

$$x+2=t \Rightarrow t-2 \leq x \Rightarrow f(x) = \begin{cases} x-1 & x \geq 3 \\ x-9 & x < 3 \end{cases} \quad \text{آبداً صعودی}$$

$$f(3x) \geq f(x+1) \Rightarrow 3-x \geq x+1 \Rightarrow 2x \leq 2 \Rightarrow \underline{x \leq 1}$$

۱

$$f(x) \rightarrow \text{صعودی آبداً} \Rightarrow f(f(x)) < f(x^3) \Rightarrow f(x) < x^3$$

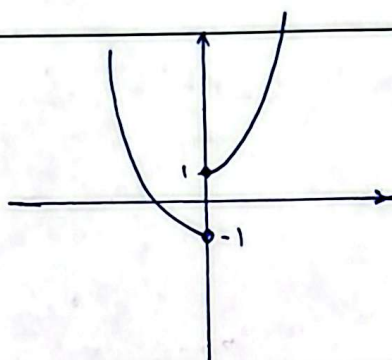
$$(x^3+x)^3 < x^3$$

$$x^3+x < x \Rightarrow x^3 < 0 \Rightarrow \underline{x < 0}$$

۲

$$f(x) = \begin{cases} x^3+1 & x \geq 0 \\ -(x^3+1) & x < 0 \end{cases}$$

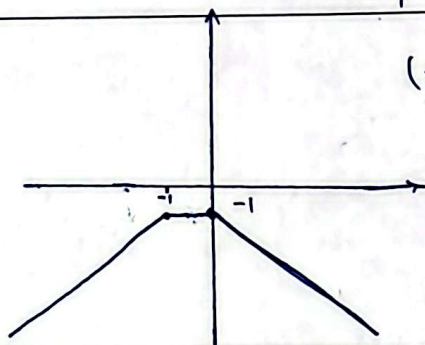
$(-\infty, 0) \rightarrow$ آبداً نزولی
 $[0, +\infty) \rightarrow$ آبداً صعودی



غیر یکنوا

۳

$$f(x) = \begin{cases} -2x-1 & x \geq 0 \\ -1 & -1 \leq x < 0 \\ 2x+1 & x < -1 \end{cases}$$



$(-\infty, -1) \rightarrow$ صعودی

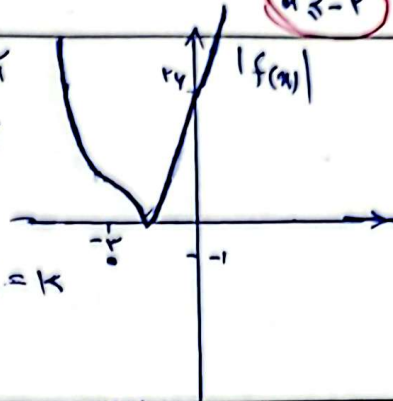
۴

۵

$$f(0) = 1, f(1) = \alpha^2 - 2 \Rightarrow f(1) > f(0) = \alpha^2 - 2 > 1 = \alpha^2 > 2 \quad (\text{الف})$$

$$f(0) = 1, f(1) = \alpha^2 - 2 \Rightarrow f(1) > f(0) = \alpha^2 - 2 > 1 = \alpha^2 > 2 \quad (\text{ب})$$

از فاصله چین بستن نقطه -1 بر موازات محور x می‌ماسیم



$$(x+2)^3 - 1 = 0 \Rightarrow (x+2)^3 = 1 \Rightarrow x+2 = 1 \Rightarrow x = -1$$

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

$$f(x) \leq \sqrt{x} \Rightarrow x - 2 \leq 0 \Rightarrow x \leq 2$$

$$g \circ f(x) = \frac{2^{x-[x]-2} - 2^{[x]-x+2}}{2}$$

$$1 < [x] - x + 2 \leq 2$$

$$2 < 2^{[x]-x+2} \leq 4$$

$$-1 > -\frac{2}{2} \geq -2$$

$$-2 \leq x - [x] - 2 < -1$$

$$\frac{1}{2} \leq 2^{x-[x]-2} < \frac{1}{2}$$

$$\frac{1}{2} \leq \frac{2^{x-[x]-2}}{2} < \frac{1}{2}$$