

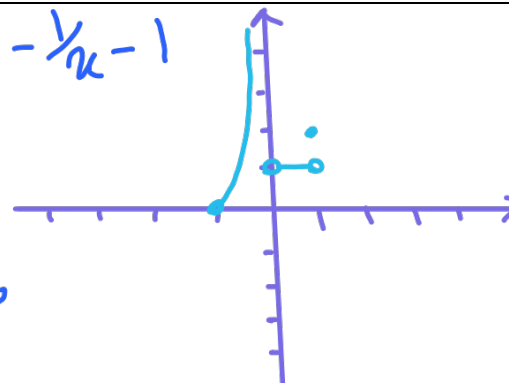
۱ $x=1 \rightarrow f(3) + f(3) = 3 + f(3)$ اعمال $\sqrt{\quad}$
 $\rightarrow f(3) = 3 \Rightarrow f(u) = u$ $\Rightarrow [0, \frac{1}{4}]$
 $y, \sqrt{-x^2 + u} \Rightarrow \left| \frac{-b}{2a} = \frac{-1}{-2} = \frac{1}{2} \Rightarrow (-\infty, \frac{1}{4}] \right.$
 $\frac{1}{4} \xrightarrow{a < 0} y_{\max}$

۲ $f(u): \frac{u(u^2-4)}{u+2} : \frac{u(u+2)(u-2)}{u+2} \neq 1 \Rightarrow u^3 - 12u \neq 12$
 $\Rightarrow u \neq -2$ $\Rightarrow u \neq 4$
 $a = -2$ ساده کردن $u(u-2) \Rightarrow u^2 - 2u \Rightarrow \left| \frac{-b}{2a} = \frac{1}{-1} \right.$
 $b = 4$ $f(\frac{-2+4}{-2}) \Rightarrow f(-1) = 3$ $\xrightarrow{a > 0} \min$
 $c = -1$

۳ این تابع جذبه ای از مرتبه فرد بوده و حتی $\sqrt[3]{\quad}$ تأثیری ندارد $R_f = \mathbb{R}$
 $\Rightarrow \sqrt[3]{(u-2)^3} = \sqrt[3]{u^3 - 6u^2 + 12u - 8}$ می در این جا دامنه مشخص کرده
 $\Rightarrow [-6, 12] \rightarrow -6 \leq u \leq 12 \rightarrow -1 \leq u-2 \leq 10$
 $\Rightarrow R_f: [-1, 10] \Rightarrow$ در صورت محدود کردن دامنه

۴ $y = \sqrt[4]{\frac{u+1}{1-u}} \Rightarrow D_y = \mathbb{R} - \{1\}$
 $y = \frac{ay^2-1}{u^2+b} \Rightarrow u^2 = -\frac{by+1}{y-a} \Rightarrow u = \sqrt{-\frac{by+1}{y-a}} \Rightarrow \frac{by+1}{y-a} \leq 0$
 $a = 1$

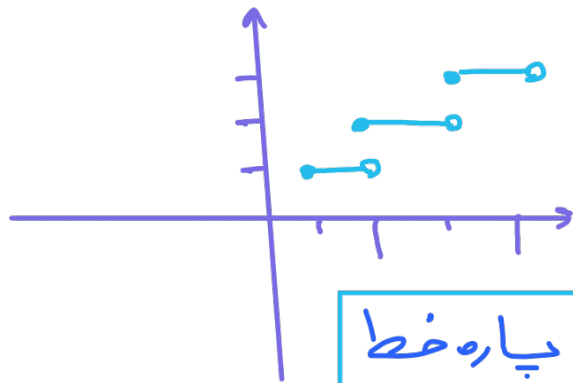
۵ $-1 \leq u < 0 \xrightarrow{[u] = -1} y: \frac{-1}{u} + \frac{-u}{u} = -\frac{1}{u} - 1$
 $0 < u < 1 \xrightarrow{[u] = 0} y = 0 + \frac{u}{u} = 1$
 $\Rightarrow f(-1) = 0 \quad f(0) = \infty \quad f(1) = 2$



$$\frac{1}{4} \leq x < 1 \quad \begin{matrix} [x] = 0 \\ [x + \frac{1}{4}] = 1 \end{matrix} \quad y = 1$$

$$1 \leq x < \frac{3}{4} \quad \begin{matrix} [x] = 1 \\ [x + \frac{1}{4}] = 1 \end{matrix} \quad y = 2$$

$$\frac{3}{4} \leq x < 2 \quad \begin{matrix} [x] = 1 \\ [x + \frac{1}{4}] = 2 \end{matrix} \quad y = 3$$



۳ پله خط

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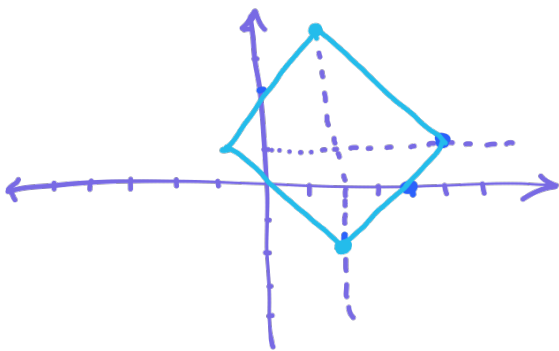
$$y = \left\lfloor \frac{x+1}{ax+3} \right\rfloor \rightarrow D_y: ax \neq -3 \rightarrow x \neq -\frac{3}{a} \Rightarrow D_y = \mathbb{R} - \{-\frac{3}{a}\}$$

$$\left| \frac{x+1}{ax+3} \right| < 1 \rightarrow -1 < \frac{x+1}{ax+3} < 1 \rightarrow \begin{cases} \frac{(a+1)x+4}{ax+3} < 0 \\ \frac{(1-a)x-2}{ax+3} < 0 \end{cases}$$

$$\Rightarrow a=1 \rightarrow \begin{cases} \frac{-2}{x+3} < 0 \rightarrow x > -3 \\ \frac{x(x+1)}{x+3} > 0 \rightarrow x > -2 \end{cases} \Rightarrow b = -2$$

$$\begin{matrix} a-b = \\ 1+2 = 3 \end{matrix}$$

۷



$$-x+2+y-1=3 \rightarrow y=x+2 \quad \textcircled{1}$$

$$\textcircled{2} \quad \begin{matrix} x- \rightarrow x > 1 \\ y+ \rightarrow y > 1 \end{matrix} \quad \begin{matrix} x+ \rightarrow x > 2 \\ y+ \rightarrow y > 1 \end{matrix} \rightarrow y = -x+2$$

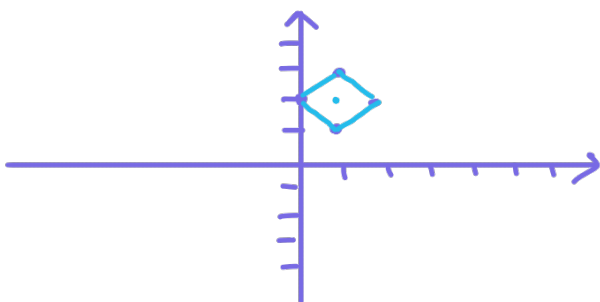
$$\textcircled{3} \quad \begin{matrix} x- \rightarrow x < 1 \\ y- \rightarrow y > 1 \end{matrix} \quad \begin{matrix} x+ \rightarrow x > 2 \\ y- \rightarrow y < 1 \end{matrix} \rightarrow y = x-2$$

$$-x+2-y+1=3 \quad \textcircled{4}$$

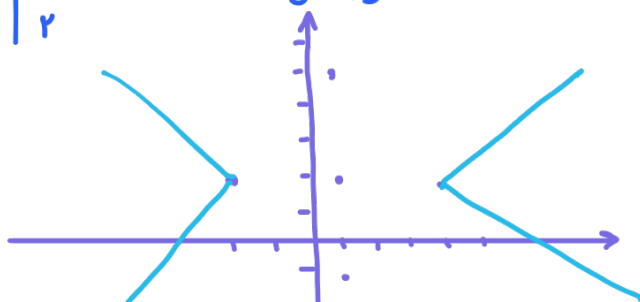
$$-y=x \rightarrow y=-x$$

۸

$$y = |x-1| + |y-2| = 1 \quad \left| \frac{1}{2} \right|$$



$$y = |x-1| - |y-2| = -3 \Rightarrow y = |y-2| - |x-1| = 3$$



۹

$$y = 3x + |ax+b| \quad \begin{matrix} ax+b > 0 \\ ax+b < 0 \end{matrix} \rightarrow y = 3x + ax + b = (3+a)x + b$$

$$\rightarrow y = 3x - ax - b = (3-a)x - b$$

۱۰

تنها در صدی که شب ۲ بخش تابع مختلف علامت باشد تمام اعداد حقیقی را در بر می گیرد

$$\Rightarrow (3+a)(3-a) < 0 \Rightarrow a^2 > 9 \Rightarrow (-\infty, -3] \cup [3, +\infty)$$