

$$f(x) = \sqrt{x(1-|x|)} \rightsquigarrow x(1-|x|) \geq 0 \rightarrow \begin{array}{c} -1 & 0 & +1 \\ + & - & + & - \end{array} \quad (1)$$

$$f(x) = \begin{cases} x > 0 \rightarrow \sqrt{x-x^2} \xrightarrow{f'} \frac{1-2x}{2\sqrt{x-x^2}} \\ x < 0 \rightarrow \sqrt{x+x^2} \xrightarrow{f'} \frac{1+2x}{2\sqrt{x+x^2}} \end{cases} \quad D_f = (-\infty, -1] \cup \{0\} \cup [0, 1]$$

$$[0, 1] \xrightarrow{\frac{1-2x}{2\sqrt{x-x^2}}} \text{if } x > 0 \rightarrow x = \frac{1}{4}$$

x	0	$\frac{1}{4}$	1
f'	+	-	
f	↗	↘	

$K=3$

$$(-\infty, -1] \xrightarrow{\frac{1+2x}{2\sqrt{x+x^2}}} \text{if } x < -1 \rightarrow \text{undefined}$$

$$K+m+n = 3 + \frac{1}{2} = \boxed{\frac{7}{2}}$$

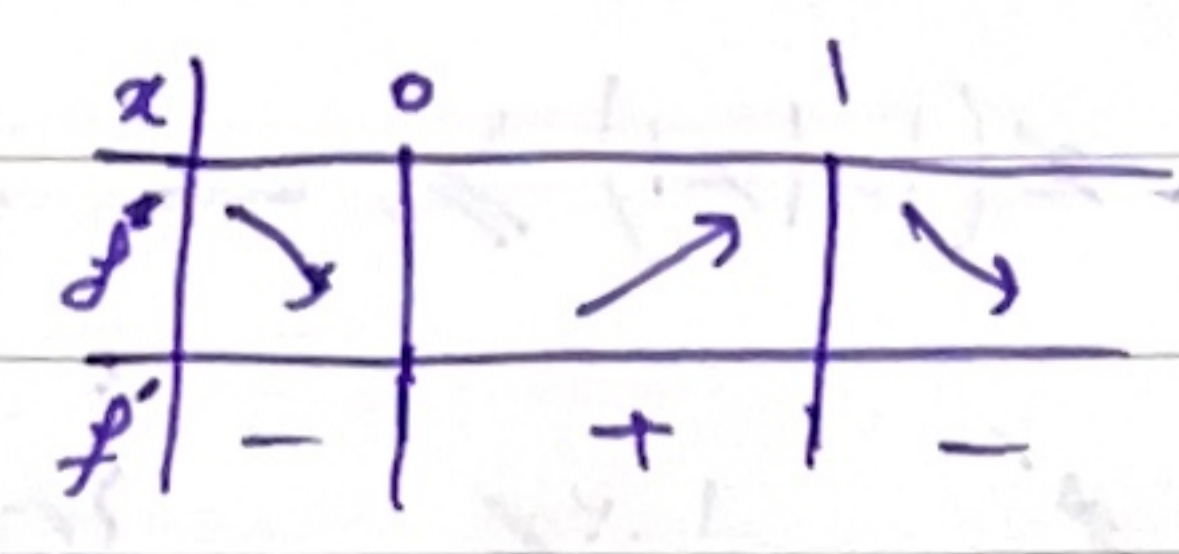
$$f(x) = \sqrt{x} + \sqrt{a-2x} \quad (2)$$

$$f(x) = \frac{x^r}{x^r-1} \quad |x^r-\epsilon| \rightarrow \begin{array}{c} -r & +r \\ + & - & + \end{array} \quad (3)$$

$$I \quad x > \epsilon \rightarrow \frac{x^r(\epsilon-x^r)}{x^r-1} \rightarrow \frac{\epsilon x^r - x^{2r}}{x^r-1} \rightarrow f'(x) = \frac{(\epsilon x^r - 2x^{2r})(x^r-1) - x^r(\epsilon x^r - x^{2r})}{(x^r-1)^2}$$

$$II \quad x < \epsilon \rightarrow \frac{x^r(x^r-\epsilon)}{x^r-1} \rightarrow \frac{x^{2r} - \epsilon x^r}{x^r-1} \rightarrow f'(x) = \frac{(\epsilon x^r - 2x^{2r})(x^r-1) - x^r(x^{2r} - \epsilon x^r)}{(x^r-1)^2}$$

$y = ax^3 + bx^2 + cx + d \rightarrow d = 0$
 $y' = 3ax^2 + 2bx + c \rightarrow c = 0$



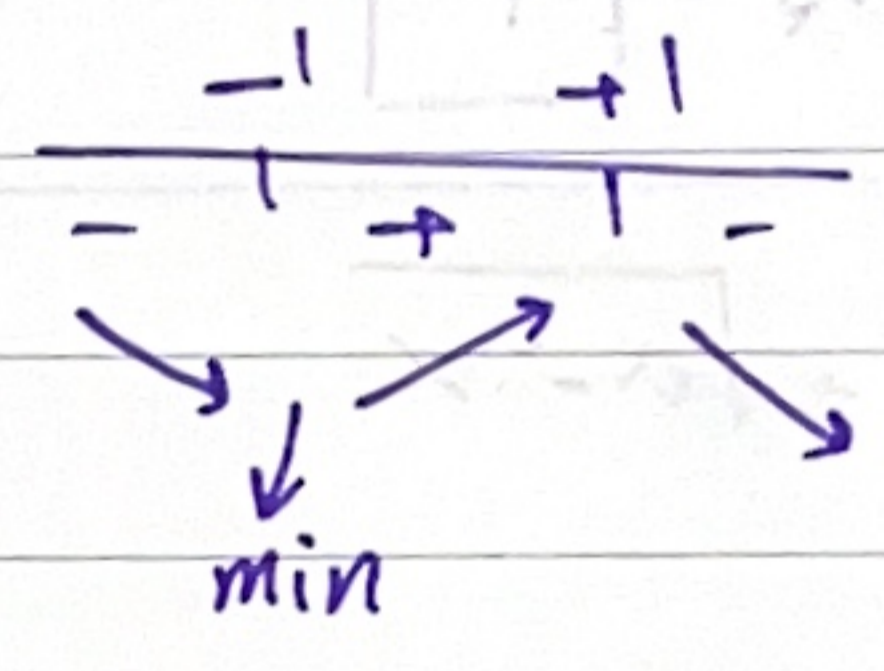
min $\leftarrow A(0, 0)$
 max $\leftarrow B(1, 1)$

$1 = a + b$

$3ax^2 + 2bx = 0 \rightarrow x(3ax + 2b) = 0$
 $3a + 2b = 0$
 $2a + 2b = 2$
 $a = -2$
 $b = +3$

$ab = -4$

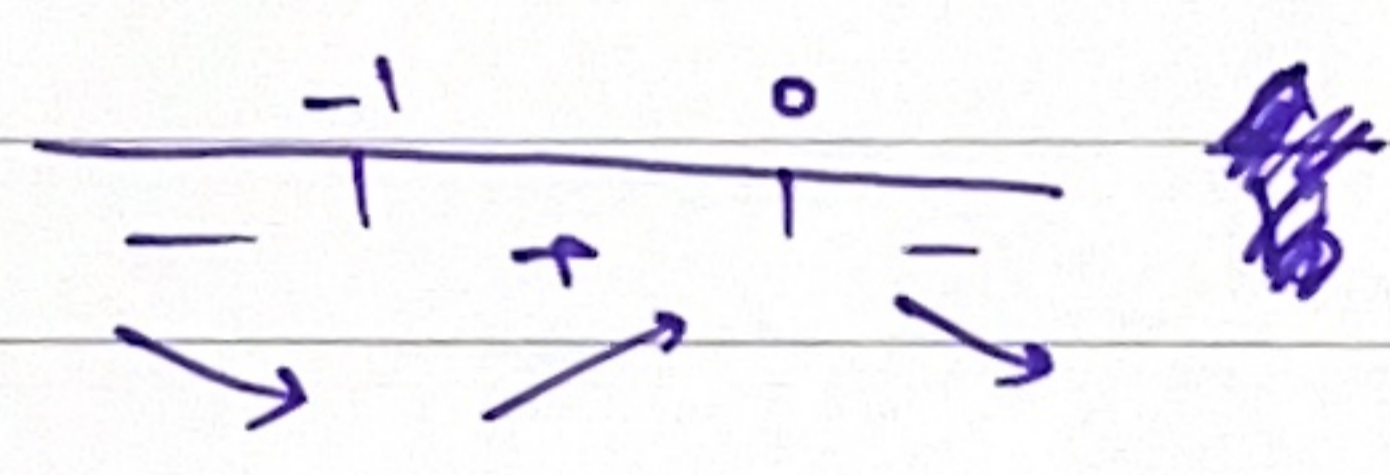
$f(x) = x|x^3 - 3x^2|$
 $x > \sqrt{3} \rightarrow 3x - x^3 \rightarrow f'(x) = 3 - 3x^2 \rightarrow 3(1 - x^2)$
 $x < \sqrt{3} \rightarrow x^3 - 3x^2$



min $\left| \begin{matrix} -1 \\ -2 \end{matrix} \right.$

$y = x^2|x| + 3ax^2 + b \rightarrow b = +\frac{3}{2}$
 چون نقطه $A(-1, 1)$ است نرم نمی آید پس x ها را
 منفی برمی داریم و بعد مشتق می گیریم

$y' = -x^3 + 3ax^2 + b \rightarrow y' = -3x^2 + 4ax$
 $-3x(x - \frac{4a}{3})$



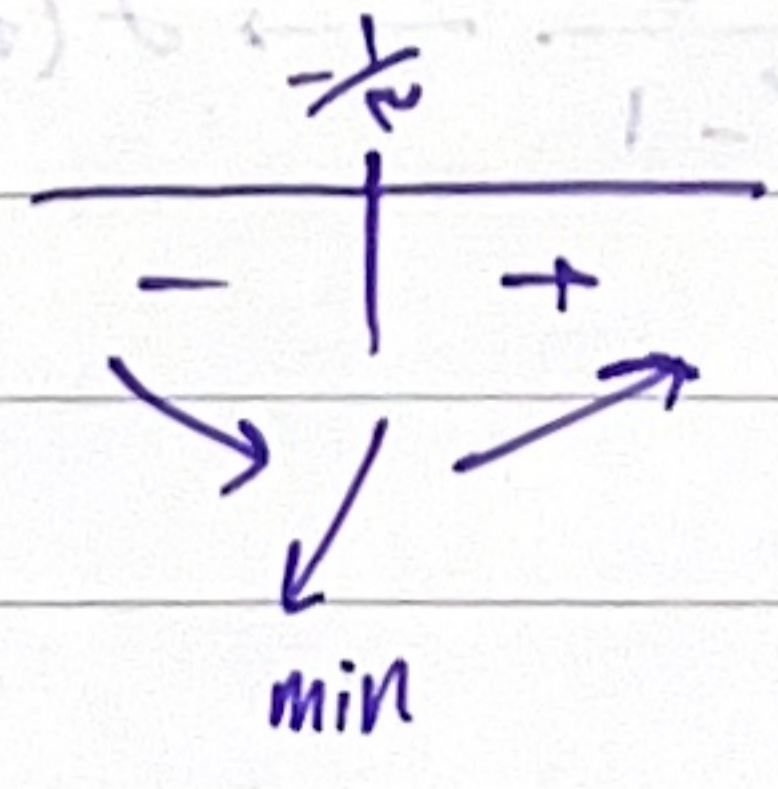
$1 + (-\frac{4a}{3}) + b = 1$

$-1 - \frac{4a}{3} = 0$
 $a = -\frac{3}{4}$

$\frac{b}{a} = \frac{\frac{3}{2}}{-\frac{3}{4}} = -2$

$y = \frac{(ax + 3)}{(a+1)x + (a-1)}$
 $4x - 1 = 0 \rightarrow x = \frac{1}{4}$
 $\frac{a}{a+1} = \frac{1}{4} = Va + V = 4a$
 $a = -\frac{1}{3}$

$y = \frac{1}{4}x^2 + x + \frac{1}{4} \rightarrow 3x + 1$



min $\left| \begin{matrix} -1/4 \\ 1/4 \end{matrix} \right.$

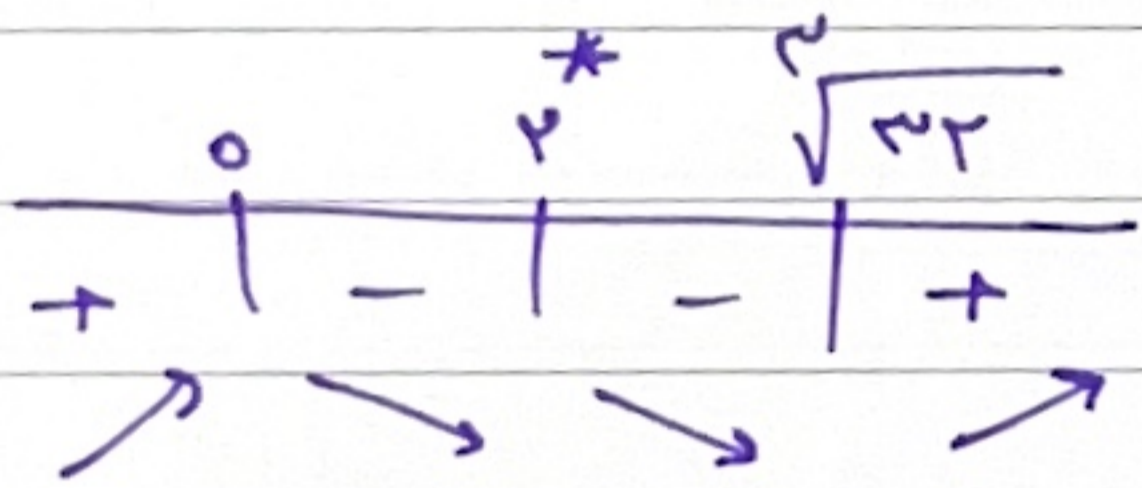
$$y = \frac{bx^r + v}{x^r + ax + 1}$$

(1)

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

(4)

$$\rightarrow \frac{x^r(rx^r - r - rx^r)}{(x^r - 1)^2} \rightarrow \frac{x^r(x^r - r)}{(x^r - 1)^2}$$



~~min~~

\sqrt{r} نقطه ای که نمودار در آن به min خود می رسد.
 و کمتر می شود یعنی در آن تابع حالت آلفا نزدیک دارد.

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

(10)

$$\rightarrow \frac{rx^r - rx^r - rx^r + r}{(x^r - r)^2} \rightarrow \frac{r - rx^r}{(x^r - r)^2}$$

$$\rightarrow \frac{x(2x^r - 12x^r + 4)}{(x^r - r)^2}$$

$$[-\sqrt{r}, -\sqrt{r-\sqrt{r}}] \cup [0, \sqrt{r-\sqrt{r}}]$$

$$\cup [\sqrt{r}, r] \rightarrow [0, r]$$

Parsian

