۱-

$\lim_{x\to 1} \frac{f(x)-f(1)}{x-1} = f'(1) \Rightarrow m = \frac{La_c - (1-a)}{3-1} = \frac{\frac{9}{c}}{2} = \frac{9}{3} \Rightarrow f(x) = \frac{9}{x^2} \to \frac{9}{x^2} = \frac{9}{c} \to x^2 = c$

$a = \pm\sqrt{3} \longrightarrow \sqrt{c}$ ✓

۲-

$y' = 6ax - 3 = -1 \longrightarrow 6ax = 2 \to x = \frac{1}{3a} \longrightarrow f(\frac{1}{a}) = -\frac{1}{a} = \frac{2}{a} - \frac{3}{a} + 5a$

$\ln a^2 = 2e \to a' = \frac{1}{9} \longrightarrow a = \pm\frac{1}{c} \to a = -\frac{1}{c}$ ✓

۴-

$y = x^3 - 12x + 2 \to y' = 3x^2 - 12 \to y' = 3(x^2 - 4) = 0 \to x = \pm 2$

	-2		2	
y'	$+$	0	$-$	0	$+$
y	↗	max	↘	min	↗

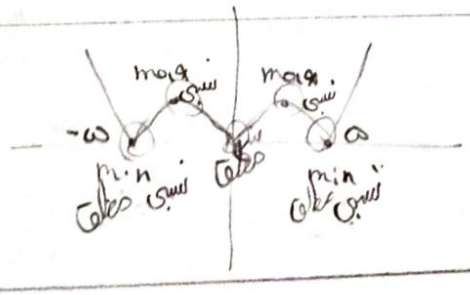
۱۴-

۵-

$f'(-1) = f'(0) = 0 \longrightarrow y = x^3 + ax^2 - 2bx - 6 \Rightarrow y' = 3x^2 + 2ax - 2b \to -2b = 0 \to b = 0$

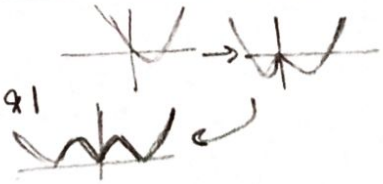
$12 - 6a = 0 \to a = 2 \longrightarrow y = x^3 + 3x^2 - 6 \longrightarrow (a, -6), (-2, 10) \longrightarrow \sqrt{(-2-0)^2 + (10+6)^2} \to 2\sqrt{5}$

۶-



$\frac{1}{m} = \frac{3}{2}$

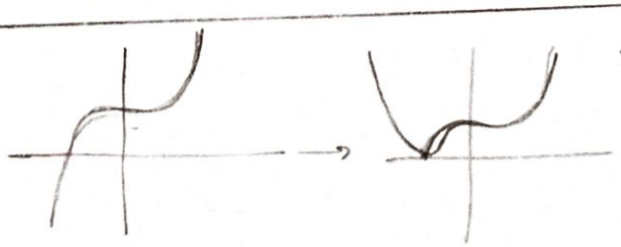
$f(x) = x^2 - 2|x| + 1$

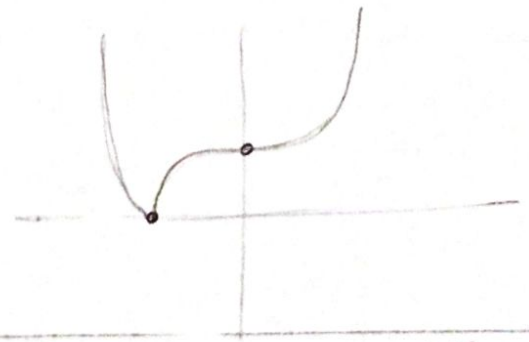


۶-

$y = |x(|x|+3)| = |x|x| + 3x| \longrightarrow x \geq 0 \quad x^2 + 3x$

$x < 0 \quad -x^2 + 3x$





(۲)

۷-

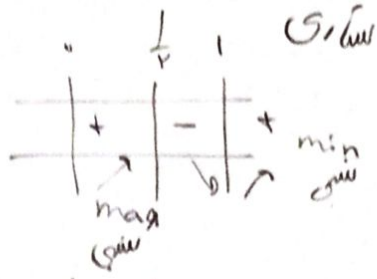
$f'(x) = \frac{2}{3\sqrt[3]{x}}(a-x) - \sqrt[3]{x^2} = \frac{2a - 3x}{3\sqrt[3]{x^2}} = 0 \longrightarrow x = \frac{2}{3}a, f(\frac{2}{3}a) = 16 \to \sqrt[3]{\frac{4a^2}{9}} \times (\frac{2}{3}a) = \frac{2}{3}$

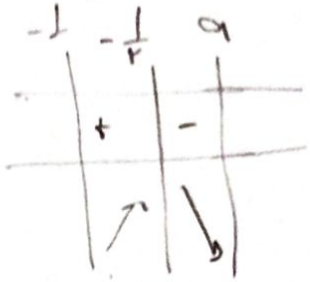
$\frac{4a^2}{27} \times \frac{a^3}{16} = \frac{1}{8} \longrightarrow a^3 = \frac{27}{2} \to a = \frac{3}{2}$

$y=\sqrt{|x|x|-x}$ $\begin{cases} x\geq 0 \to \sqrt{x^2-x} \\ x<0 \to \sqrt{-x^2-x} \end{cases}$

$m=2n=b \Rightarrow m=1$ $\to$ $\frac{1}{2}$

$\frac{2x-1}{2\sqrt{x^2-x}}$ $\Rightarrow$ $\frac{1-2x}{2\sqrt{-x^2-x}}$





نمودار

۷- نقاط بحرانی $x=0$ و $x=\frac{1}{2}$

۹- $(1,\infty)$ در f $\to$ $m>1$ $\to$ $m=0$ یا $m=2$ و $y'=\frac{m(m-1)-2}{(x+m-1)^2}$

$m^2-m-2=(m-2)(m+1)=0$

$\begin{cases} m<1 \to m<2 \to m\leq 0 \\ m>1 \to m\geq 2 \end{cases}$ $\Rightarrow$ $m=0$ یا $m=1$

۱۰- $D_f=R-\{1,-1\}$ $\to$ $f(x)=\frac{x}{x^2-1}$ $\to$ $x=0$ و $\frac{x}{x^2+1}$ $\to$ $x=0$

$f'(x)=\frac{(1-x^2)-(-2x)x}{(1-x^2)^2}=\frac{1+x^2}{(1-x^2)^2}$ $\to$ $x=0$

$\frac{(1+x^2)-(2x)x}{(1+x^2)^2}=\frac{1-x^2}{(1+x^2)^2}$ $\to$ $x=0$

$a=-1$