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~~$x \in [-4, 4]$~~ ~~$f(x) \geq 0$~~ ~~$x \in [0, 4]$~~ ~~$f(x) \leq 0$~~

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~~$f(x) \geq 0$~~

~~$f(x) \leq 0$~~

~~$x \in [-4, 4]$~~

$$f(x) \geq 0 \rightarrow x \in [-4, 0] \cup [0, 4] \leftarrow f(x)$$

~~$f(x) \geq 0$~~

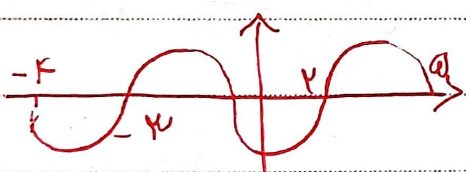
$$f(x) \geq 0 \quad x \in [-4, 0]$$

$$f(x) \leq 0 \quad x \in [0, 4] \quad / \quad x \geq 0 \quad x f(x) \geq 0$$

$$f(x) \geq 0 \rightarrow x \in [0, 4] \quad \text{است}$$

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$$Df = [-4, 0] \leftarrow x \in [0, 4) \quad \text{اگر } x \text{ کمتر از } 0$$



$$y = \sqrt{\frac{-x}{f(x)}}$$

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$$\frac{-x}{f(x)} \geq 0 \quad f(x) \neq 0 \quad f(x) \rightarrow [0, -\varepsilon] \quad f(x) > 0$$

$$Df = (-\varepsilon, 0) \cup (0, 4)$$

$$f(x) < 0$$

$$(0, 4)$$

$$x = -\varepsilon, 0, 4$$

$$f(x) = 0$$

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$$x \in (-\varepsilon, 0) \quad f(0) = 0, x = 0 \quad f(x) > 0 \quad x \geq 0 \leftarrow -x \leq 0 \quad \text{اگر}$$

$$-x \leq 0 \quad \text{اگر}$$

$$x \in (0, 4) \quad f(x) < 0 \quad x \geq 0$$

$$\{-\varepsilon, -\varepsilon - 1, 1\} \quad \text{است} \quad (-\varepsilon, 0) \cup (0, 4) \leftarrow \text{است}$$

parsian

ساخت

$$f(-1) \text{ دینو } f(x) - 1f\left(\frac{1}{x}\right) = x^4 - 1^3x + \varepsilon \quad \underline{3}$$

$$\begin{cases} f(x) - 1f\left(\frac{1}{x}\right) = x^4 - 1^3x + \varepsilon \\ f\left(\frac{1}{x}\right) - 1f(x) = -x^4 + 1^3x + \varepsilon \end{cases}$$

$f(1) = 1$ $f(-1) = -1$ $f(x) = x$

$$f(f(0)) + f(f(1)) \text{ دینو } f(x) = \begin{cases} x - \sqrt{x+1} & ; x \geq 0 \\ 1/x + 1 & ; x < 0 \end{cases} \quad \underline{4}$$

$f(1) \text{ دینو } 1 + 1 = 2 \rightarrow f(f(1)) = f(2) \rightarrow 2 - \sqrt{2+1} = 2 - \sqrt{3}$

$$f(0) = 0 - \sqrt{0+1} = 0 - 1 = -1 \quad f(f(0)) = f(-1)$$

$$1 < 1 \rightarrow \text{دینو } f(1) = 1(1) + 1 = 2$$

$$f(f(1)) + f(f(0)) = 2 + (-1) = 1$$

$$f(x+1) - f(x) = 4x+1 \quad f(x) = ax^2 - bx + \frac{1}{2} \quad \underline{5}$$

$$f(x-1) \rightarrow a(x-1)^2 - b(x-1) + \frac{1}{2}$$

$$8a-b \text{ دینو}$$

$$f(x-1) = a(x^2 - 2x + 1) - bx + b + \frac{1}{2}$$

$$f(x-1) = ax^2 - 2ax + a - bx + b + \frac{1}{2}$$

$$f(x-1) - f(x) \rightarrow (ax^2 - 2ax + a - bx + b + \frac{1}{2}) - (ax^2 - bx + \frac{1}{2}) \rightarrow$$

$$-2ax + a + b = 4x + 1 \rightarrow -2a = 4 \rightarrow a = -2 \quad a + b = 1$$

$$-2 + b = 1 \rightarrow b = 3$$

$$a - b \rightarrow -2 - 3 = -5 \quad \underline{1}$$

6 اگر $f(x) = \frac{x^p + \varepsilon x + 1}{x^p + \varepsilon x + \nu}$ مقدار $f(\sqrt{\nu} - 1)$ را بیابید

$$\left. \begin{array}{l} (x^p + \varepsilon x + 1) + 1 \rightarrow (x + \nu)^p + 1 \\ (x^p + \varepsilon x + \varepsilon) + \nu \rightarrow (x + \nu)^p + \nu \end{array} \right\} \rightarrow \frac{(x + \nu)^p + 1}{(x + \nu)^p + \nu} \rightarrow \frac{\sqrt{\nu} - 1 + \nu - (\sqrt{\nu})^p + 1}{(\sqrt{\nu})^p + \nu}$$

$$\frac{\nu + 1}{\nu + \nu} = \frac{\varepsilon}{\nu} = \frac{\nu}{\nu}$$

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7 مقدار $f(x - \frac{1}{x}) = \frac{x^p + 1}{x^p}$ را بیابید

$$\frac{x^p}{x^p} + \frac{1}{x^p} = x^p + \frac{1}{x^p} \rightarrow x - \frac{1}{x} = \nu \quad / \quad x^p + \frac{1}{x^p} \rightarrow (x - \frac{1}{x})^p + \nu$$

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$$f(\nu) = (\nu)^p + \nu = 9 + \nu = 11$$

8 اگر $g(x) = \sqrt{9 - x^2}$ و $f(x) = \left\{ (1, 0), (0, -1), (0, 1), (1, 1) \right\}$ را بیابید

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$[1, 0] \rightarrow g(x) \in \text{points}$ / $[0, 1] \rightarrow g(x) \in \text{points}$ / $[0, 0] \rightarrow g(x) \in \text{points}$ / $[1, 1] \rightarrow g(x) \in \text{points}$

$$\sqrt{9 - x^2} - \sqrt{9 - \varepsilon} = \sqrt{9} \rightarrow \frac{0}{\sqrt{9}} = 0 \quad / \quad \sqrt{9 - 1} = \sqrt{1} \rightarrow \frac{-1}{\sqrt{1}}$$

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$$\sqrt{9 - 0} \rightarrow \frac{\nu}{\sqrt{9} = \nu} \rightarrow \frac{\nu}{\nu} \quad / \quad \frac{\sqrt{1}}{-1} \rightarrow \frac{\nu}{\nu} \rightarrow \frac{\sqrt{9}}{0} \rightarrow \frac{g}{f}$$

