

$$\left. \begin{aligned} \frac{f(x) - f(1)}{x - 1} &= \frac{1 - \frac{a}{x^2} - 1 + a}{x - 1} = \frac{a}{x^2} \\ f'(x) &= -a \left(-\frac{1}{x^2}\right) = \frac{a}{x^2} \end{aligned} \right\} \frac{a}{x^2} = \frac{a}{x^2} \rightarrow x = \pm \sqrt{x}$$

۱

$$y' = f'(x) - a = 1 \rightarrow x = \frac{x}{\sqrt{a}} \rightarrow y = \sqrt{a} \left( \frac{a}{\sqrt{a} x^2} \right) - \frac{1a}{\sqrt{a}} + 11a = 11a - \frac{x}{a}$$

$$\rightarrow 11a - \frac{x}{a} = \frac{x}{\sqrt{a}} \rightarrow \sqrt{a} = \frac{1}{\sqrt{a}} \rightarrow \sqrt{a} = 1 \rightarrow a = \frac{1}{\sqrt{a}}$$

۲

$$y' = 3x^2 - 12$$

x	-2	2	
y'	+	-	+
y	↗	↘	↗

Max  
نسبی  
Min  
نسبی

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

۳

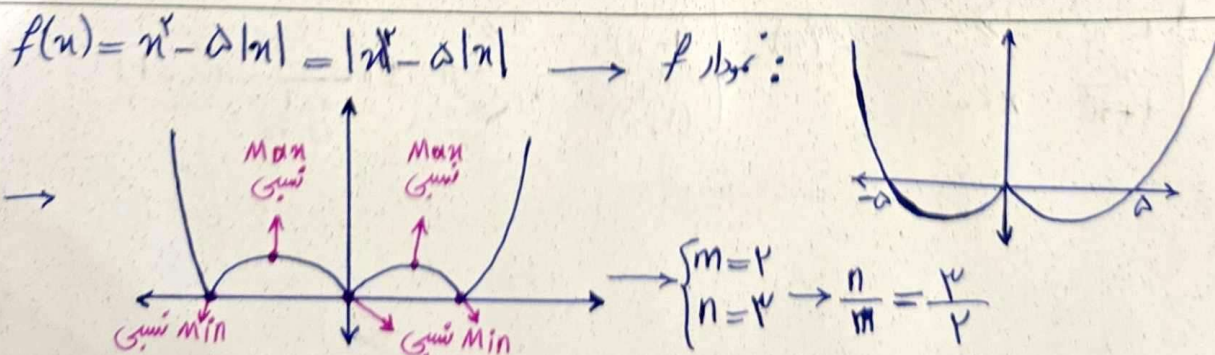
$$y' = 3x^2 + 2ax - 12$$

$$\begin{aligned} x=0 &\rightarrow -2b=0 \rightarrow b=0 \\ x=-2 &\rightarrow 12 - 4a - 2b = 0 \rightarrow 2 = a \end{aligned}$$

$$\rightarrow y = x^3 + 2x^2 - 12$$

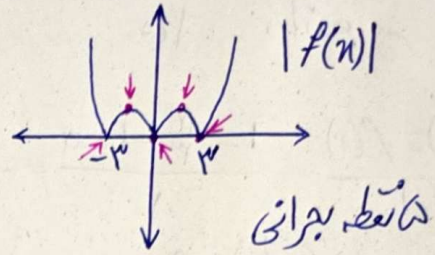
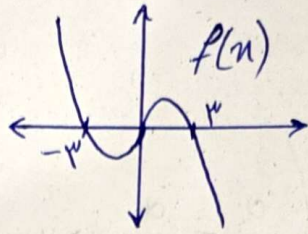
$$\begin{aligned} x=0 &\rightarrow y = -12 \\ x=-2 &\rightarrow y = 0 \end{aligned} \rightarrow \sqrt{(0+2)^2 + (-12-0)^2} = \sqrt{20} = 2\sqrt{5}$$

۴



۵

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



۶

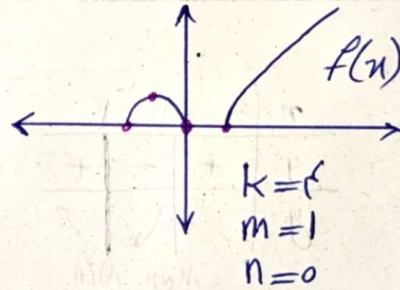
$$[0, \alpha) \rightarrow f(x) = (\alpha - x) \sqrt[r]{x} \rightarrow f'(x) = -\sqrt[r]{x} + \frac{\gamma(\alpha - x)}{\gamma \sqrt[r]{x}} = \frac{-\alpha x + \gamma \alpha}{\gamma \sqrt[r]{x}}$$

$$x = \alpha \rightarrow f(x) = 0$$

$$\left. \begin{cases} f(x) = 1/\alpha = (\alpha - x) \sqrt[r]{x} \\ f'(x) = 0 = -\alpha x + \gamma \alpha \rightarrow \alpha = \frac{\alpha x}{\gamma} \end{cases} \right\} \rightarrow \frac{\gamma}{\gamma} = \frac{\gamma}{\gamma} x \sqrt[r]{x} = 1 \rightarrow x = 1 \rightarrow \alpha = \frac{\alpha}{\gamma}$$

۷

$$f(x) = \begin{cases} \sqrt{x^k - x} & x \geq 0 \rightarrow D = [1, +\infty) \\ \sqrt{-x^k - x} & x < 0 \rightarrow D = [-1, 0] \end{cases}$$



$$\rightarrow \frac{km + n}{k - n} = \frac{r + 0}{r - 0} = 1$$

۸

$$f'(x) = \frac{m(x-1+m) - (mx+\gamma)}{(x-1+m)^r} = \frac{m^r - m - \gamma}{(x-1+m)^r} < 0$$

$$\text{عبارت} \rightarrow x = 1 - m \rightarrow 1 - m \leq 1 \rightarrow 0 \leq m$$

$$\text{مثال: } (m - \gamma)(m + 1) < 0 \rightarrow \frac{-1 - \gamma}{+1 - 1 + \gamma} \rightarrow -1 < m < \gamma$$

$$\left. \begin{matrix} 0 \leq m < \gamma \\ \downarrow \\ m = 1 \\ m = 0 \end{matrix} \right\}$$

۹

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

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

$$x = \pm 1 \rightarrow x = -1$$

کلیک

۱۰