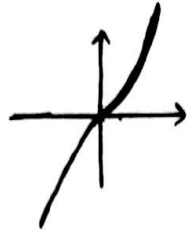
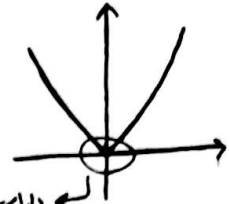


$$f(x) = \begin{cases} x^2 + 3x & ; x \geq 0 \\ -x^2 + 3x & ; x < 0 \end{cases}$$



$$\rightarrow y = |f(x)|$$



(2)

✓. $x=0$ دلای یک نقطه بحرانی د

$$f(0) = 0 \quad / \quad f(a) = 0$$

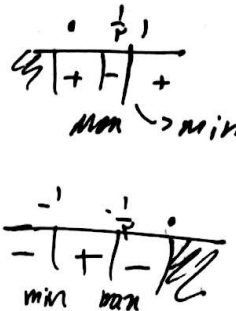
$$f(x) = \sqrt[3]{a^2} (a-x) \leftarrow [0, a] \text{ سازه } (1,0)$$

$$f'(x) = \frac{-3x + 3a}{\sqrt[3]{x^2}} \rightarrow -3x + 3a = 0 \Rightarrow x = \frac{3a}{3} = a$$

$$f\left(\frac{a}{2}\right) = \sqrt[3]{\frac{9a^2}{4}} = \frac{a}{2} \Rightarrow \frac{9a^2}{4} = \frac{a^3}{4} \Rightarrow 9a^2 = a^3 \Rightarrow a = \frac{9}{a} \Rightarrow a = \sqrt[3]{9}$$

$$f(x) = \sqrt{9x^2 - 2x}$$

$$f'(x) = \begin{cases} \frac{2m-1}{2\sqrt{m^2-x}} \\ \frac{-2m-1}{2\sqrt{-m^2-x}} \end{cases}$$



$$\begin{aligned} n = 2 &= \text{min} \\ m = 2 &= \text{max} \\ x = 0 &= \text{بحرانی} \end{aligned}$$

$$\frac{km+n}{k-n} = \frac{2}{2} = 1 \quad (\text{جواب پایین})$$

$$y = \frac{m^2 + r}{n-1+m}$$

(1, +∞) نزکی

$$y' = \frac{m(m-1+n) - m^2 - r}{(m-1+m)^2} = \frac{m^2 - m - r}{(n-1+m)^2} < 0$$

$$m^2 - m - r < 0 \Rightarrow \frac{-1 \pm \sqrt{1+4r}}{2} < m < \frac{-1 \pm \sqrt{1+4r}}{2}$$

$$r = 2 \Rightarrow k = 1 - m < 1 \rightarrow m \geq 0 \quad (II)$$

$$(I) \wedge (II) \rightarrow m = 0, 1$$

$$f(x) = \frac{x}{1-|x/x|}$$

$$\Rightarrow f(x) = \begin{cases} \frac{x}{1-x} & x \geq 0 \\ \frac{x}{1+x} & x < 0 \end{cases}$$

$$\lim_{x \rightarrow 0} \frac{f(x) - f(0)}{x} = 1 \quad (1)$$

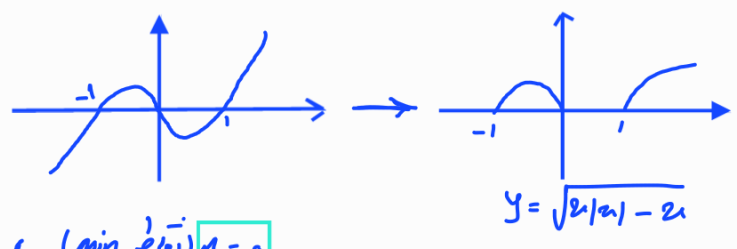
$$D_{f(x)} = 1 - x^2 = 0 \rightarrow x^2 = 1 \rightarrow \begin{cases} x \geq 0 & x^2 = 1 \rightarrow x = 1 \checkmark \\ x < 0 & -x^2 = 1 \rightarrow x = -1 \times \end{cases} \rightarrow D_f = \mathbb{R} - \{1\}$$

مجموع دلای مشتق در $x=1$ است
و فقط سی بحرانی نیز ندارد.

$$\left\{ \begin{aligned} x \geq 0 &\rightarrow f'(x) = \frac{1-x^2+x^2}{(1-x)^2} = \frac{1}{(1-x)^2} \rightarrow x^2 = -1 \times \\ x < 0 &\rightarrow f'(x) = \frac{1+x^2+x^2}{(1+x)^2} = \frac{1+2x^2}{(1+x)^2} \rightarrow x^2 = 1 \rightarrow x = -1 \checkmark \end{aligned} \right.$$

ی نقطه بحرانی

$$y = |x| - x \rightarrow \begin{cases} x - x & x \geq 0 \quad (I) \\ -x - x & x < 0 \quad (II) \end{cases}$$



(نقطه بحرانی) $K = f$ ، (max) $M = 1$ ، (min) $m = 0$

$$\frac{Km + M}{K - m} = \frac{f \cdot 1 + 0}{f - 0} = \frac{f}{f} = 1$$