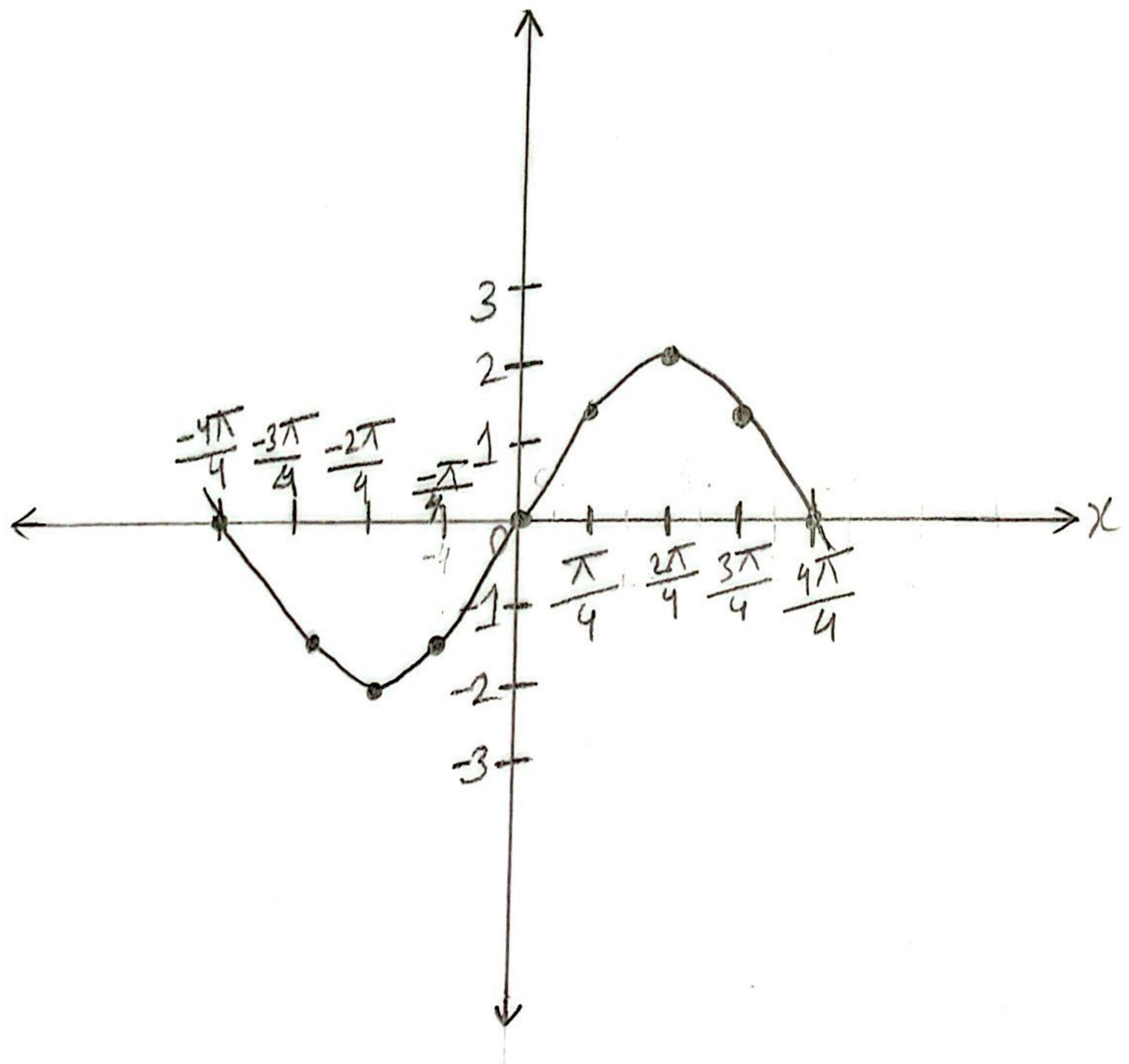
x	$-\frac{4\pi}{4}$	$-\frac{3\pi}{4}$	$-\frac{2\pi}{4}$	$-\frac{\pi}{4}$	0	$\frac{\pi}{4}$	$\frac{2\pi}{4}$	$\frac{3\pi}{4}$	$\frac{4\pi}{4}$
$\sin(2x)$	0	1	0	-1	0	1	0	-1	0



Q. No: 8

$$f(x) = y = 2 \sin x$$

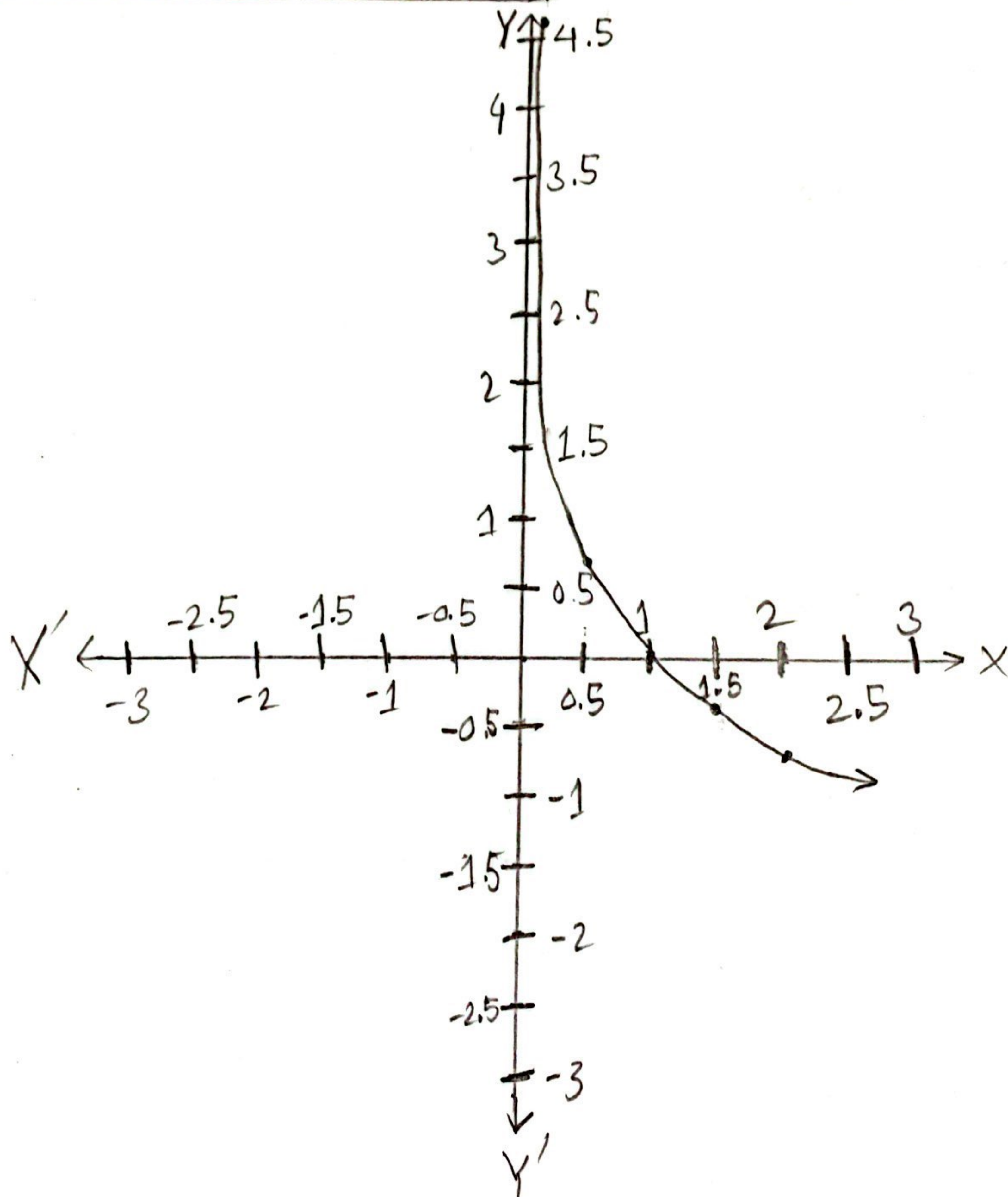
x	$-\frac{4\pi}{4}$	$-\frac{3\pi}{4}$	$-\frac{2\pi}{4}$	$-\frac{\pi}{4}$	0	$\frac{\pi}{4}$	$\frac{2\pi}{4}$	$\frac{3\pi}{4}$	$\frac{4\pi}{4}$
$2 \sin x$	0	-1.41	-2	-1.41	0	1.41	2	1.41	0



Q. No: 9

$$y = f(x) = -\log x$$

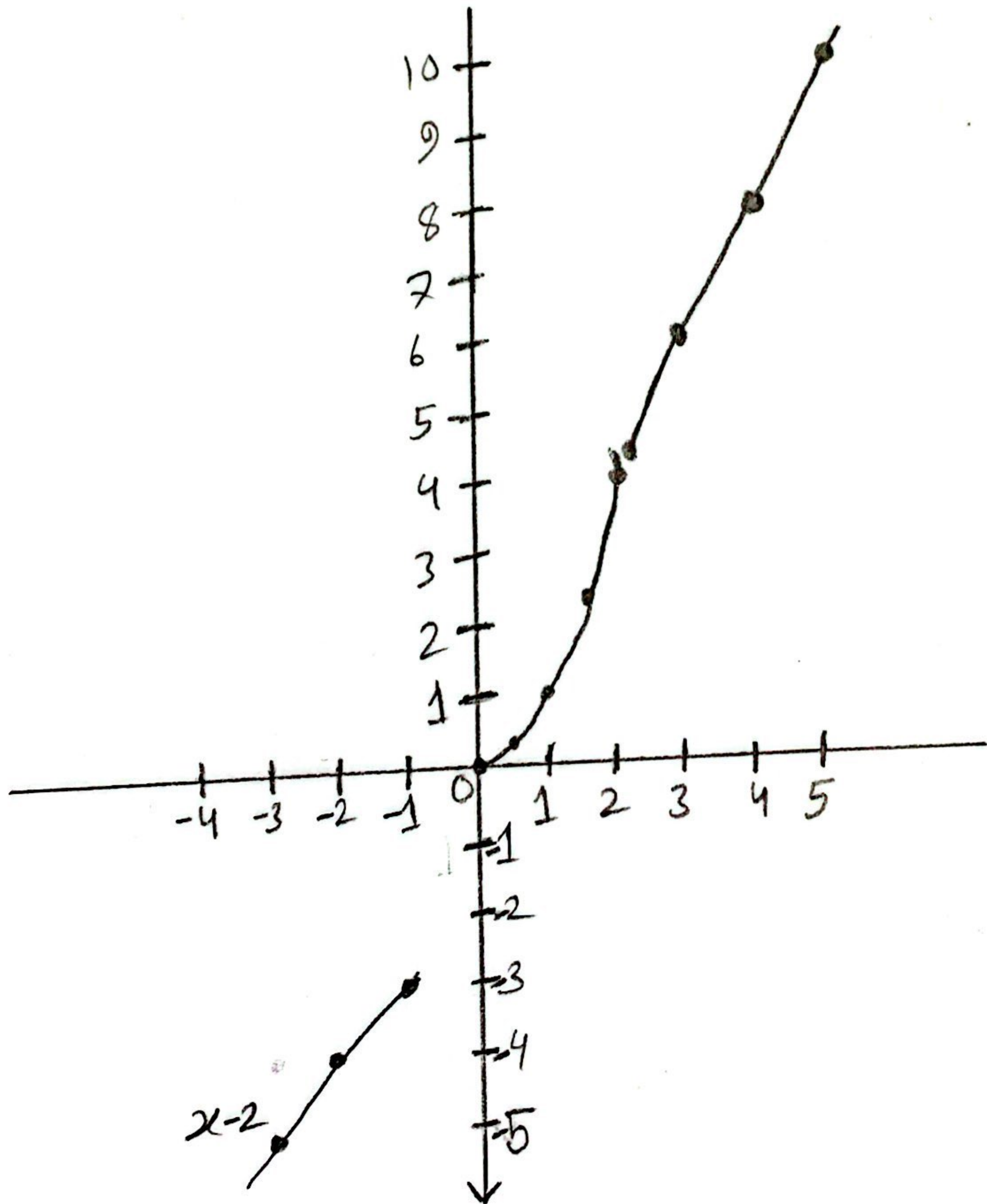
x	0.01	0.5	1	1.5	2
$-\log x$	4.6	0.7	0	-0.4	-0.7



Q. NO: 10

$$f(x) = y = \begin{cases} x-2; & x < 0 \\ x^2; & 0 \leq x \leq 2 \\ 2x; & x > 2 \end{cases}$$

	-3	-2	-1	-0.99	0	0.5	1	1.5	2	2.1	3	4	5
	-5	-4	-3	-2.99	0	0.25	1	2.25	4	4.2	6	8	10

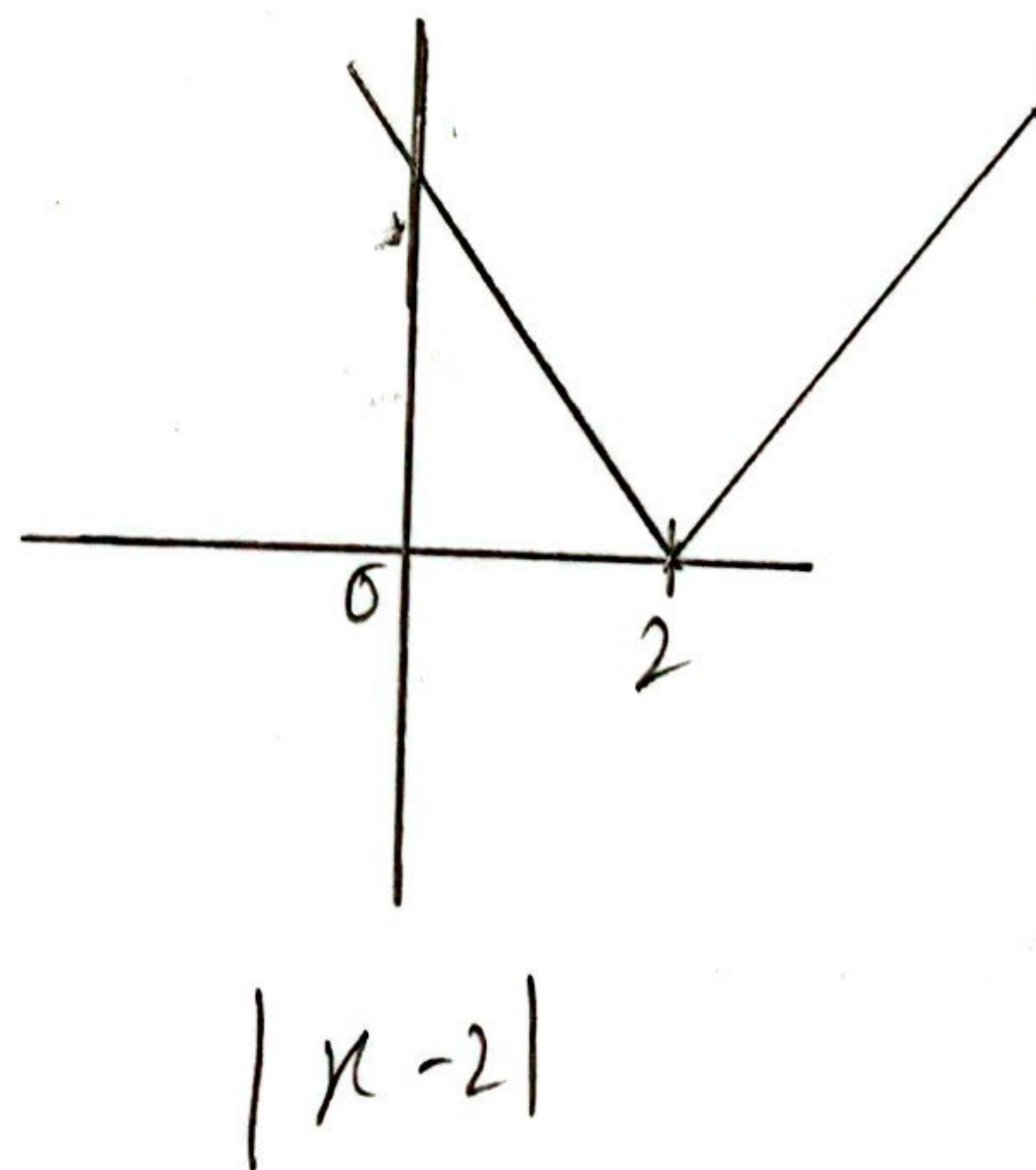
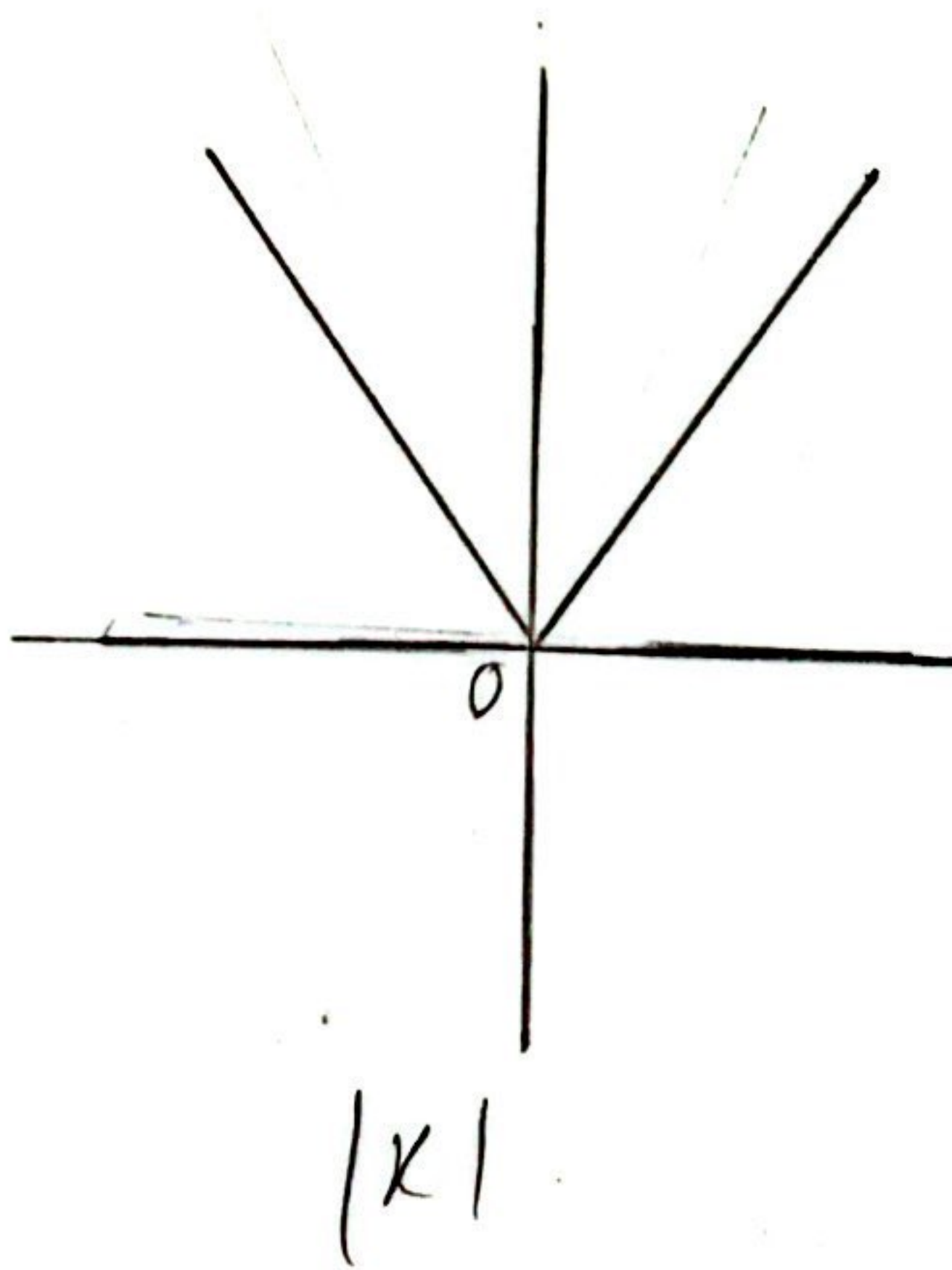


Q. NO: 11

$$y = \sqrt{x^2 - 4x + 4}$$

$$\Rightarrow y = \sqrt{(x-2)^2}$$

$$\Rightarrow y = |x-2|$$

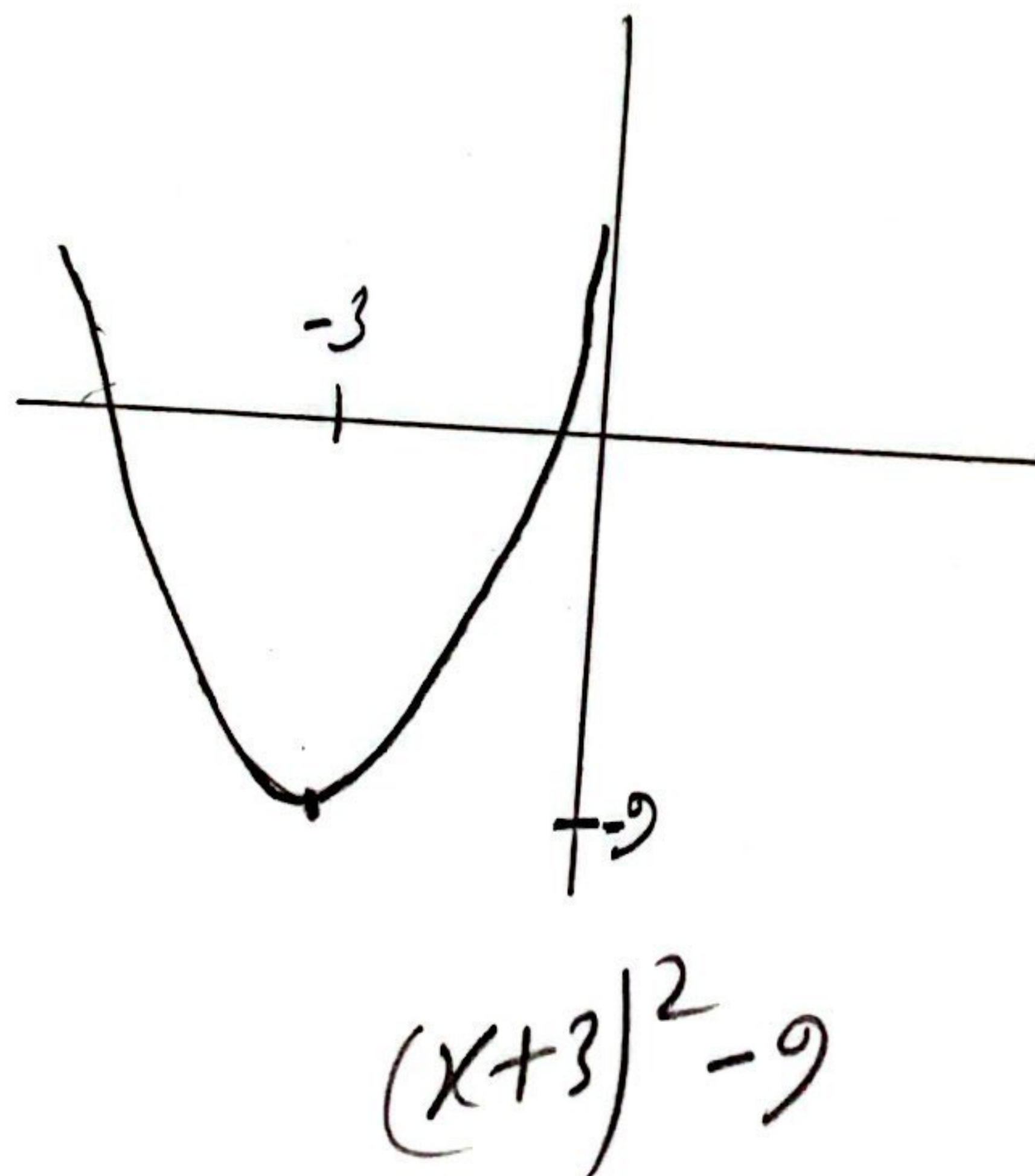
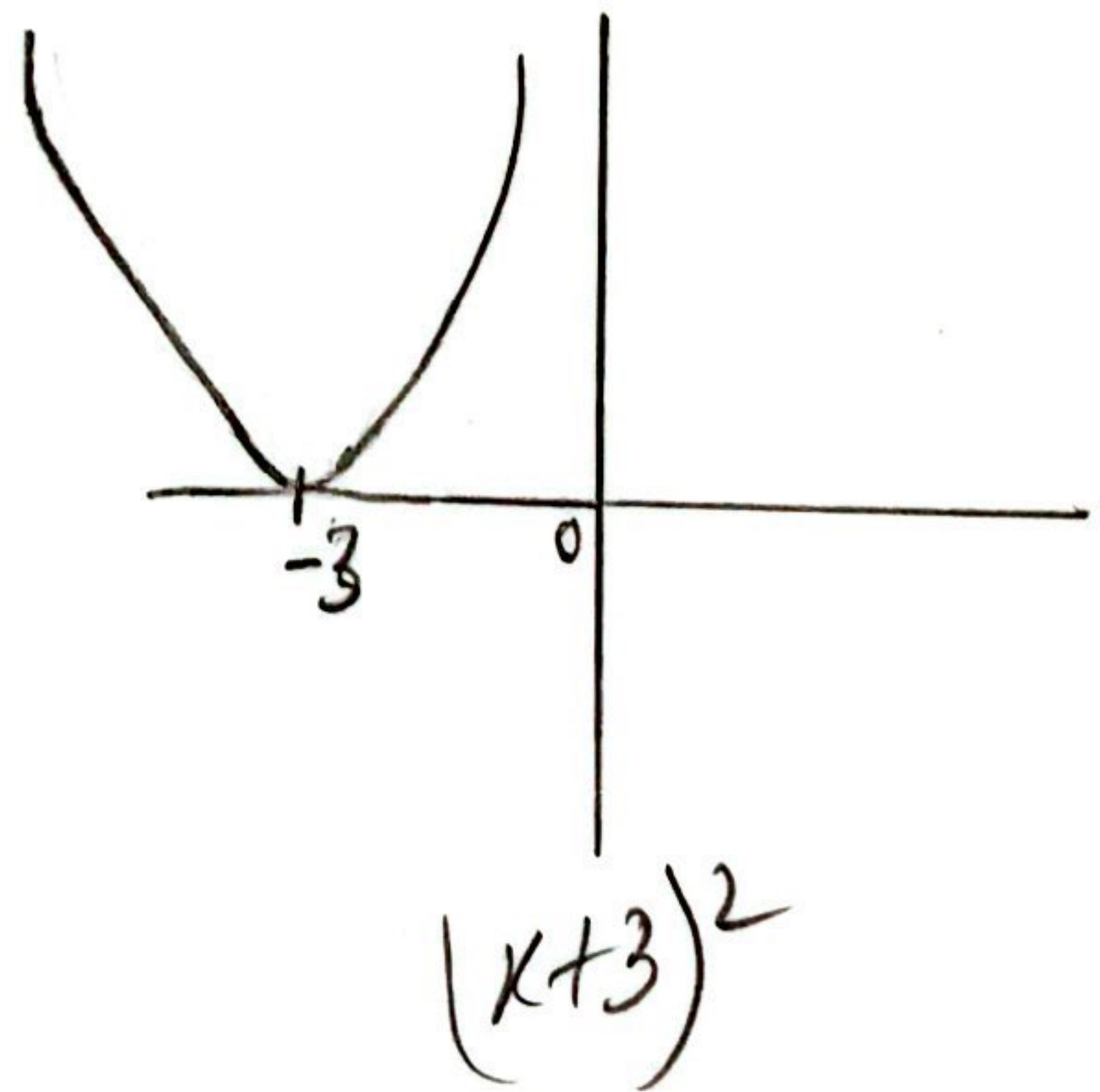
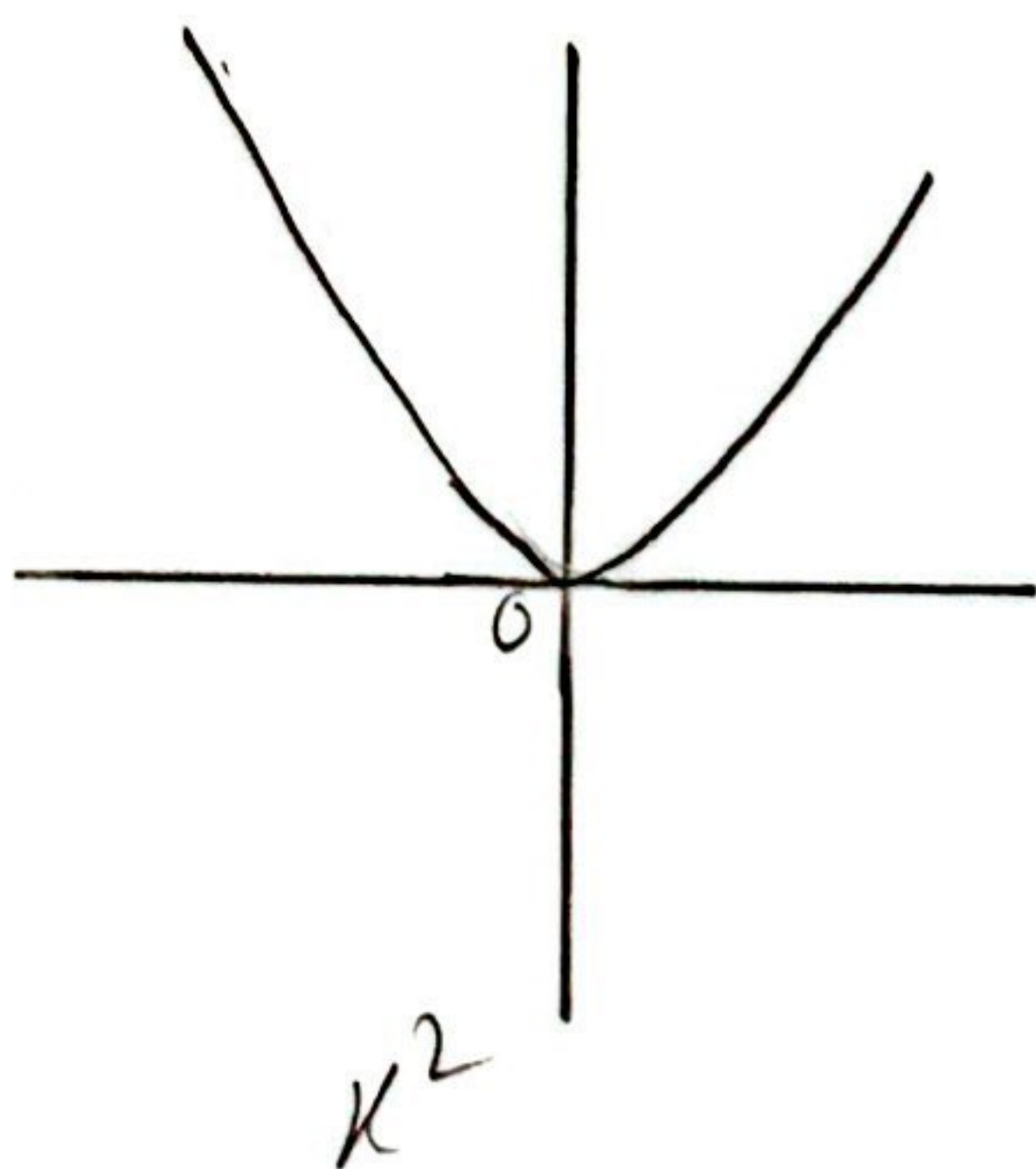


Q. No: 12

$$y = x^2 + 6x$$

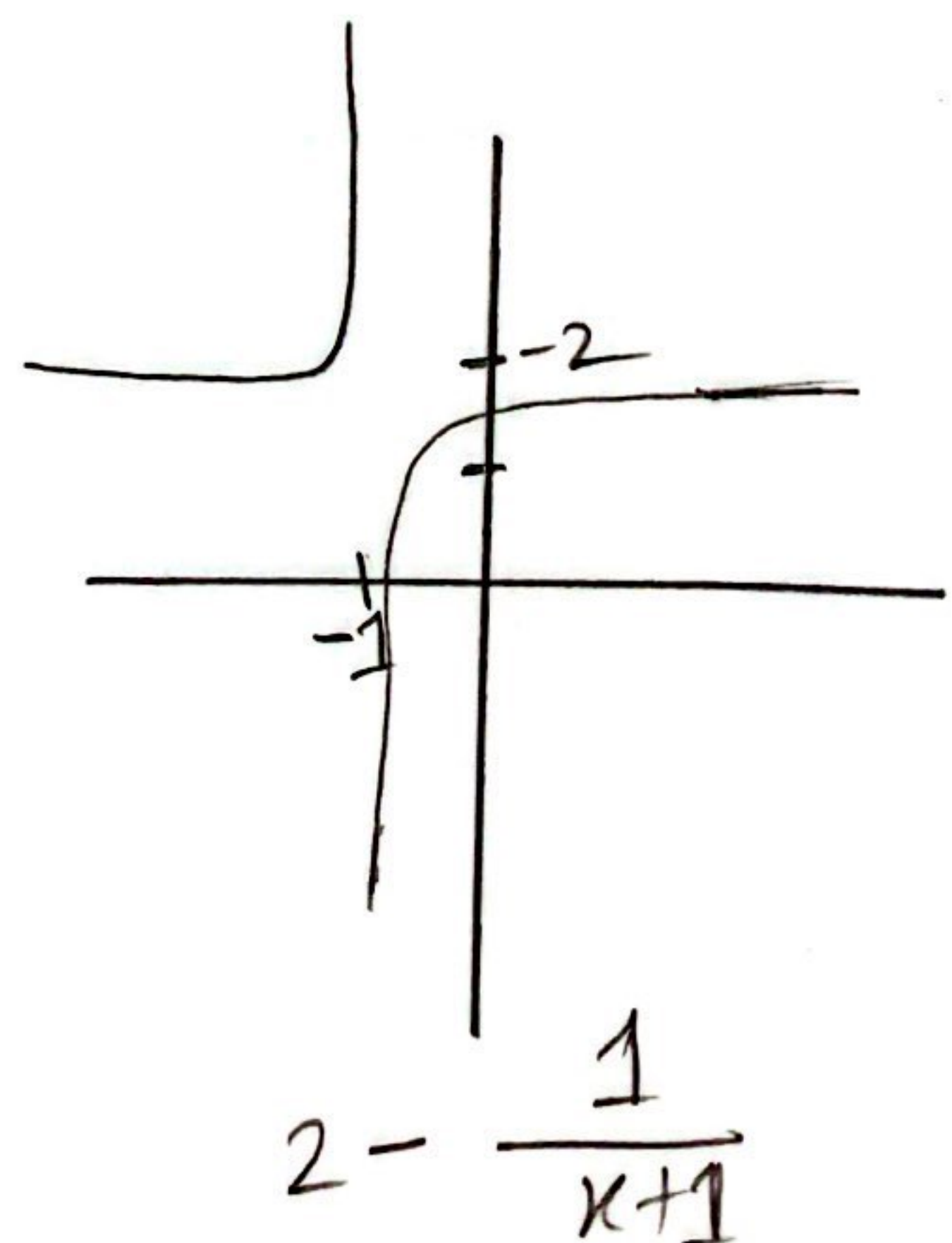
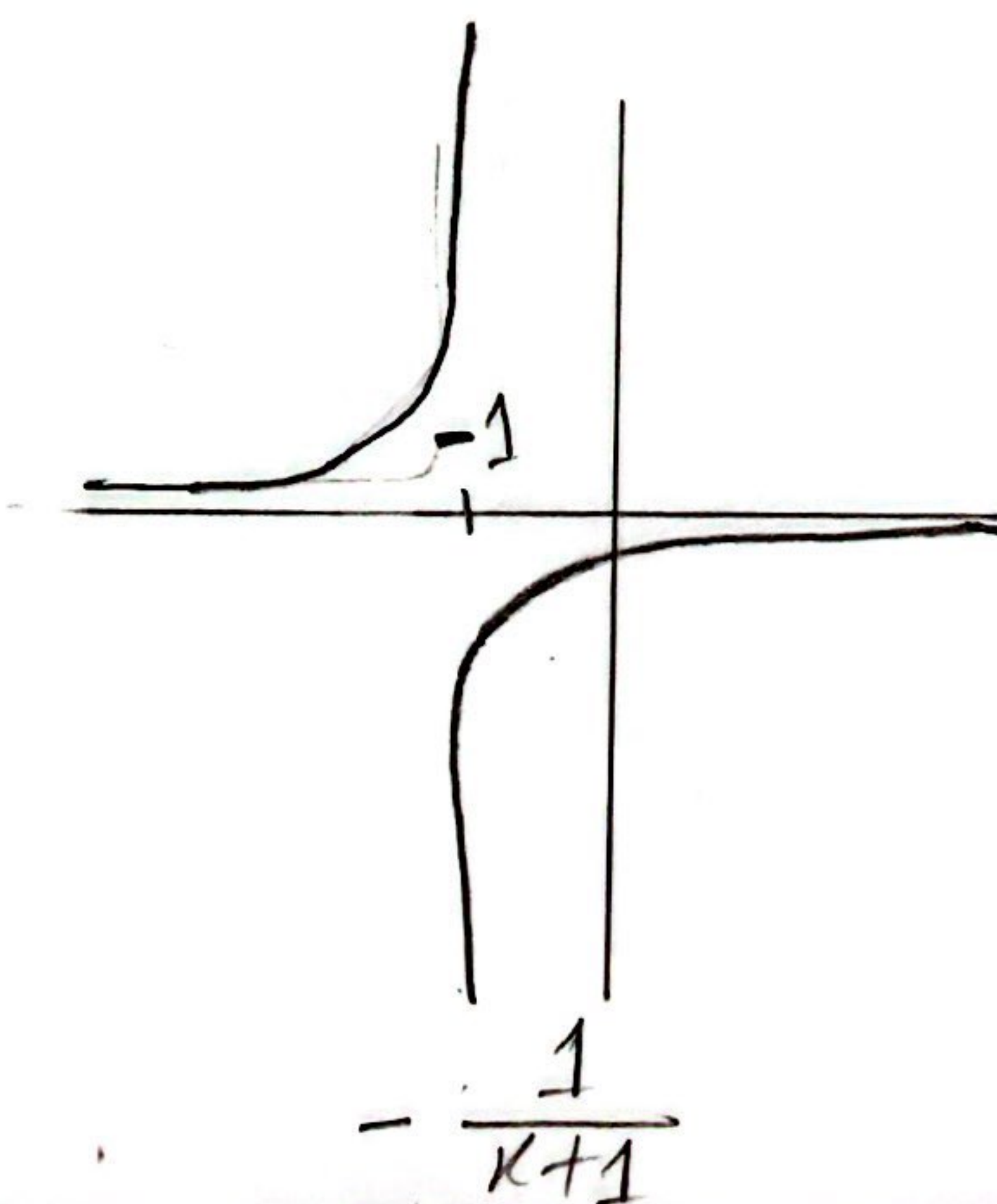
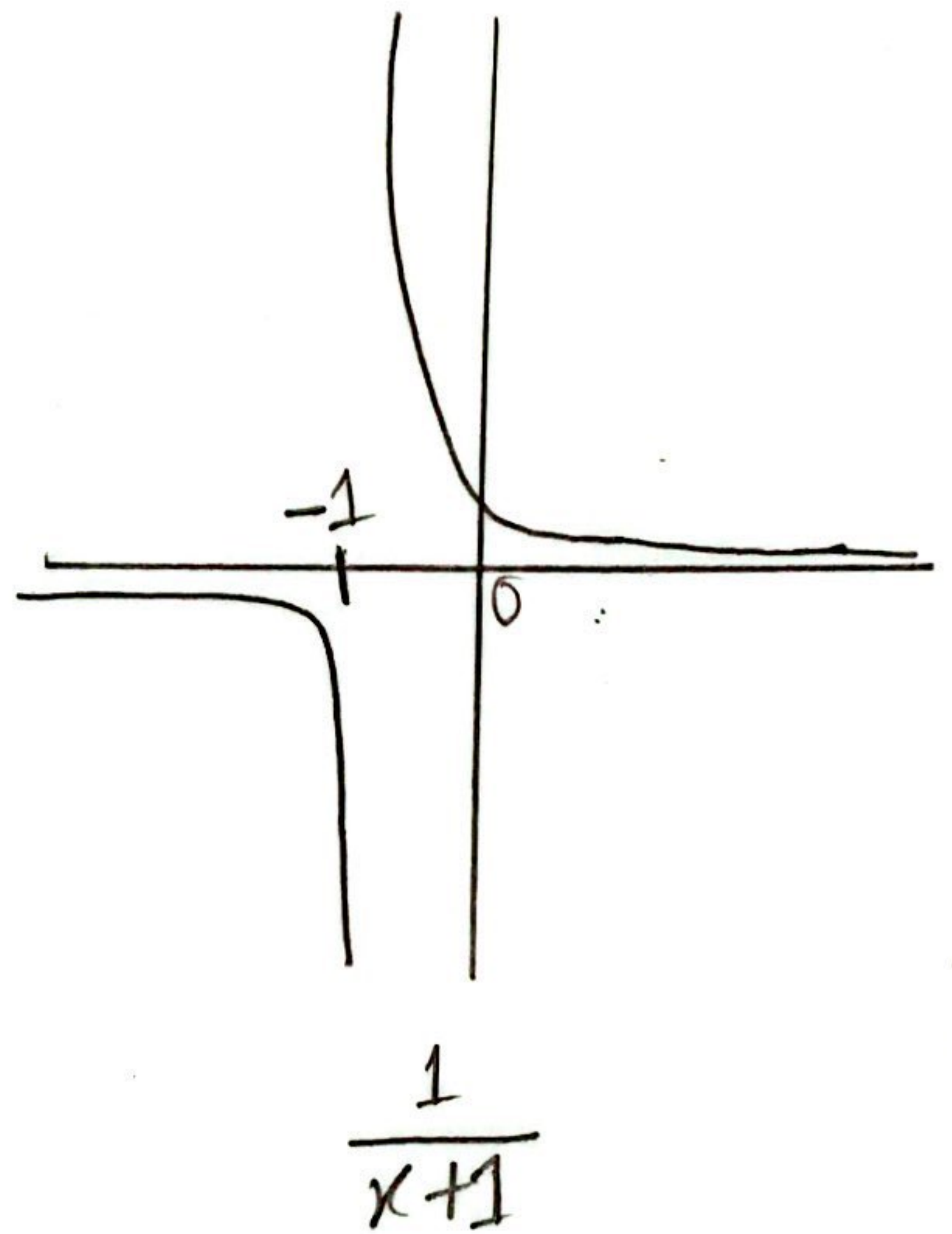
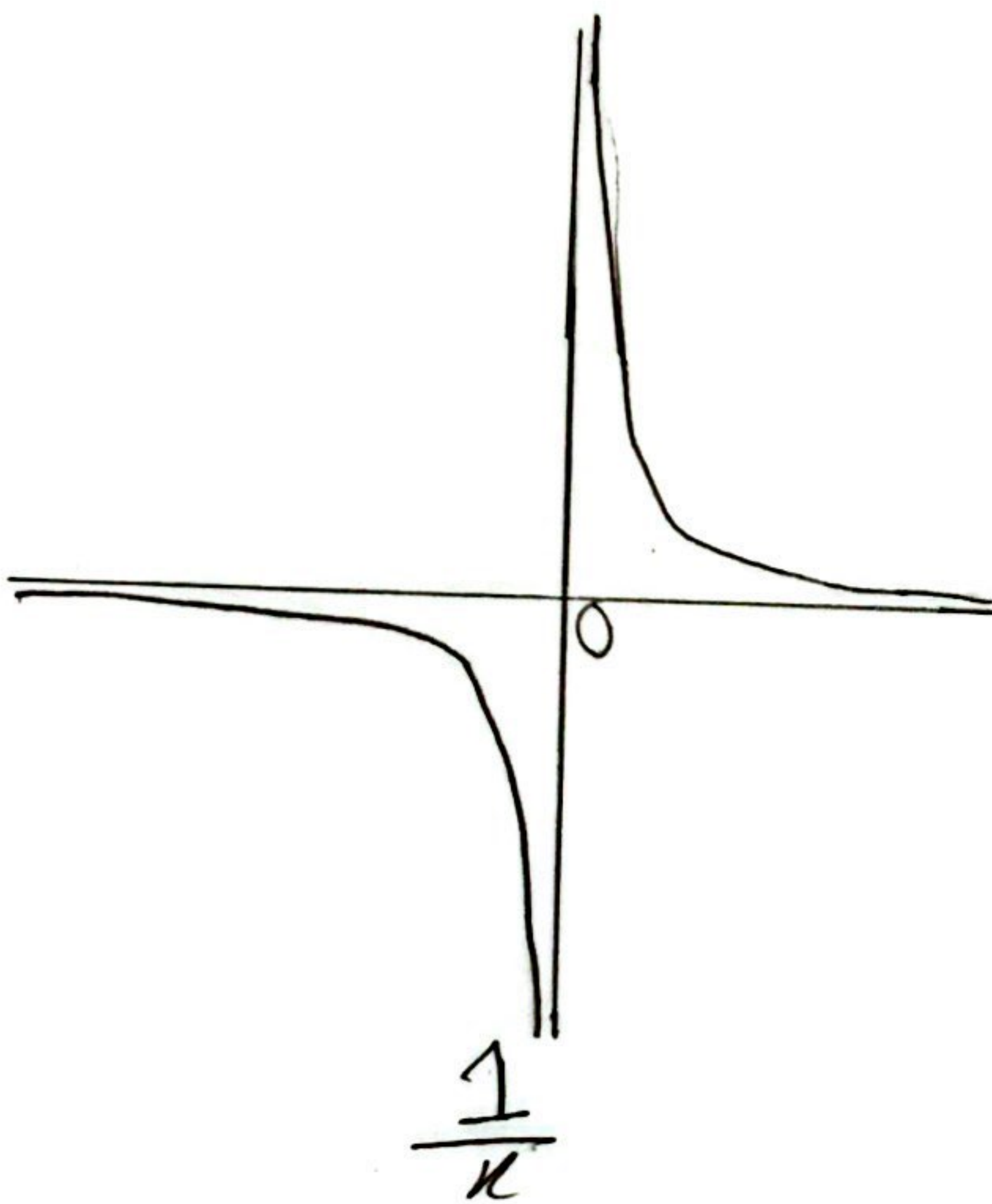
$$\Rightarrow y = x^2 + 2 \cdot x \cdot 3 + 3^2 - 9$$

$$\Rightarrow y = (x+3)^2 - 9$$



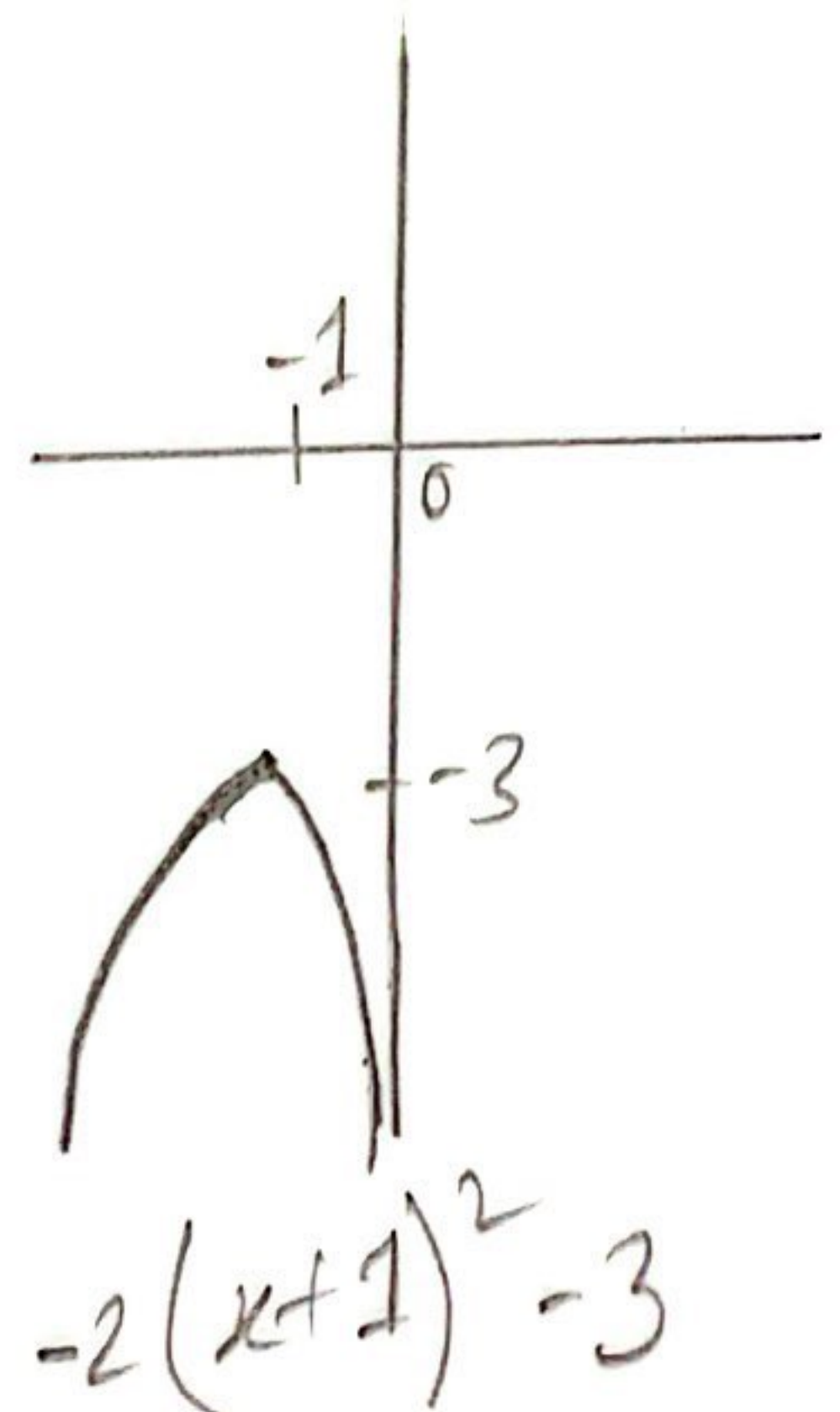
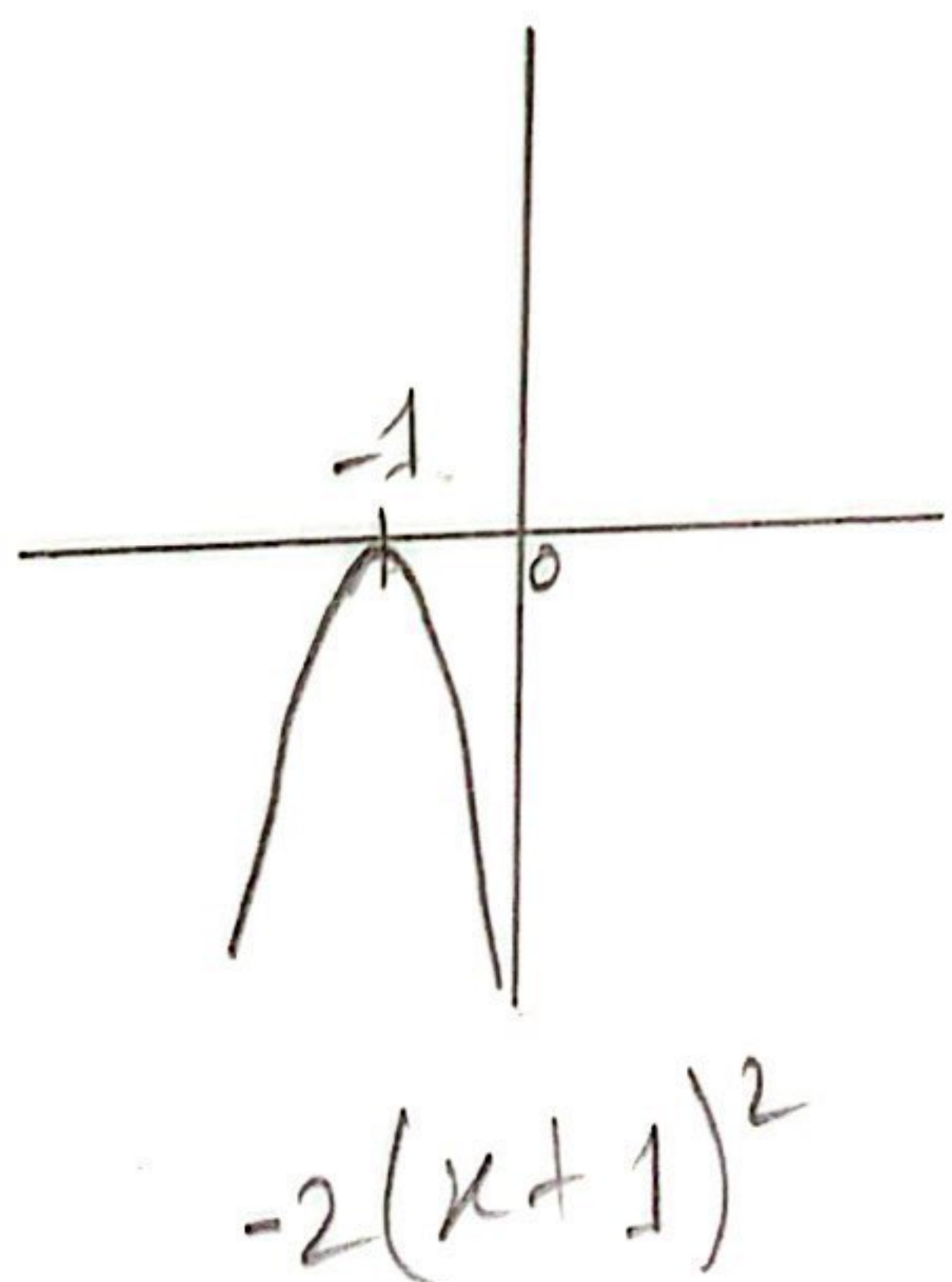
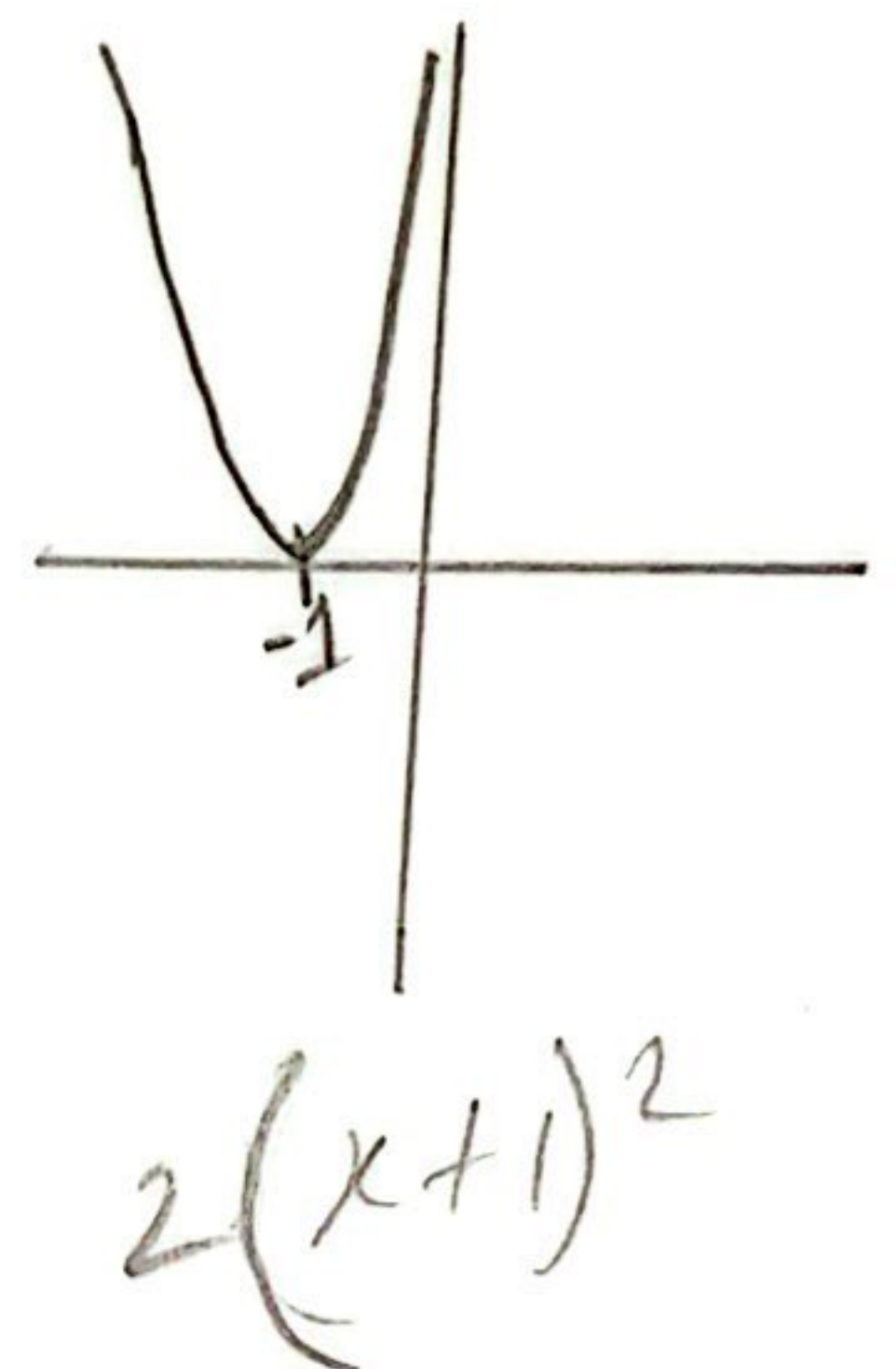
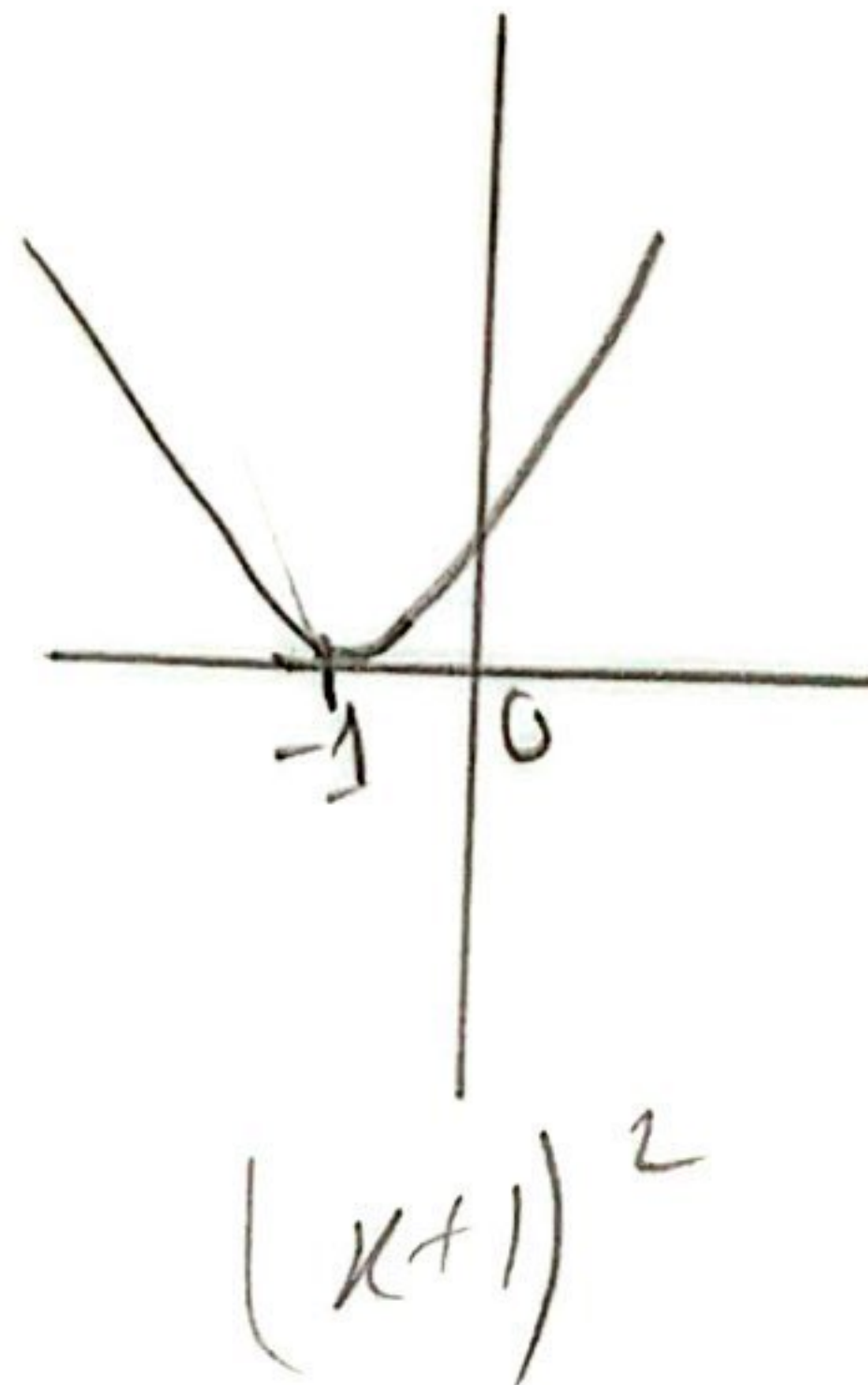
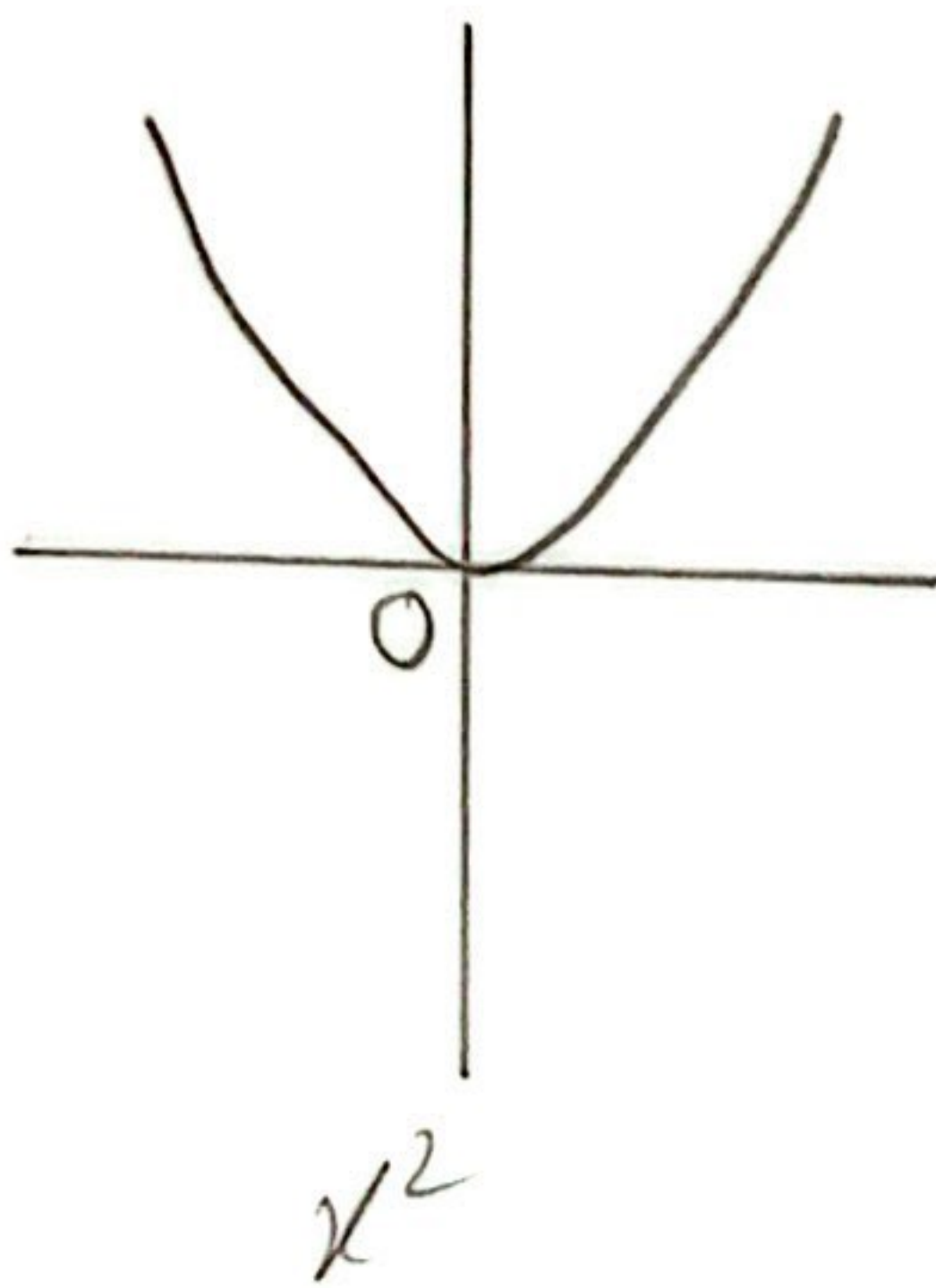
Q. No: 13

$$y = 2 - \frac{1}{x+1}$$



Q. No: 14

$$y = -2(x+1)^2 - 3$$



Q. No: 15

$$\lim_{x \rightarrow 1} \frac{x-1}{x^3-1}$$

x	0.9	0.99	0.999	1	1.002	1.0	1.1
$\frac{x-1}{x^3-1}$	0.36	0.3366	0.333 666		0.332	0.33	0.3

$$\lim_{x \rightarrow 1^-} \frac{x-1}{x^3-1} = 0.333$$

$$\lim_{x \rightarrow 1^+} \frac{x-1}{x^3-1} = 0.333$$

$$\lim_{x \rightarrow 1} \frac{x-1}{x^3-1} = 0.333$$

Q. No: 16

$$\text{for } f(x) = \begin{cases} x-2 & ; x < 0 \\ x^2 & ; 0 \leq x \leq 2 \\ 2x & ; x > 2 \end{cases}$$

$$\lim_{x \rightarrow 2} f(x)$$

x	1.9	1.99	1.999	2	2.001	2.01	2.1
$f(x)$	3.61	3.9601	3.996001		4.002	4.02	4.2

$$\lim_{x \rightarrow 2^-} f(x) = 4$$

$$\lim_{x \rightarrow 2^+} f(x) = 4$$

$$\lim_{x \rightarrow 2} f(x) = 4$$

Q. No 17

$$\lim_{x \rightarrow -\infty} \frac{4x^2 - x}{2x^3 - 5}$$

x	-10	-100	-1000	$-\infty$
$f(x)$	-0.2	-0.02004	-0.002004	-

$$\lim_{x \rightarrow -\infty} \frac{4x^2 - x}{2x^3 - 5} = 0$$