

$$\frac{1 - \frac{a}{3} - (1 - \frac{a}{1})}{3-1} = \frac{\frac{2}{3}a}{2} = \frac{a}{3} \quad -1$$

$$f'(x) = -\frac{-a}{x^2} = \frac{a}{x^2} \quad \frac{a}{3} = \frac{a}{x^2} \rightarrow x = \pm \sqrt{3}$$

$$f(x) = 2ax^2 - 8x + 11a$$

$$y = +x \quad -2$$

$$f'(x) = 4ax - 8$$

$$(4ax - 8) = 1 \rightarrow 4ax = 9$$

$$x = \frac{9}{4a}$$

$$2ax^2 - 8x + 11a = x$$

$$2ax^2 - 9x + 11a = 0 \rightarrow ax^2 - \frac{9}{2}x + \frac{11}{2}a = 0$$

$$\Delta = 0 \rightarrow 9 = 4 \times 9 a^2$$

$$\frac{1}{4} = a^2 \rightarrow a = \pm \frac{1}{2}$$

$$x < 0 \rightarrow a = -\frac{1}{2}, x = -\frac{9}{2}$$

$$f(x) = x^3 - 12x + 12$$

$$f'(x) = 3x^2 - 12$$

$$f(2) = 1 - 24 + 12 = -11$$

$$f'(x) = 3x^2 + 2ax - 2b$$

$$b = 0 \quad 12 - 4a = 0$$

$$a = 3$$

$$f(x) = x^3 + 3x^2 - 2$$

x	-2	$+2$
$f'(x)$	$+$	$-$
$f(x)$	\nearrow	\searrow
	max	min

$$f(0) = f'(2) = 0 \quad -4$$

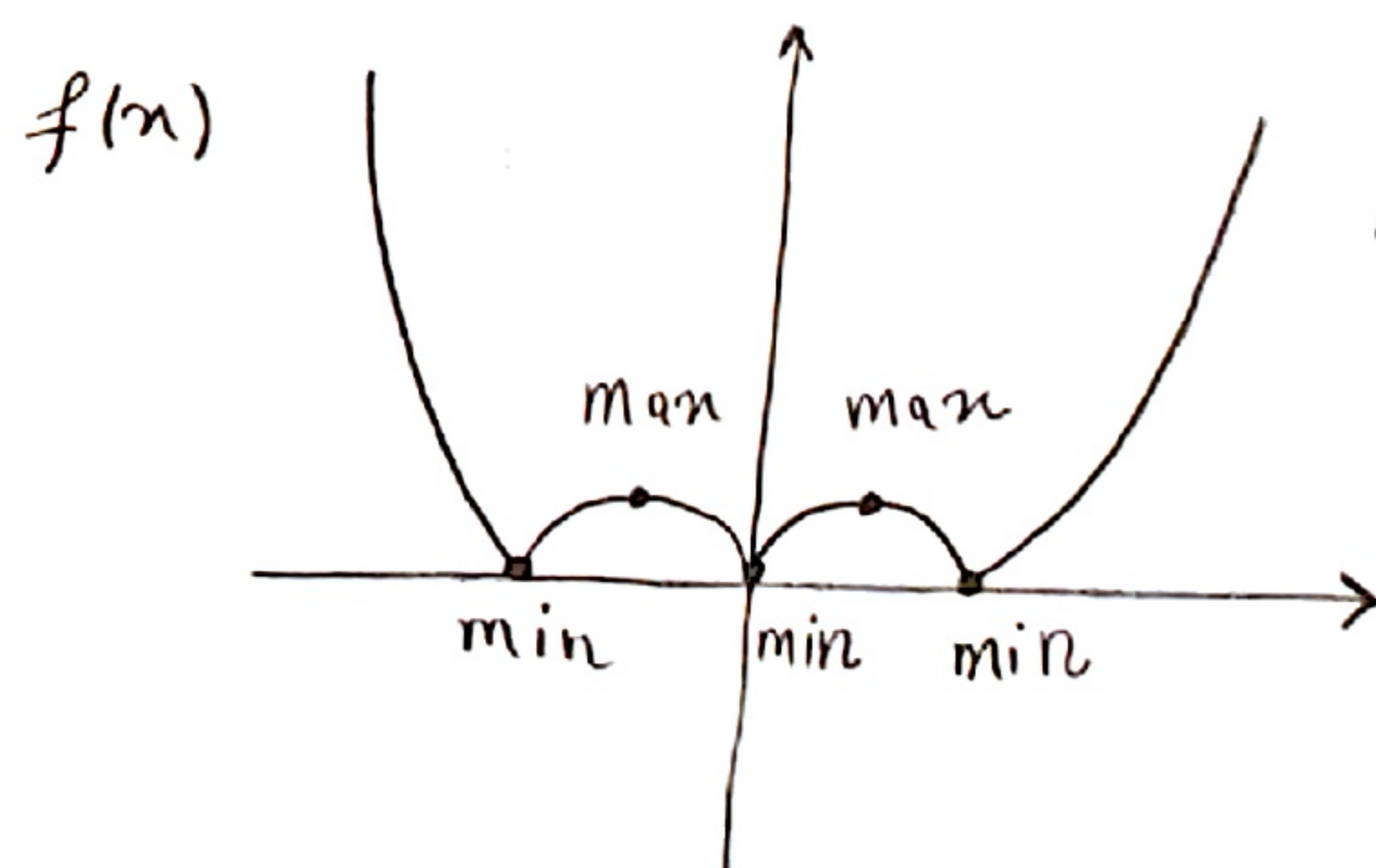
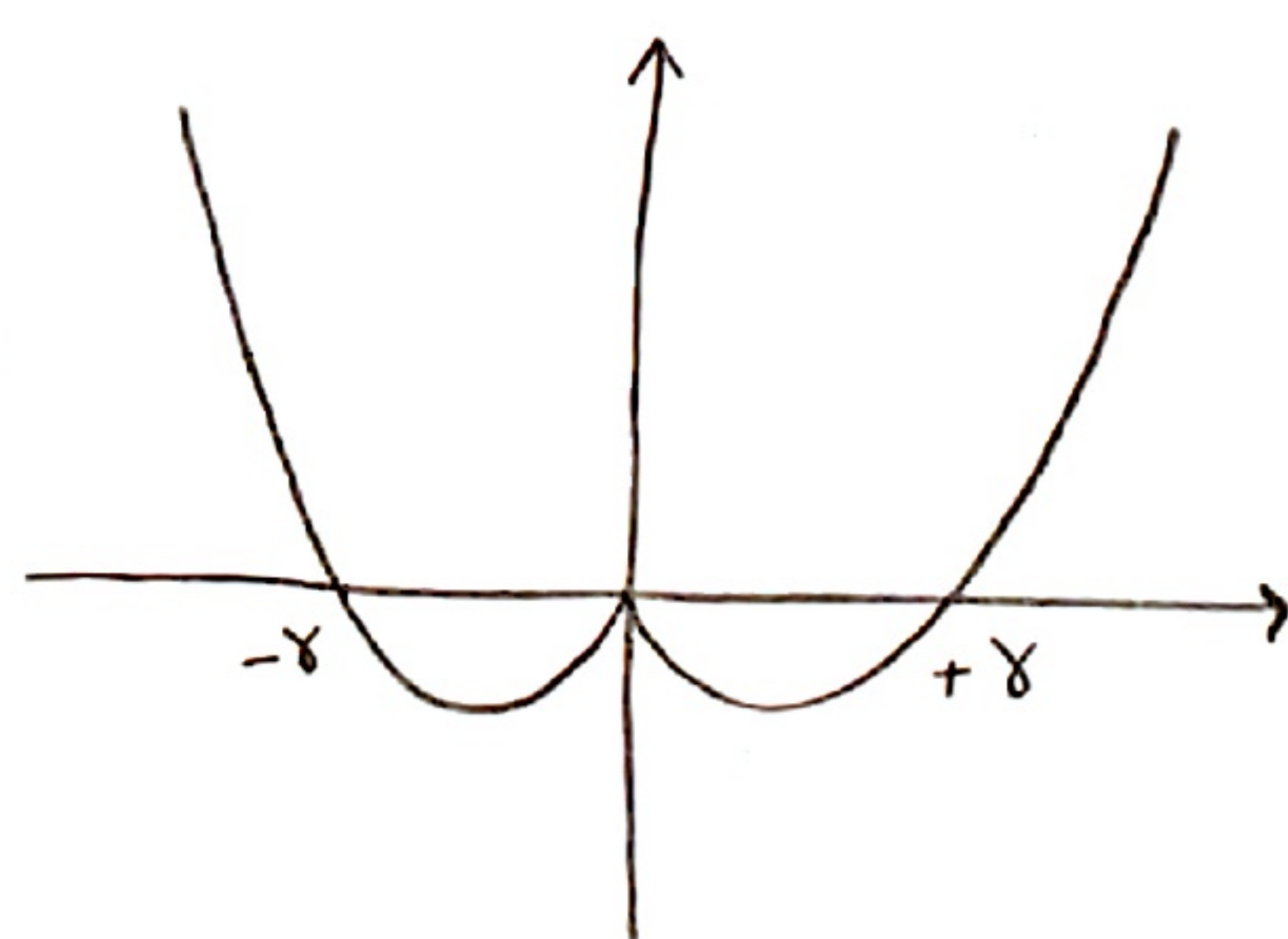
$$f(0) = -2$$

$$f(-2) = 0$$

$$(0, -2)$$

$$(-2, 0)$$

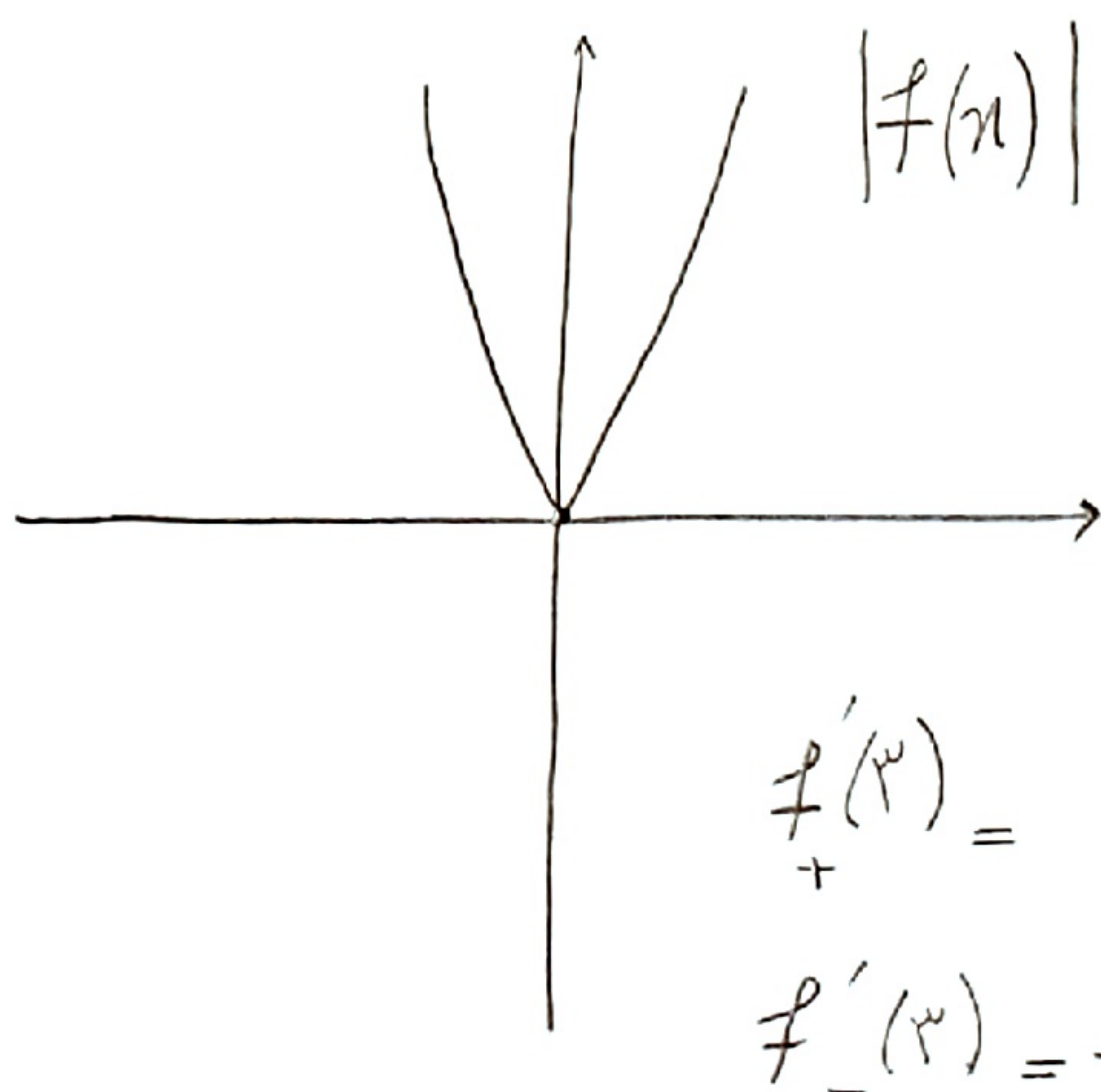
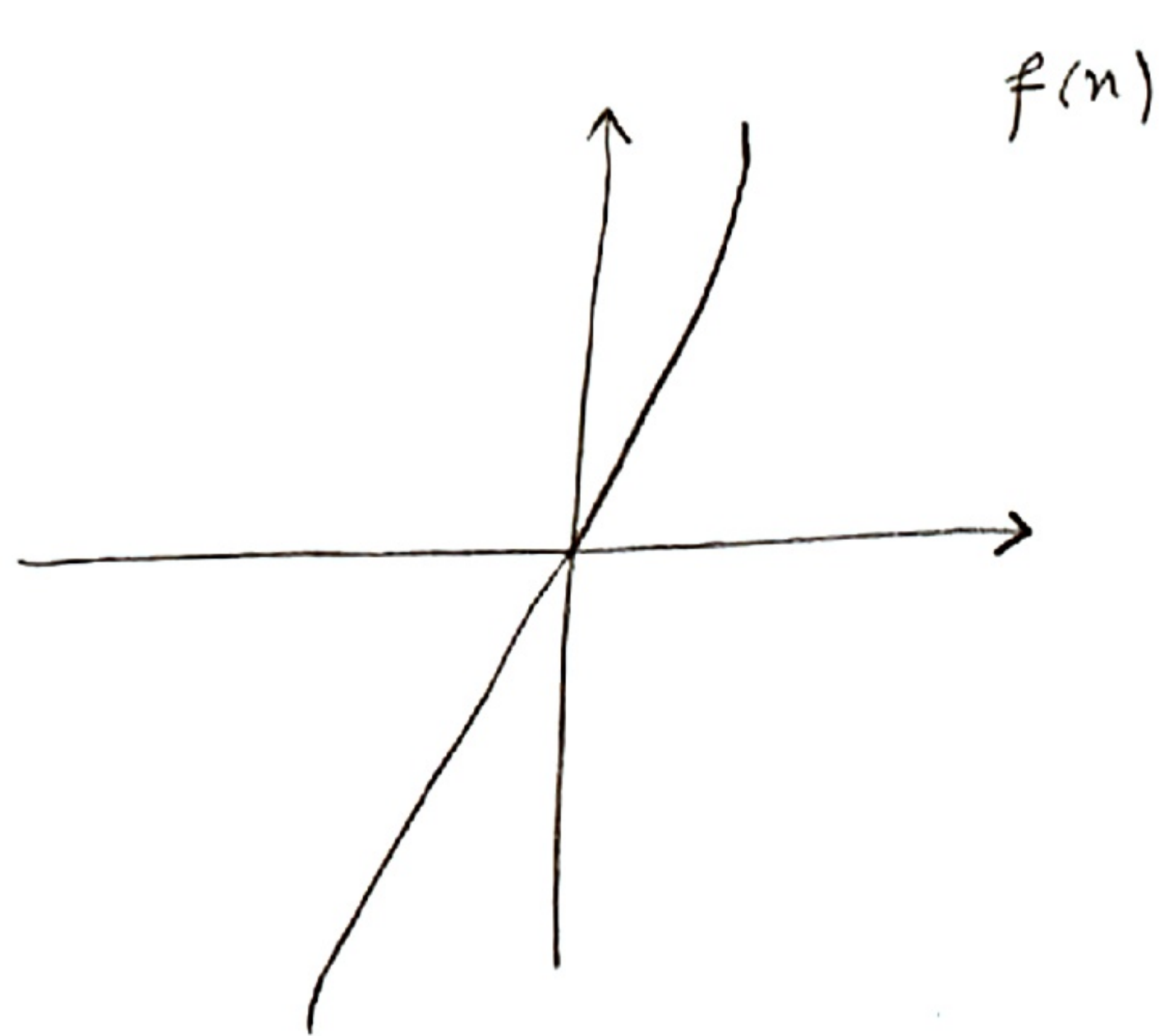
$$\rightarrow d: \sqrt{4+12} = 2\sqrt{4}$$



$$m = 2$$

$$n = 3$$

$$\frac{n}{m} = \frac{3}{2} \quad -8$$



-6

$$f(x) = \sqrt[r]{x^r |x-a|}$$

بسیار ساده برآید در $x=0$ است.

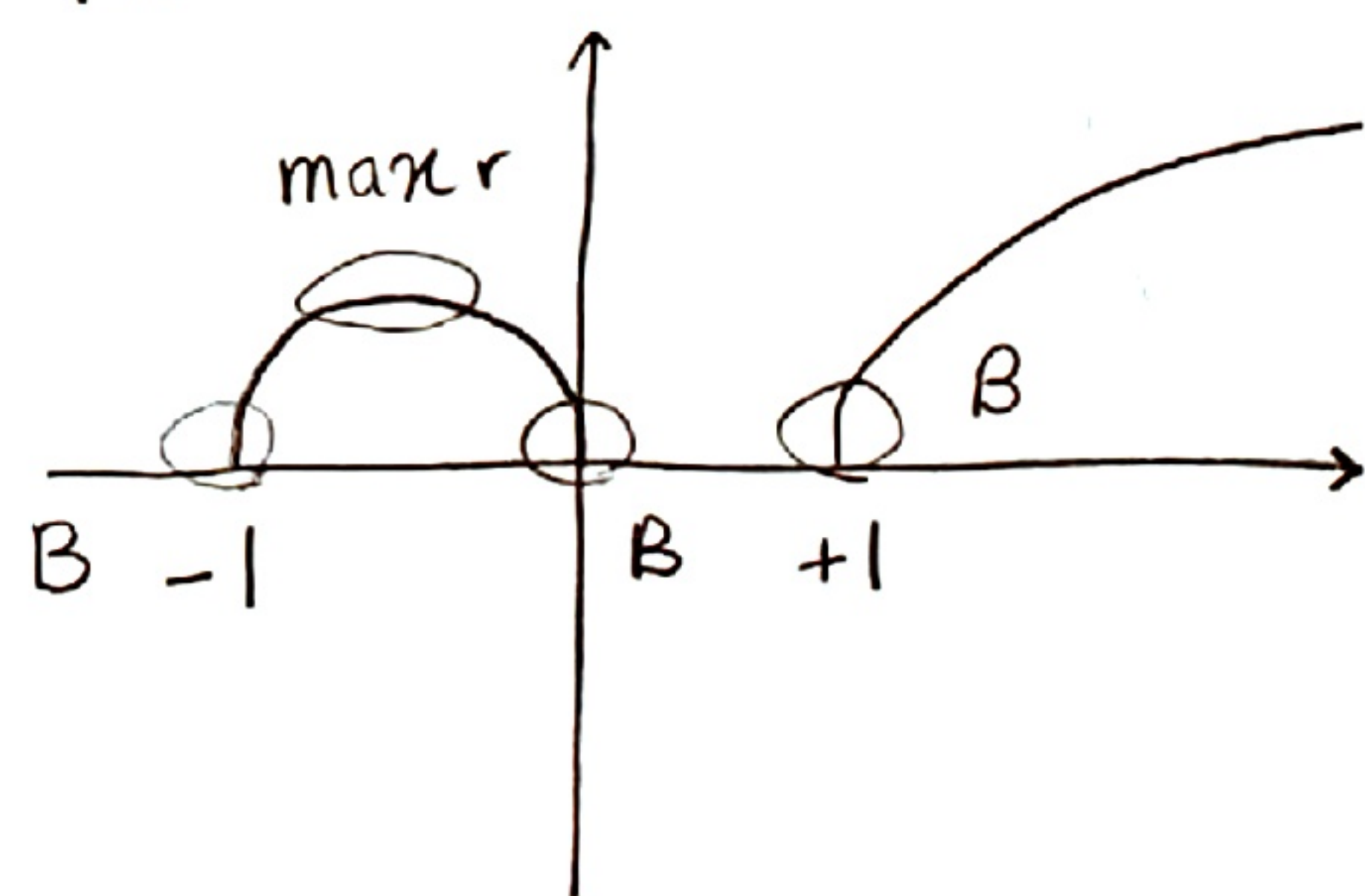
-7

$$f(x) = x^{\frac{r}{r}} (x-a) \rightarrow f'(x) = \frac{r}{r} x^{-\frac{1}{r}} (x-a) + x^{\frac{r}{r}}$$

$$x^{-\frac{1}{r}} \left(\frac{r}{r} (x-a) + x \right) = \frac{\frac{r}{r} x - \frac{r}{r} a}{\sqrt[r]{x}}$$

$$x = \frac{ra}{r} \rightarrow \left(\frac{ra}{r}\right)^{\frac{r}{r}} \left(\frac{ra}{r}\right) = \frac{r}{r} \rightarrow \left(\frac{ra}{r}\right)^{\frac{1}{r}} = \frac{r}{ra}$$

$$\frac{r}{ra} = 1 \rightarrow a = r/r$$



$$f(x) \begin{cases} \sqrt{x(x-1)} & x > 0 \\ \sqrt{-x(x+1)} & x < 0 \end{cases}$$

-8

$$m=1$$

$$n=0$$

$$k=r$$

$$\frac{r|x| + 0}{r - 0} = 1$$

$$f'(x) = \frac{m(m-1) - r}{(x-1+m)^r} \rightarrow$$

$$m^r - m - r \leq 0$$

$$-1 \leq m \leq r$$

$m \in [-1, r]$ (I) -9

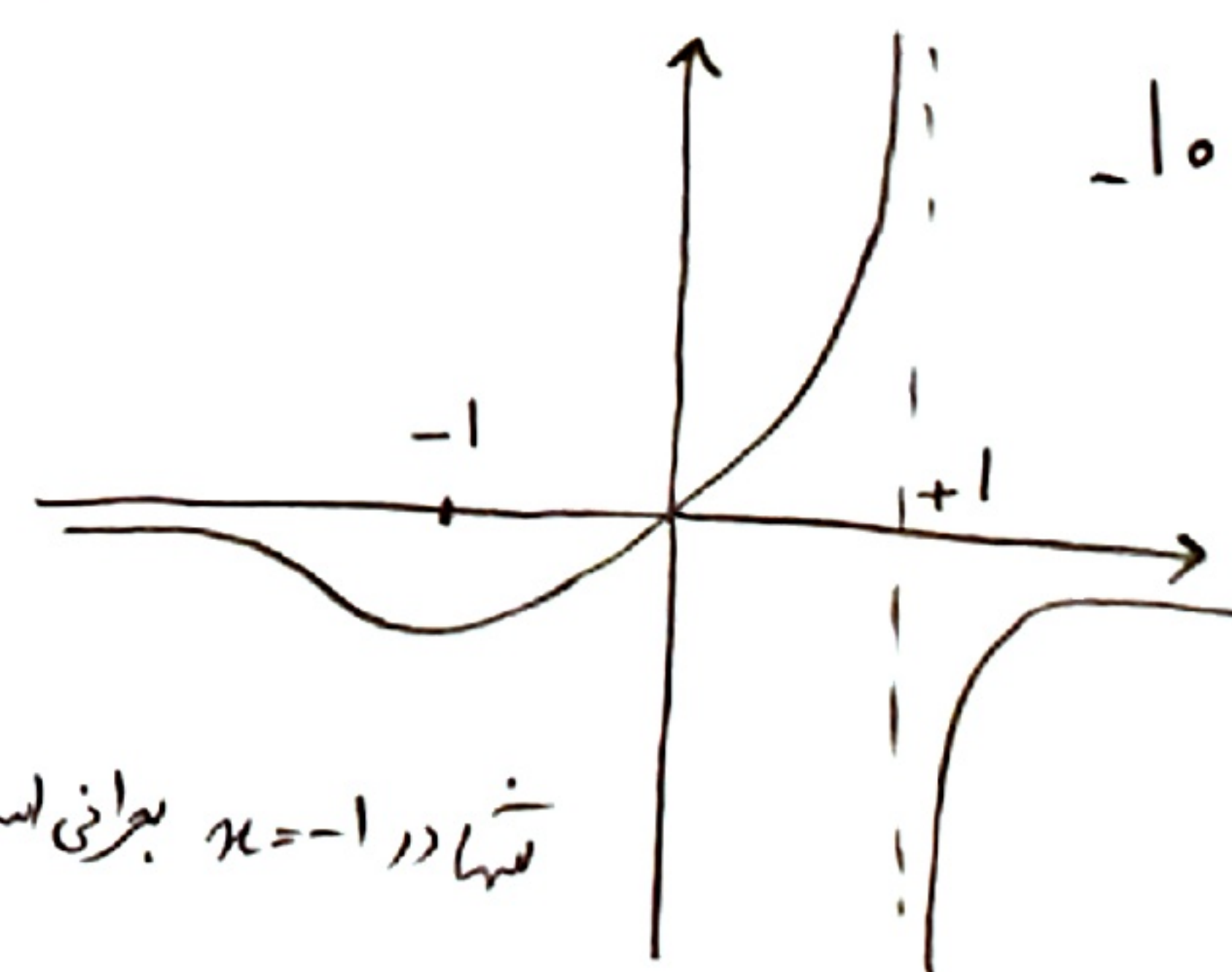
$$x-1+m=0 \rightarrow x=1-m$$

$$f(x) = \frac{x}{1-x^r |x|}$$

$$1-m \leq 1 \rightarrow 0 \leq m \text{ (II)} \quad m=0, 1$$

$$f(x) \begin{cases} \frac{x}{1-x^r} & x > 0 \\ \frac{x}{1+x^r} & x < 0 \end{cases}$$

$$f'(x) \begin{cases} \frac{+x^r + 1}{(1-x^r)^2} & x \geq 0 \\ \frac{1-x^r}{(1+x^r)^2} & x \leq 0 \end{cases}$$



شماره در $x=-1$ برآید است.