

کتابخانه

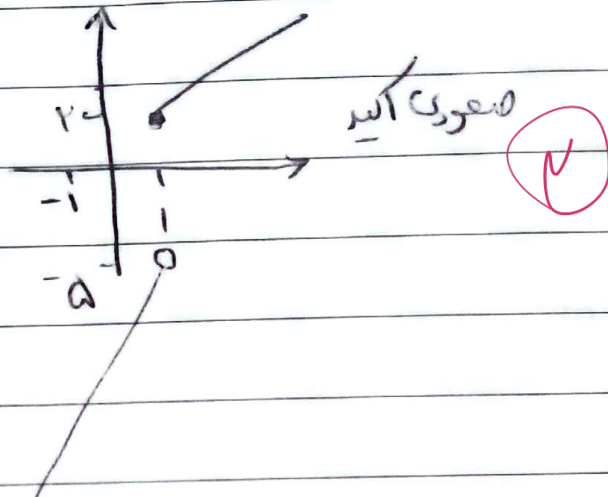
داده‌های دفتر

$$f(x+2) = \begin{cases} 3x+5 & x \geq 1 \\ 8x-1 & x < 1 \end{cases}$$

$$\rightarrow f(x) = \begin{cases} 3x-1 & x \geq 1 \\ 8x-9 & x < 1 \end{cases}$$

$$3(t-2)+5 = 3t-1$$

$$8(t-2)-1 = 8t-9$$



$$y = \sqrt{f(3-x) - f(x+1)}$$

$$f(3-x) - f(x+1) \geq 0$$

$$f(3-x) \geq f(x+1) \rightarrow 3-x \geq x+1 \rightarrow 2x \leq 2 \rightarrow x \leq 1$$

$$D_y = (-\infty, 1] \quad \checkmark$$

$$f(x) = (x^3 + x)^{\frac{1}{3}} \quad \text{صورتی}$$

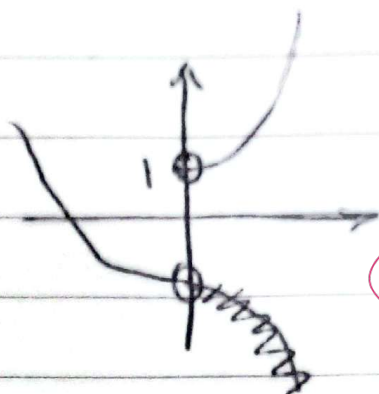
$$f \circ f(x) < f(x^3)$$

$$f(x^3 + x)^{\frac{1}{3}} < f(x^3) \rightarrow (x^3 + x)^{\frac{1}{3}} < x^{\frac{1}{3}} \rightarrow x^3 + x < x^3$$

$$\rightarrow x^3 < 0 \rightarrow x < 0 \rightarrow (-\infty, 0) \quad \checkmark$$

$$y = \ln\left(x^2 + \frac{1}{x}\right)$$

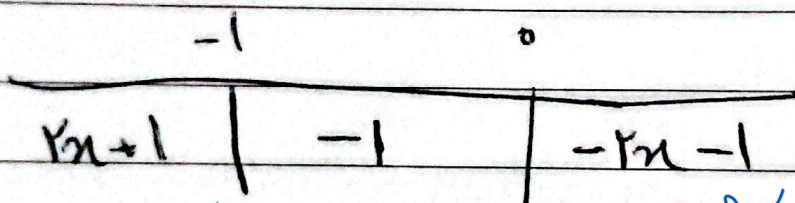
$$y = \begin{cases} x^3 + 1 & x > 0 \\ -x^3 - 1 & x < 0 \end{cases}$$



غیر یکپوا است

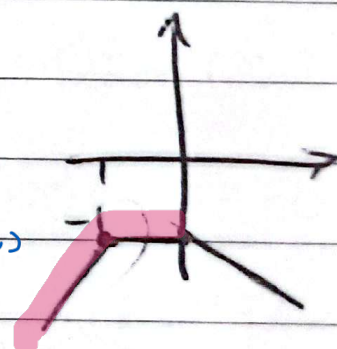
$$f(x) = \frac{2x+1}{|x| - |x+1|} \quad (-\infty, a] \text{ صوری}$$

1, 2



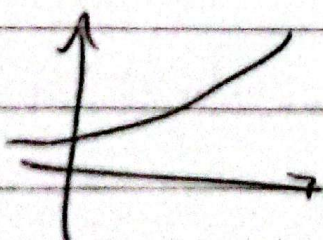
در بازه‌های که مثبت است می‌تواند صوری هم باشد

$$a = -1 \rightarrow a < 0$$



$$y = \log_{\frac{1}{r}}(x^2 - 2x - 1) = -\log_r(x^2 - 2x - 1) = \log_{\frac{1}{r}} \frac{1}{x^2 - 2x - 1}$$

1



$$\frac{1}{x^2 - 2x - 1} > 0 \rightarrow x^2 - 2x - 1 > 0$$

$$(x-2)(x+2) > 0 \quad \begin{array}{c} -2 \quad \varepsilon \\ + \quad | \quad - \quad | \quad + \\ \hline \end{array}$$

$$x < -2 \cup x > 2$$

باید نزدیکی هم باشد چون $\log_{\frac{1}{r}}$ نزولی است $x^2 - 2x - 1$ هم باید نزولی باشد

$$x < -2$$

$$x^2 - 2x - 1 < 0 \rightarrow x < 1$$

$$f(x) = (a^x - 1)^n$$

⑥

$$a^x - 1 > 1 \leadsto a^x > 2 \leadsto |a| > 1$$

$$a > 1 \cup a < -1$$

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$$\S a^x - 1 > 1 \leadsto a > 1, a < -1$$

$$a^x - 1 = 0 \leadsto a^x = \pm \sqrt{x}$$

$$(-\infty, -1] \cup [1, +\infty) \cup \{\pm \sqrt{x}\}$$

⑦

$$f(x) = x^n + ax^r + bx + c$$

$$(-1, -1)$$

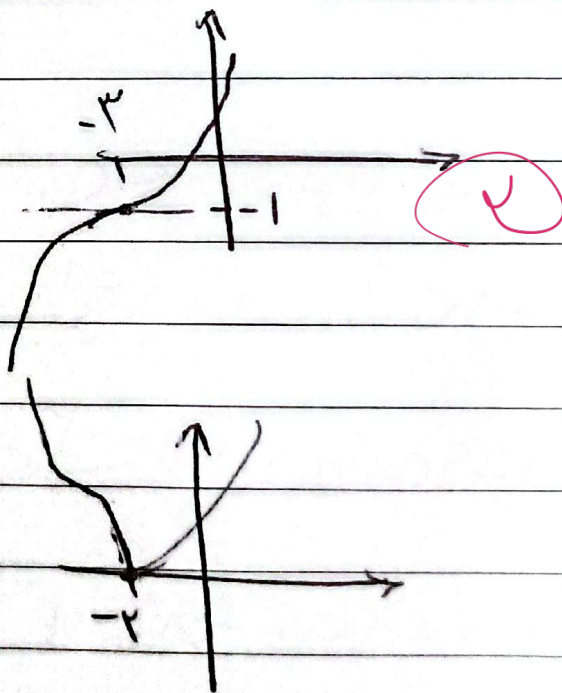
$$f(x) = (x+1)^n - 1$$

$$= x^n + nx^{n-1} + \dots + nx + 1$$

$$f(x) = 0 \rightarrow x = -1$$

$$[-1, +\infty)$$

$$x = -1$$



$$f(n) = n + \sqrt{n} - 2 \quad \text{مطلوب}$$

①

$$f(n) \leq f(\sqrt{n})$$

1,28

$$f(n + \sqrt{n} - 2) \leq f(\sqrt{n}) \rightarrow n \geq 0$$

$$n + \sqrt{n} - 2 \leq \sqrt{n} \rightarrow n - 2 \leq 0 \rightarrow n \leq 2$$

$$D_{f(n)} \rightarrow f(n) \in D_f \rightarrow n + \sqrt{n} - 2 \geq 0$$

$$[0, 2]$$

$$\{0, 1, 2\} \rightarrow [0, 2] \quad (\sqrt{n+1})(\sqrt{n+1}) \geq 0$$

$$\sqrt{n} \geq 1 \rightarrow n \geq 1$$

$$f(n) = \sqrt[3]{9 \cos^3 n - 1} - 2$$

$$1 \leq n \leq 2$$

②

$$-1 \leq \cos n \leq 1 \rightarrow 0 \leq \cos^3 n \leq 1 \rightarrow 0 \leq 9 \cos^3 n \leq 9$$

$$-1 \leq 9 \cos^3 n - 1 \leq 8 \rightarrow -1 \leq \sqrt[3]{9 \cos^3 n - 1} \leq 2$$

③

$$-1 \leq 1 - 9 \cos^3 n \leq 1 \rightarrow -1 \leq \sqrt[3]{1 - 9 \cos^3 n} \leq 1$$

$$\cos^3 n = 0 \rightarrow f(n) = 2^{-1} - 2 = \frac{1}{2} - \frac{4}{2} = -\frac{3}{2}$$

$$\cos^3 n = 1 \rightarrow f(n) = 2^2 - 2^{-2} = 4 - \frac{1}{4} = \frac{15}{4}$$

$$\left[-\frac{3}{2}, \frac{15}{4}\right]$$

$$f(n) = n - [n+1] = n - [n] + 1 \rightarrow R, E, B, U \quad (1)$$

$$g(n) = \frac{r^n - r^{-n}}{r} \rightarrow \text{geo } \frac{r}{|r|}$$

D_g
 $g \circ f \rightarrow$

$$g(-r) = \frac{r^{-r} - r^r}{r} = \frac{\frac{1}{r} - r}{r} = \frac{-1a}{1} \quad \textcircled{r}$$

$$g(-1) = \frac{r^{-1} - r}{r} = \frac{\frac{1}{r} - r}{r} = \frac{-r}{r}$$

$$R = \left[-\frac{1a}{1}, \frac{-r}{r} \right) \quad \checkmark$$