

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

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

$$\begin{cases} x = -\sqrt{3} & \times \\ x = \sqrt{3} & \checkmark \end{cases}$$

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

$$y = +x$$

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

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

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

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

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

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

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

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

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

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

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

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

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

$$a = 3$$

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

x	-2	+2
f'(x)	+	-
f(x)	↗	↘
	max	min

$$f(0) = f'(2) = 0$$

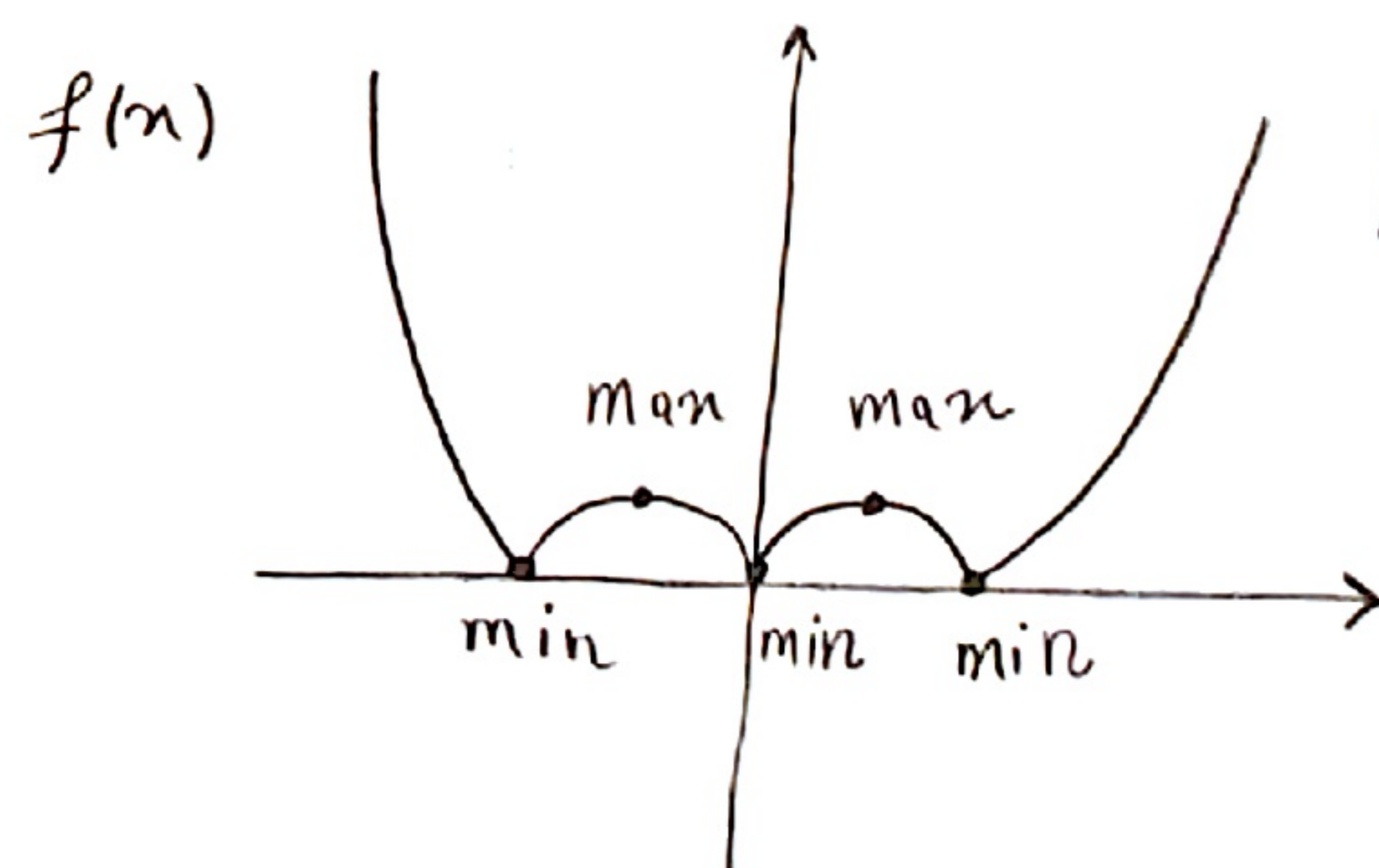
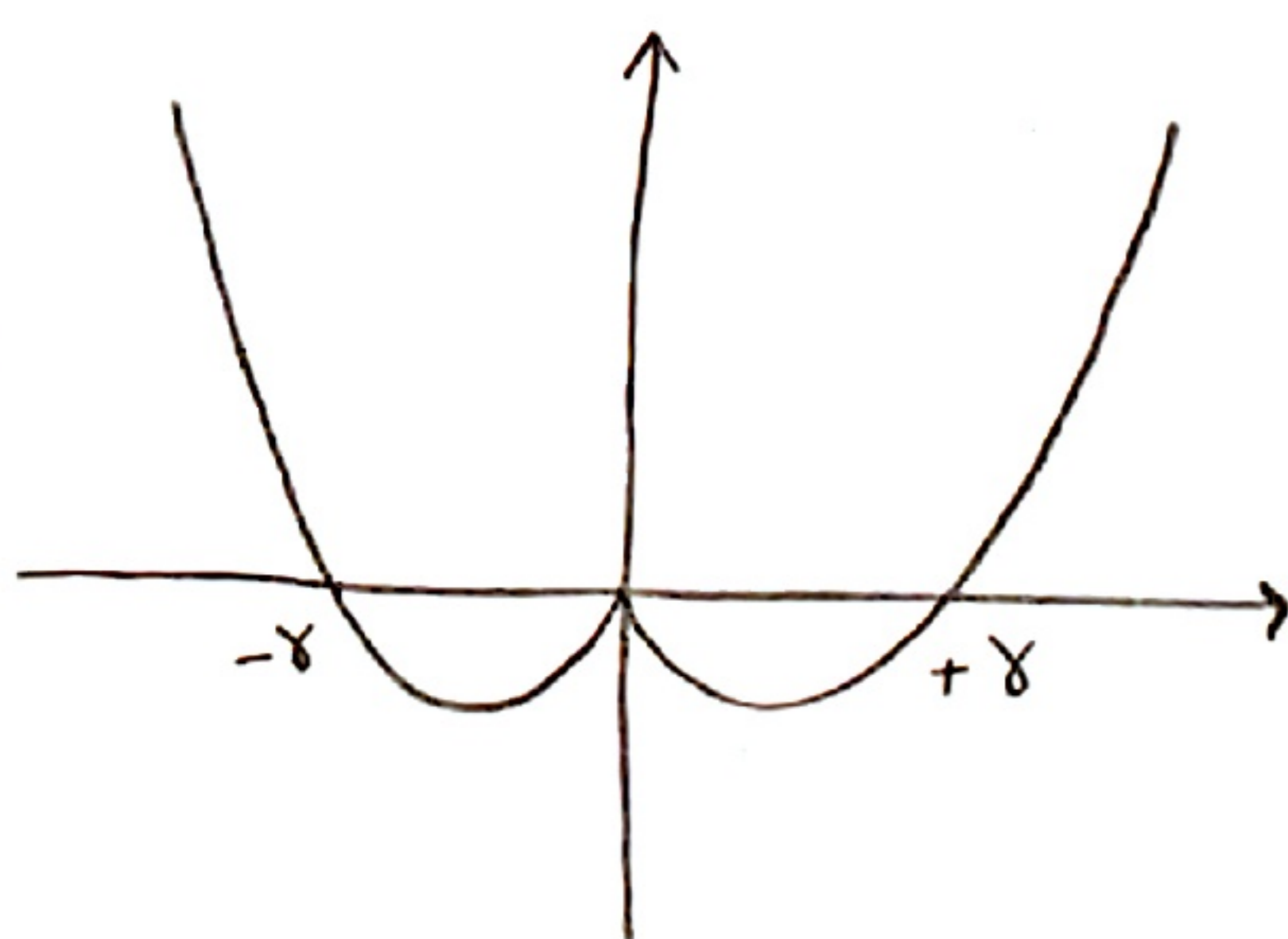
$$f(0) = -2$$

$$f(-2) = 0$$

$$(0, -2)$$

$$(-2, 0)$$

$$\rightarrow d: \sqrt{4+12} = 2\sqrt{8}$$

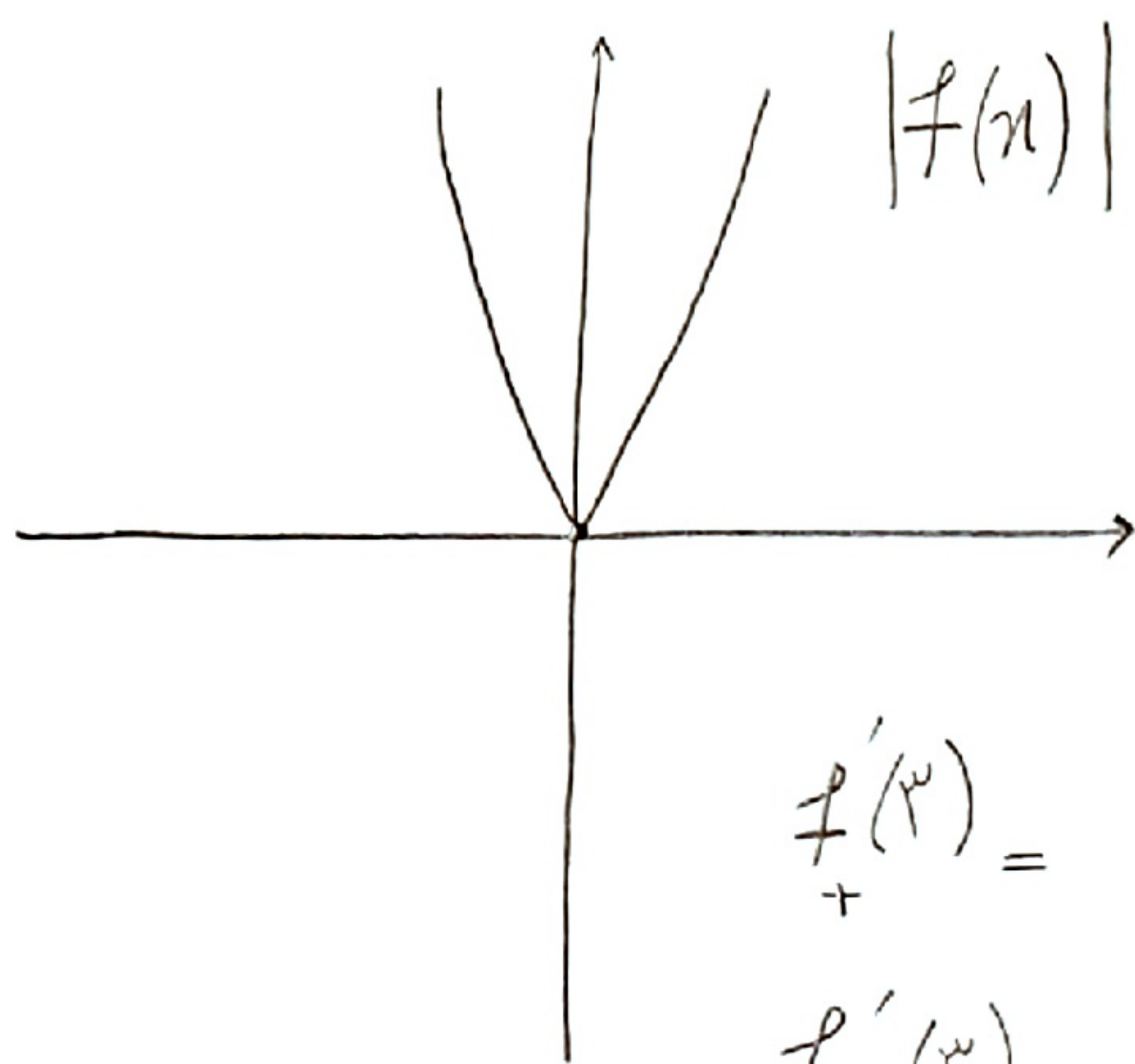
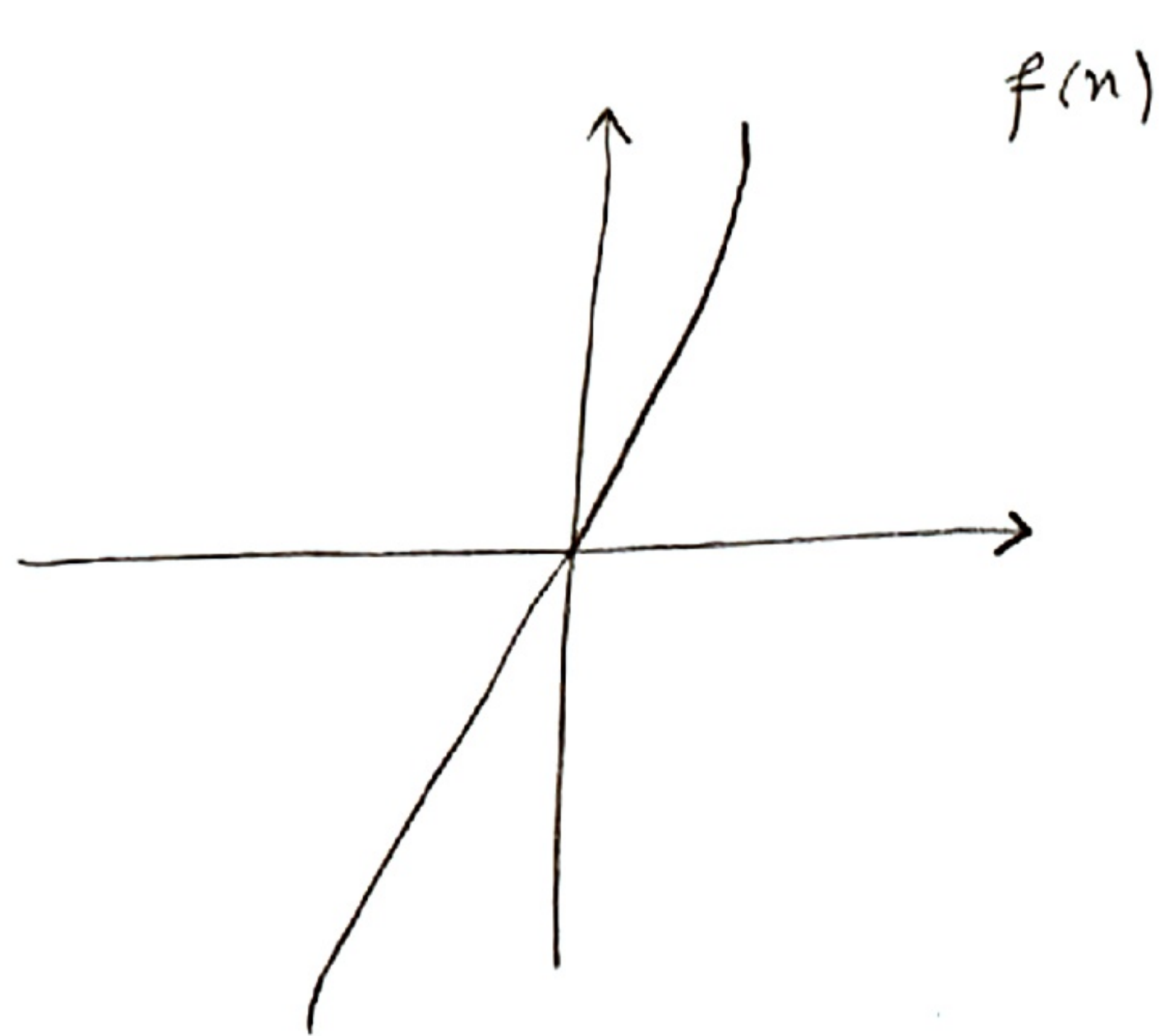


$$m = 2$$

$$n = 3$$

$$\frac{n}{m} = \frac{3}{2}$$

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$$f'_+(x) = x$$

$$f'_-(x) = -x$$

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✓ بیانگر برآنی در $x=0$ است. ✓

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

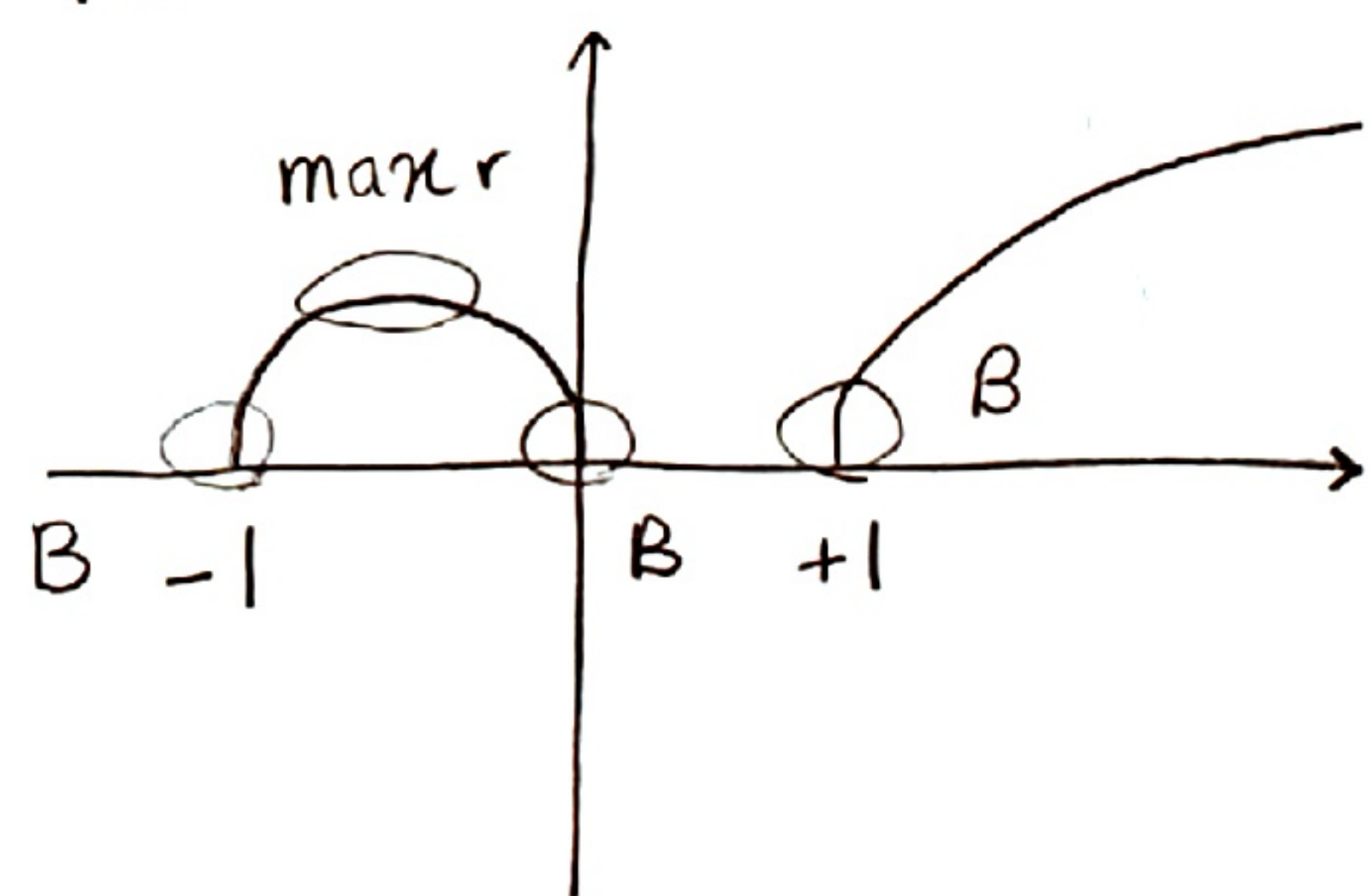
$$f(x) = x^{\frac{r}{r}} (x-a) \rightarrow f'(x) = \frac{r}{r} x^{-\frac{1}{r}} (x-a) + x^{\frac{r}{r}}$$

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

$$x = \frac{ra}{r}$$

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

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



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

-1

$$m=1 \\ n=0 \\ k=r$$

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

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

$$m^2 - m - r \leq 0 \\ -1 \leftarrow 1 \rightarrow r$$

$$m \in [-1, r] \text{ (I)}$$

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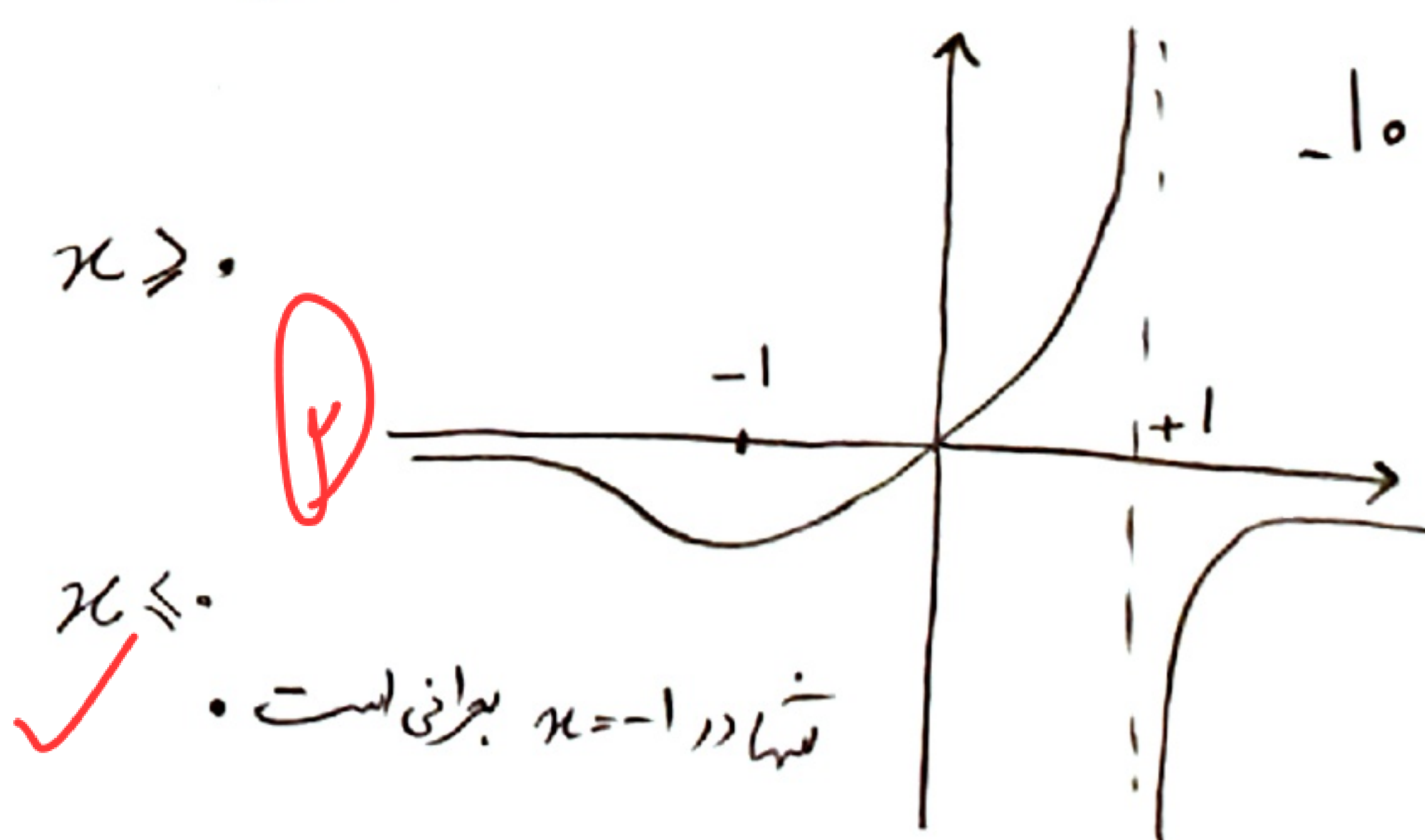
$$x-1+m=0 \rightarrow x=1-m$$

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

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

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

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



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✓ $x \leq 0$ تنها در $x=-1$ برآنی است.