

«بينا خدا»

کلیف شماره ۲۴

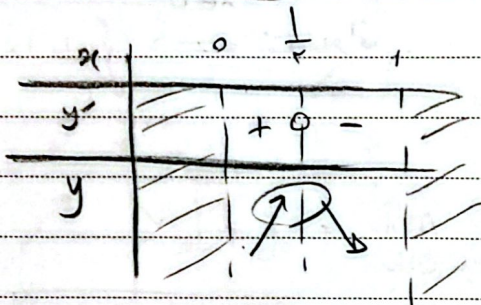
در کجوان (مطابق نسبت) <<

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

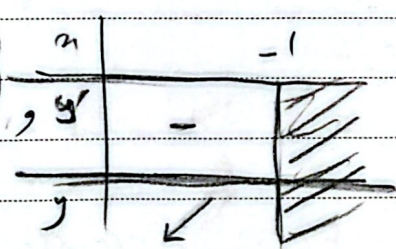
نقاط بحرانی $\Rightarrow x^2+x=0 \rightarrow x=0, x=-1$ و $x-x^2=0 \rightarrow x=0, x=1$

$K = \varepsilon$

نقاط بحرانی
Max
Min



$M \in \mathbb{R}$



$\rightarrow K, M, n = \varepsilon + 1 + 0 = \boxed{2}$

$n=0$

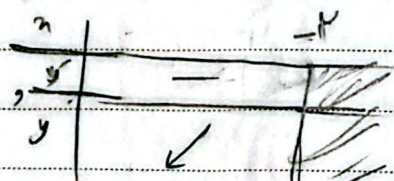
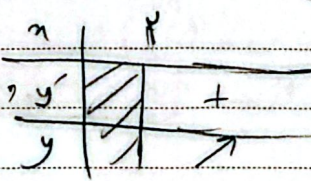
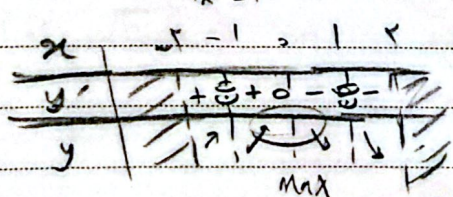
① $D_f = [0, +\infty)$, ② $a-2x > 0 \rightarrow a > 2x \rightarrow x < \frac{a}{2}$ $\Rightarrow D_f = [0, \frac{a}{2}]$

$$f'(x) = \frac{1}{\sqrt{x}} - \frac{1}{\sqrt{a-2x}} = 0 \rightarrow \frac{1}{\sqrt{x}} = \frac{1}{\sqrt{a-2x}} \rightarrow \sqrt{x} = \sqrt{a-2x}$$

$\varepsilon x = a-2x \rightarrow x = \frac{a}{4}$ \rightarrow نقاط بحرانی $= \{0, \frac{a}{4}, \frac{a}{2}\}$ $\rightarrow f(0) = \sqrt{a}$
 $f(\frac{a}{4}) = \sqrt{\frac{a}{4}} \rightarrow f(\frac{a}{4}) = \sqrt{\frac{a}{4}} + \sqrt{\frac{3a}{4}} = 2\sqrt{\frac{a}{4}}$

$\rightarrow \text{Max} = 2\sqrt{\frac{a}{4}}, \text{Min} = \sqrt{\frac{a}{4}} \rightarrow \sqrt{\frac{a}{4}} \times 2\sqrt{\frac{a}{4}} = \sqrt{a} \rightarrow \boxed{a = \varepsilon}$
 $[\varepsilon] = \varepsilon$

$$f(x) = \begin{cases} \frac{-x\varepsilon + \varepsilon x^2}{x^2-1} & -r < x < r \\ \frac{x\varepsilon - \varepsilon x^2}{x^2-1} & x < -r \text{ or } x > r \end{cases} \rightarrow f'(x) = \begin{cases} \frac{-\varepsilon x^2}{(x^2-1)^2} & -r < x < r \\ \frac{\varepsilon x^2}{(x^2-1)^2} & x < -r \text{ or } x > r \end{cases} \quad (2)$$



$-r < x < r \rightarrow x=0 \rightarrow \text{Max}$

Farhang Gostar X ext 2/2

ext X
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توی کلاس

$f(x) = ax^2 + bx^2 + cx + d \rightarrow f(0) = 0 \rightarrow \boxed{d=0}$ (3)

$f'(x) = 2ax^2 + 2bx + c \rightarrow f'(0) = 0 \rightarrow \boxed{c=0}$

① $f(1) = 1 \rightarrow \begin{cases} a+b=1 \\ 3a+2b=2 \end{cases} \rightarrow \begin{cases} a=-2 \\ b=3 \end{cases} \rightarrow ab = -6 \checkmark$
 ② $f'(1) = 0 \rightarrow \begin{cases} 3a+2b=0 \\ 3a+2b=0 \end{cases}$

$f(x) = \begin{cases} x^2 - x^2 & -\sqrt{x} \leq x \leq \sqrt{x} \\ x^2 - \sqrt{x} & x > \sqrt{x} \text{ or } x < -\sqrt{x} \end{cases} \rightarrow f'(x) = \begin{cases} 2x - 2x & -\sqrt{x} \leq x \leq \sqrt{x} \\ 2x^2 - \frac{1}{2\sqrt{x}} & x > \sqrt{x} \text{ or } x < -\sqrt{x} \end{cases}$ (5)

$2x - 2x = 0 \rightarrow x = \pm 1 \checkmark$ (ق) \rightarrow نقاط بحرانی $\Rightarrow \{-1, 1, \sqrt{x}\}$

$2x^2 - \frac{1}{2\sqrt{x}} = 0 \rightarrow x = \pm 1 \times$ (ق) \checkmark

$f(-1) = -1 + 1 = 0$
 $f(1) = 1 - 1 = 0$
 $f(\sqrt{x}) = x^2 - \sqrt{x} = 0$
 Min = $\begin{bmatrix} -1 \\ -2 \end{bmatrix} \checkmark$
 طبق سنج

$f(-\frac{1}{\sqrt{x}}) = -1 + \frac{1}{\sqrt{x}}$ / $f(-1) = 1 \rightarrow 1 + 3a + b = 1 \rightarrow \boxed{b = -3a}$ (4)

$f(x) = \begin{cases} x^2 + 3ax^2 + b & x > 0 \\ -x^2 + 3ax^2 + b & x < 0 \end{cases} \rightarrow f'(x) = \begin{cases} 2x^2 + 4ax & x > 0 \\ -2x^2 + 4ax & x < 0 \end{cases}$

$f'(-1) = 0 \rightarrow -2 - 4a = 0 \rightarrow 4a = -2 \rightarrow a = -\frac{1}{2}$ (6) $\rightarrow b = -3(-\frac{1}{2}) = \frac{3}{2}$
 $\rightarrow \frac{b}{a} = \frac{\frac{3}{2}}{-\frac{1}{2}} = \boxed{-3} \checkmark$

$y = \frac{1}{4}x^2 + x + \frac{5}{4} \rightarrow x = \frac{-b}{2a} = \frac{-1}{\frac{1}{2}} = -2$ (7)

$y_{\text{min}} = y_{\text{min}} = \frac{1}{4}(\frac{1}{4}) - \frac{1}{4} + \frac{5}{4} = \frac{1}{4} - \frac{1}{4} + \frac{5}{4} = \frac{1}{2} \rightarrow \text{Ext} = \begin{bmatrix} \frac{1}{4} \\ \frac{1}{2} \end{bmatrix}$

$\lim_{x \rightarrow \infty} \frac{ax + 3}{(a+1)x + (a-1)} = \frac{a}{a+1} = \frac{1}{2}$ (جانب راست) $\rightarrow \boxed{a=2}$

$(a+1)x + (a-1) < 0 \rightarrow x < \frac{(1-a)}{a+1} = -\frac{1}{2}$ (جانب چپ)

$y = \frac{2x+3}{x^2+1} = 0 \rightarrow \boxed{x = -\frac{3}{2}} \checkmark$

$\lim_{x \rightarrow \infty} \frac{bx^r + v}{\epsilon x^r + ax + 1} = +\infty$ بجانب اول $\frac{b}{\epsilon} = \infty \rightarrow b = 1^r$ (A)

بجانب اول $\epsilon \left(-\frac{1}{\epsilon}\right)^r + a \left(-\frac{1}{\epsilon}\right) + 1 = 0 \rightarrow 1 - \frac{a}{\epsilon} + 1 = 0 \rightarrow a = \epsilon$
 $\frac{b}{a} = \frac{1^r}{\epsilon} = \frac{1}{\epsilon}$ 13 ✓

$f(x) = \frac{x^\epsilon}{x^r - 1} \Rightarrow f'(x) = \frac{\epsilon x^{\epsilon-1} (x^r - 1) - (x^r) (\epsilon x^{\epsilon-1})}{(x^r - 1)^2}$ (9)

$= \frac{x^\epsilon (\epsilon x^r - \epsilon x^r - \epsilon x^r)}{(x^r - 1)^2} \Rightarrow f'(x) = \frac{x^\epsilon (\epsilon x^r - 2\epsilon x^r)}{(x^r - 1)^2}$

	0	r	$\sqrt[r]{\epsilon}$					
x								
y'	+	0	-	0	-	0	+	
y	↗	↓	↓	↓	↓	↓	↗	
	صعود	نزول	نزول	نزول	نزول	نزول	صعود	

$\hookrightarrow \text{Min} = \sqrt[r]{\epsilon} - r = \sqrt[r]{\epsilon} (\sqrt[r]{\epsilon} - 1)$ ✓
 : دقت

$f(x) = \frac{x^\epsilon - \mu}{x^r - \mu} \Rightarrow f'(x) = \frac{(\epsilon x^{\epsilon-1})(x^r - \mu) - (x^r)(\epsilon x^{\epsilon-1})}{(x^r - \mu)^2}$ (b)

$= \frac{\mu (\epsilon x^\epsilon - \epsilon x^r - \epsilon x^\epsilon + \mu)}{(x^r - \mu)^2} \Rightarrow f'(x) = \frac{\mu (\epsilon x^\epsilon - \epsilon x^r + \mu)}{(x^r - \mu)^2}$

$\epsilon x^\epsilon - \epsilon x^r + \mu = 0 \xrightarrow{x^r = t} t^\epsilon - \epsilon t + \mu = 0 \rightarrow t = \frac{\epsilon \pm \sqrt{\epsilon^2 - 4\mu}}{2} \Rightarrow x = \sqrt[r]{\frac{\epsilon \pm \sqrt{\epsilon^2 - 4\mu}}{2}}$

$x = \pm \sqrt[r]{\frac{\epsilon + \sqrt{\epsilon^2 - 4\mu}}{2}}$ و $x = \pm \sqrt[r]{\frac{\epsilon - \sqrt{\epsilon^2 - 4\mu}}{2}}$ و $x = 0$ و $x = \pm \sqrt[r]{\mu}$

	$-\sqrt[r]{\mu}$	$-\sqrt[r]{\frac{\epsilon - \sqrt{\epsilon^2 - 4\mu}}{2}}$	$-\sqrt[r]{\mu}$	0	$+\sqrt[r]{\mu}$	$+\sqrt[r]{\frac{\epsilon + \sqrt{\epsilon^2 - 4\mu}}{2}}$	$+\sqrt[r]{\mu}$	
x								
y'	-	0	+	+	+	-	0	+
y	↘	↘	↗	↗	↗	↘	↘	↗

$(-\sqrt[r]{\mu}, -\sqrt[r]{\frac{\epsilon - \sqrt{\epsilon^2 - 4\mu}}{2}})$ در حالت اول مثبت، بازه زیر مجریه من که آن سال در اما در اینجا بازه های $(\sqrt[r]{\mu}, \sqrt[r]{\frac{\epsilon + \sqrt{\epsilon^2 - 4\mu}}{2}})$ و $(\sqrt[r]{\frac{\epsilon - \sqrt{\epsilon^2 - 4\mu}}{2}}, \sqrt[r]{\mu})$ تابع اکیدا نزولی است.
 تعداد = 3 بازه ✓