۱۷/۵

Date: .... ۲۴ Subject: A دوازدهم رودرین قشوریان

① $f(x)=\sqrt{x(1-|x|)}$

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$m \leftarrow$ ماکسیمم نسبی

$n \leftarrow$ مینیمم نسبی

$k \leftarrow$ عطف بحرانی

$k+m+n$

$D = \xrightarrow{0^+} \sqrt{x-x^2}$, $x(1-x)$

$\xrightarrow{0^-} x+x^2$, $x(1+x)$

$D_f = (-\infty \; 1] \cup [0 \;\; 1]$

$$f(x)\begin{cases}\sqrt{x-x^2} & x\geq 0\\ \sqrt{x+x^2} & x\leq 0\end{cases} \xrightarrow{f'(x)} \begin{cases}\dfrac{1-2x}{2\sqrt{x-x^2}} & x>0\\ \dfrac{1+2x}{2\sqrt{x+x^2}} & x<0\end{cases}$$

ت.ن : ۰

صفر : $\frac{1}{2}$

ت.ن : ۰

ق.ن $-\frac{1}{2}$

داخل دامنه نیست

x	$-\infty$	$-\frac{1}{2}$		1	0	$\frac{1}{2}$		1	$+\infty$
$f'(x)$	$-$	0	$+$	ت.ن	ت.ن	$+ \; 0$	$-$	ت.ن	
$f(x)$	$\searrow$		$\nearrow$	0	0	$\nearrow$	$\searrow$	0	

$m=1$ $\quad$ $\cancel{n=1}$ $\quad$ $n=0$

~~k بحرانی = ۵~~ $\quad$ $K=4$

$\boxed{5+1+1=7}$

$K+m+n=5$

(2) $f(x) = \sqrt{x} + \sqrt{a-2x}$ $\quad \min \times \mathrm{Max} = \sqrt{12}$ $\quad a > 0$ $\quad [a] = ?$

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

1

$$\sqrt{a-2x} = 2\sqrt{x}$$

$$a - 2x = 4x \longrightarrow a = 6x$$

$$f(x) = \sqrt{x} + \sqrt{a-2x} \rightarrow \begin{cases} x \geq 0 \\ a - 2x \geq 0 \end{cases} \rightarrow x \leq \frac{a}{2} \xrightarrow{\cap} 0 \leq x \leq \frac{a}{2}$$

$$f'(x) = \frac{1}{2\sqrt{x}} + \frac{-2}{2\sqrt{a-2x}} = \frac{1}{2\sqrt{x}} - \frac{1}{\sqrt{a-2x}} \xrightarrow{y'=0} \frac{1}{2\sqrt{x}} - \frac{1}{\sqrt{a-2x}} = 0 \rightarrow x = \frac{a}{6}$$

$$\begin{cases} x = 0 \rightarrow y = f(0) = \sqrt{a} \\ x = \frac{a}{2} \rightarrow y = f\left(\frac{a}{2}\right) = \sqrt{\frac{a}{2}} \rightarrow \min \\ x = \frac{a}{6} \rightarrow y = f\left(\frac{a}{6}\right) = 3\sqrt{\frac{a}{6}} \rightarrow \max \end{cases}$$

$$\min \times \max = \sqrt{12} \rightarrow 3\sqrt{\frac{a^2}{12}} = \sqrt{12} \xrightarrow{a>0} \frac{3a}{\sqrt{12}} = \sqrt{12}$$

$$3a = 12 \rightarrow a = 4 \rightarrow \boxed{[a] = 4}$$

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$$f(x) = \pm\left(\frac{x^{۲}}{x^{۲}-۱}\right)\left(x^{۲}-۴\right)$$

$$\cancel{۲x^{۳}} - ۲x - \cancel{۲x^{۳}}$$

$$f'(x) = \pm\left(\left(\frac{(۲x)(x^{۲}-۱)-(۲x)(x^{۲})}{(x^{۲}-۱)^{۲}}\right)(x^{۲}-۴) + (۲x)\left(\frac{x^{۲}}{x^{۲}-۱}\right)\right)$$

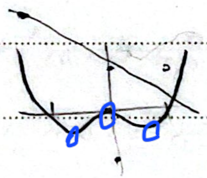
$$f'(x) = \pm\left(\left(\frac{-۲x}{(x^{۲}-۱)^{۲}}\right)(x^{۲}-۴) + \frac{۲x^{۳}}{x^{۲}-۱}\right)$$

$$f'(x) = \pm\left(\frac{-۲x^{۳}+۸x+۲x^{۵}-۲x^{۳}}{(x^{۲}-۱)^{۲}}\right)$$

$$f'(x) = \pm\left(\frac{۲x^{۵}-۴x^{۳}-۲x^{۳}+۸x}{(x^{۲}-۱)^{۲}}\right)$$

$$\pm\frac{(۲x(x^{۴}-x^{۲}-x+۸))}{(x^{۲}-۱)^{۲}}$$

$$x^{۴}-x^{۲} = \cancel{x} - x - ۸$$



۳ نقطه

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$y = ax^3 + bx^2 + cx + d$ $\quad A(0\ \ 0) \quad B(1\ \ 1)$

$\xrightarrow{d=0} y' = 3ax^2 + 2bx + c \qquad y' = 3ax(x-1)$

$y' = 3ax^2 - 3ax \qquad -3a = 2b$

$-\frac{3}{2}a = b$

$\xrightarrow{c=0}$

$y = a + b + \cancel{c} + \cancel{d} = 1 \qquad -\frac{3}{2}a + a = 1 \qquad -\frac{1}{2}a = 1 \qquad \boxed{a = -2}$

$\boxed{b = 3}$

$\boxed{a \times b = -6}$

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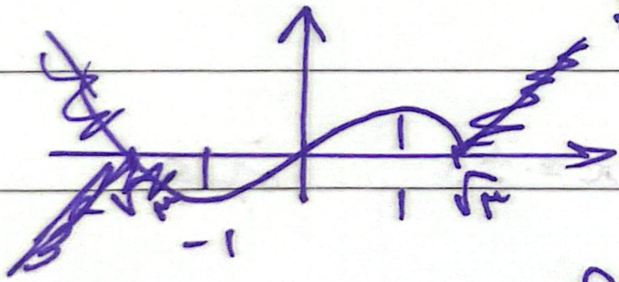
۵) $f(x) = |\sqrt{۳} - x|\, x\, |\sqrt{۳} + x|$



$f(x) = \pm(x^{۳} - ۳x)$

$f'(x) = \pm(۳x^{۲} - ۳)$ $x = \pm 1$

$f(-1) = -1(۲) = \boxed{-۲}$

۲

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$$y = x^2|x| + 3ax^2 + b$$

$$y = \begin{cases} x^3 + 3ax^2 + b & x > 0 \\ -x^3 + 3ax^2 + b & x < 0 \end{cases}$$

$$y' = \begin{cases} 3x^2 + 6ax & x > 0 \quad 3x(x+2a) \\ -3x^2 + 6ax & x \leq 0 \quad -3x(x-2a) \end{cases}$$

$$-3(-1)(-1-2a) = 0$$

$$-1-2a = 0 \qquad \boxed{a = -\frac{1}{2}}$$

$$\xrightarrow{\text{جایگذاری}} y = x^2|x| - \frac{3}{2}x^2 + b$$

$$y = 1 - \frac{3}{2} + b = 1 \longrightarrow b = \frac{3}{2}$$

$$\frac{b}{a} = \frac{+\frac{3}{2}}{-\frac{1}{2}} = \boxed{-3}$$

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$$y = \frac{۳}{۲}x^{۲} + x + \frac{۵}{۶}$$

$$y' = ۳x + ۱ = ۰ \longrightarrow \boxed{x = -\frac{۱}{۳}}$$

$$y = \frac{۳}{۲} \times \frac{۱}{۹} - \frac{۱}{۳} + \frac{۵}{۶} = \cancel{۱+۲} \qquad \frac{۱ - ۲ + ۵}{۶} = \frac{۲}{۳}$$

$$\left(-\frac{۱}{۳} \quad \frac{۲}{۳}\right)$$

۲

$$\frac{a}{a+۱} = \frac{۲}{۳} \longrightarrow \boxed{a = ۲}$$

$$\longrightarrow f(x) = \frac{۲x + ۳}{۳x + ۱} \xrightarrow{y=۰} \boxed{x = -\frac{۳}{۲}}$$

(8) $y = \dfrac{bx^2 + 7}{4x^2 + ax + 1}$ مجانب افقی $= \dfrac{b}{4} = 3$ $\boxed{b = 12}$

$\xrightarrow[\text{مخرج را صفر کند}]{x = -\frac{1}{2}}$ $4 \times \frac{1}{4} + -\frac{a}{2} + 1 = 0$ $-\frac{a}{2} = -2$ $\boxed{a = 4}$

$\boxed{\dfrac{12}{4} = 3}$

2

(9)

$$f'(x) = \frac{(4x^3)(x^3-8)-(3x^2)(x^4)}{(x^3-8)^2}$$

$$f'(x) = \frac{4x^6-32x^3-3x^6}{(x^3-8)^2} = \frac{x^6-32x^3}{(x^3-8)^2} \quad \frac{x^3(x^3-32)}{(x^3-8)^2}$$

2

مخ $= x = 2$

$0 \Rightarrow x = 0 \qquad x = \sqrt[3]{32} = 3/1$

	0		2^*		$3/1$	
$+$	$\mid$		$\mid$	$-$	$\mid$	$+$

$[2 \quad \sqrt[3]{32}) \cup [0 \quad 2) \longrightarrow \boxed{\text{Min بازه} = \sqrt[3]{32} - 2}$

(10)

$$f'(x) = \frac{(4x)(x^2-3)-(2x)(x^4-4)}{(x^2-3)^2}$$

1

$$f'(x) = \frac{4x^3-12x-2x^5+6x}{(x^2-3)^2} = \frac{-2x^5+4x^3-6x}{(x^2-3)^2}$$

$t^2 - 2t + 3 \quad (t-3)$

$$\frac{-2x(x^4 - \cancel{2x^2+3})}{\cancel{(x^2-3)^2}} = \cancel{A2x(x^2-3)(x^2+1)}$$

$2 \pm \sqrt{4-12}$

ریشه ندارد

$$f'(x) = \frac{12x^3(x^2-3)-2x(3x^4-3)}{(x^2-3)^2} = \frac{2x((6x^4-9x^2)-(x^4-3))}{(x^2-3)^2}$$

	$-\sqrt{3}$		0		$\sqrt{3}$	
$f'(x)$ $+$	ن	$+$	0	$-$	ن	$-$

$\boxed{\text{بازه}}\ [0 \quad \sqrt{3}) \cup (\sqrt{3} \quad 2)$

MAHAN

$2x^5 - 12x^3 + 6x = 0 \rightarrow 2x(x^4 - 6x^2 + 3) = 0 \rightarrow \{x = 0$

$\rightarrow x^4 - 6x^2 + 3 = 0 \xrightarrow{x^2 = t} t^2 - 6t + 3 = 0 \rightarrow t = \frac{6 \pm \sqrt{24}}{2} = 3 \pm \sqrt{6} \rightarrow \begin{cases} x = \pm\sqrt{3-\sqrt{6}} \\ x = \pm\sqrt{3+\sqrt{6}} \text{ غ ق ق} \end{cases}$

x		$-\sqrt{3}$		$-\sqrt{3-\sqrt{6}}$		0		$\sqrt{3-\sqrt{6}}$		$\sqrt{3}$	
y'	$-$	ن	$-$	0	$+$	0	$-$	0	$+$	ن	$+$

$\longrightarrow$ در ۳ بازه اکیداً نزولی