Date: ....

(۴۶) Subject: A دوازدهم روژین قشوریان

① $f(x) = \sqrt{x(1-|x|)}$

m ← ماکسیمم نسبی

n ← مینیمم نسبی

k ← بحرانی $\quad k+m+n$

$D = \xrightarrow{0^+} \sqrt{x - x^2}$

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

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

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

ت ن: 0

صفر: $\frac{1}{2}$

ت ن: 0

صفر: $-\frac{1}{2}$

	$-\infty$	$-\frac{1}{2}$	1	0	$\frac{1}{2}$	1	$+\infty$
$f'(x)$	−	0 +	ت ن	ت ن +	0 −	ت ن	
$f(x)$	↘	↗	0	0 ↗	↘	0	

$m = 1 \quad n = 1$

k بحرانی $= 5$

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

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

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

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

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

(۳) $f(x) = \pm\left(\frac{x^2}{x^2-1}\right)(x^2-4)$

$2\cancel{x^4} - 2x - \cancel{2x^4}$

$$f'(x) = \pm\left(\left(\frac{(2x)(x^2-1)-(2x)(x^2)}{(x^2-1)^2}\right)(x^2-4) + (2x)\left(\frac{x^2}{x^2-1}\right)\right)$$

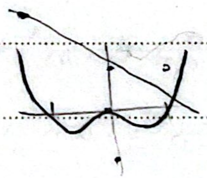
$$f'(x) = \pm\left(\left(\frac{-2x}{(x^2-1)^2}\right)(x^2-4) + \frac{2x^3}{x^2-1}\right)$$

$$f'(x) = \pm\left(\frac{-2x^3+8x+2x^5-2x^3}{(x^2-1)^2}\right)$$

$$f'(x) = \pm\left(\frac{2x^5-4x^3-2x^2+8x}{(x^2-1)^2}\right)$$

$$\frac{\pm(2x(x^4-x^2-x+8))}{(x^2-1)^2}$$

$x^4 - x^2 = x - 8$



4

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

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

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

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

$\xrightarrow{c=0}$

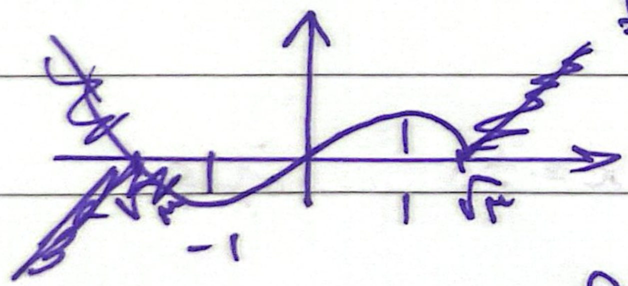
$y = a + b + \cancel{c} + \cancel{d} = 1$ $\qquad$ $-\frac{3}{2}a + a = 1$ $\qquad$ $-\frac{1}{2}a = 1$ $\qquad$ $\boxed{a = -2}$

$\boxed{b = 3}$

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

Date: .... Subject: ....

⑤) $f(x) = |\sqrt{3} - x|\, x\, |\sqrt{3} + x|$



$f(x) = \pm(x^3 - 3x)$

$f'(x) = \pm(3x^2 - 3)$ $\quad x = \pm 1$

$f(-1) = -1(2) = \boxed{-2}$

6

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

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

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

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

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

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

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

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

Subject:

Year: Month: Day: page: ( )

۷

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

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

$$y = \frac{۳}{۲} \times \frac{۱}{۹} - \frac{۱}{۳} + \frac{۵}{۶} = \cancel{۴+۸}$$

$$\frac{۱ - ۲ + ۵}{۶} = \frac{۲}{۳}$$

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

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

$$\longrightarrow f(x) = \frac{۴x + ۲}{۳x + ۱} \xrightarrow{y=۰} \boxed{x = -\frac{۳}{۲}}$$

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

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

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

⑨ $f'(x) = \dfrac{(4x^3)(x^3-8) - (3x^2)(x^4)}{(x^3-8)^2}$

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

ت ن $= x = 2$

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

$\begin{array}{ccccccc} & 0 & & 2 & & 3/1 & \\ + & | & - & | & - & | & + \end{array}$

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

⑩ $f'(x) = \dfrac{(4x)(x^2-3) - (2x)(x^4-3)}{(x^2-3)^2}$

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

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

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

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

ریشه ندارد

$\begin{array}{cccccccc} & -\sqrt{3} & & 0 & & \sqrt{3} & \\ f'(x) \; + & \text{ت ن} & + & 0 & - & \text{ت ن} & - \end{array}$

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