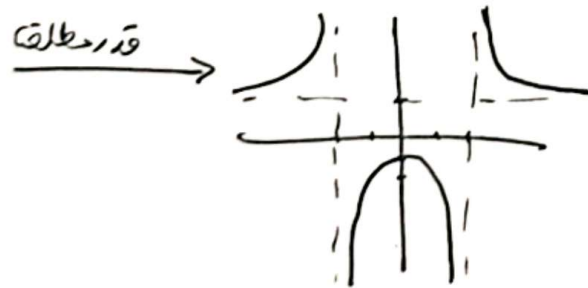
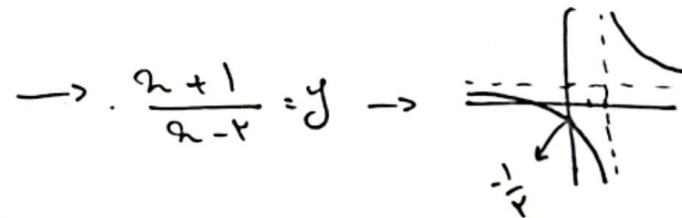


پیریا احسنی

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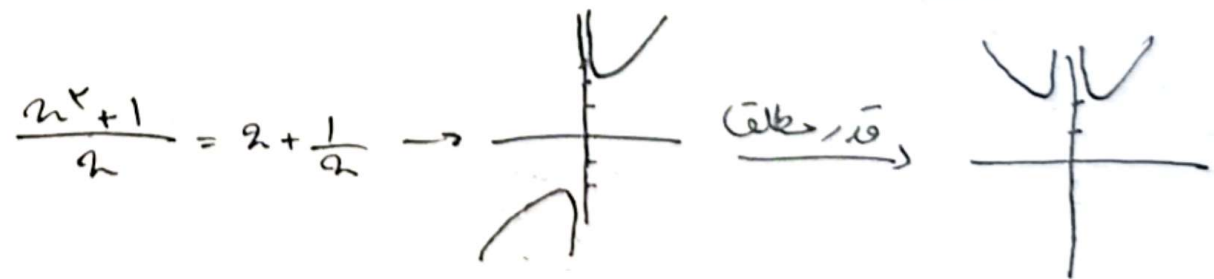
$$y = \frac{|x|+1}{|x|-2} \text{ (داف)}$$



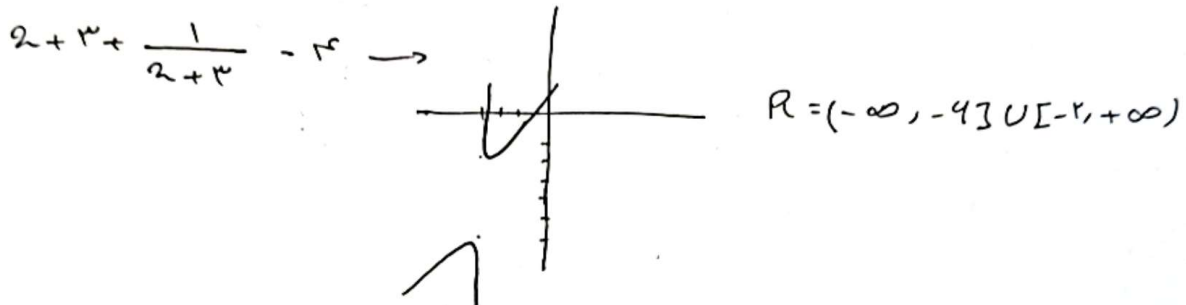
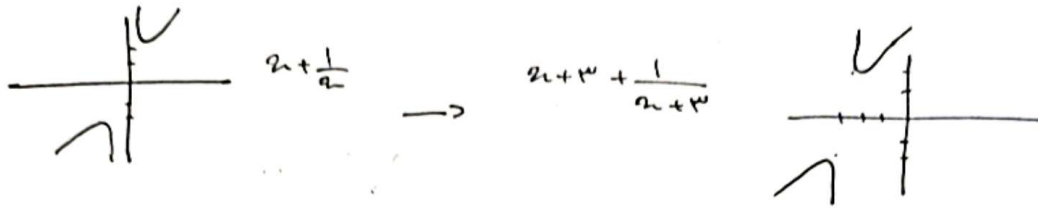
$$R = (-\infty, -\frac{1}{2}] \cup (1, +\infty)$$

$$\rightarrow \frac{x^2+1}{|x|} = \frac{|x|^2+1}{|x|}$$

$$R = [2, +\infty)$$



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



$$\frac{(2 - \frac{1}{x})^x}{2^x - 2x + 1} \rightarrow D = \mathbb{R}$$

$$\frac{2^x - 2x + \frac{1}{x}}{2^x - 2x + 1} \xrightarrow{2^x - 2x = t} \frac{t + \frac{1}{x}}{t + 1}$$

$$2^x - 2x \begin{cases} -\frac{b}{a} = \frac{1}{x} \\ y_{\min} = -\frac{1}{x} \end{cases}$$

$$\left(y = \frac{t + \frac{1}{x}}{t + 1} \right) \times (t + 1) \Rightarrow y(t + 1) = t + \frac{1}{x} \rightarrow$$

$$yt + y = t + \frac{1}{x} \rightarrow yt - t = \frac{1}{x} - y \rightarrow t(y - 1) = \frac{1 - xy}{x} \rightarrow t = \frac{1 - xy}{x(y - 1)}$$

$$t \geq -\frac{1}{x} \rightarrow \frac{1 - xy}{x(y - 1)} \geq -\frac{1}{x} \rightarrow \frac{1 - xy}{y - 1} \geq -1 \rightarrow \frac{1 - xy + y - 1}{y - 1} \geq 0 \rightarrow$$

$$\frac{-xy}{y - 1} \geq 0 \quad \frac{0}{-1 + 1} \quad R = [0, 1)$$

$$\omega) y = \sqrt{-2^x + \varepsilon 2x - 1} \rightarrow R \sqrt{f} = [0, \sqrt{3}]$$

$$f \Rightarrow \begin{cases} 2_{\max} = 3 \\ y_{\max} = 3 \end{cases} \quad Rf = (-\infty, 3]$$

$$\neg) y = \sqrt[3]{2^x - 2x} \rightarrow R \sqrt[3]{f} = [-1, +\infty)$$

$$f \Rightarrow \begin{cases} 2_{\min} = 1 \\ y_{\min} = -1 \end{cases} \quad Rf = [-1, +\infty)$$

$\omega) y = \log \underbrace{(2^x - 2 + 1)}_f \rightarrow R_{\log(f)}$
 $R_f = \mathbb{R}$

$\min \rightarrow \log \left(\frac{1}{1} \right) \rightarrow -\infty$
 $\max \rightarrow \log \left(\frac{+\infty}{1} \right) \rightarrow +\infty$

$R_{\log f} = \mathbb{R}$

$\neg) \log \left(\frac{2^x + 1}{2} \right)$
 R

$f = \frac{2^x + 1}{2} = 2 + \frac{1}{2} \rightarrow (-\infty, 2] \cup [2, +\infty)$

$R_{\log f} = \mathbb{R}$

$\log \frac{+\infty}{2} \rightarrow -\infty$

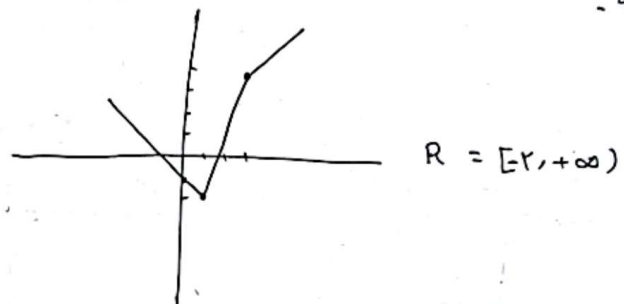
$\log \frac{1}{2} \rightarrow -\infty$

$\log 2 \rightarrow 1$

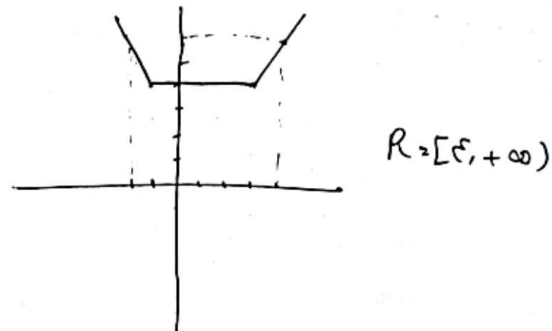
$\log \frac{+\infty}{2} \rightarrow +\infty$

$\omega) y = |2x - 2| - |2 - x|$

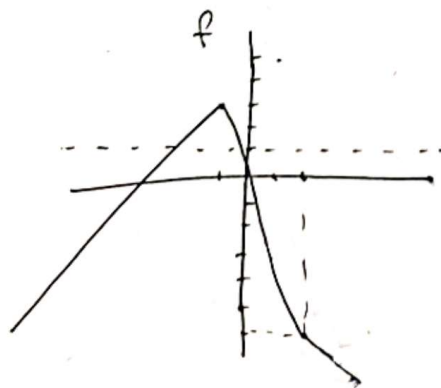
$y = \begin{cases} x+1 & x > 2 \\ 3x-2 & 1 \leq x \leq 2 \\ -x-1 & x < 1 \end{cases}$



$\neg) y = |2x - 2| + |2 - x|$



$|2x - 2| - |2 - x| \leq 1$



$f = \begin{cases} -x-1 & x > 2 \\ -3x & 1 \leq x \leq 2 \\ x+1 & x < 1 \end{cases}$

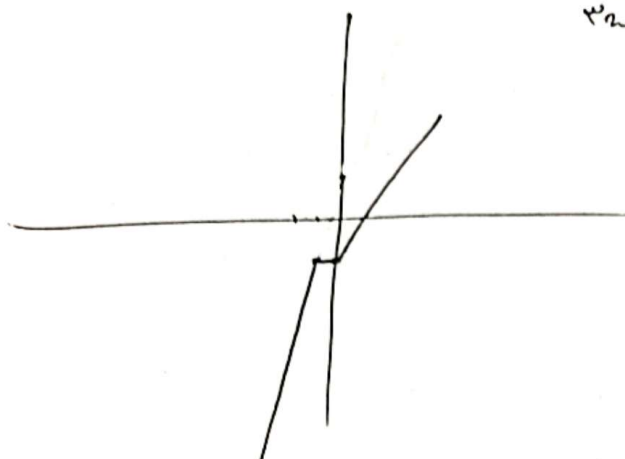
$x+1 = 1 \rightarrow x = 0$

$-3x = 1 \rightarrow x = -\frac{1}{3}$

$(-\infty, -\frac{1}{3}) \cup [\frac{1}{2}, +\infty)$

$$y = 3x - |x+1| + |x-1|$$

- 1



$x < -1$	$-1 < x < 1$	$x > 1$
$3x + x + 1 - x = x + 1$	$3x - x - 1 - x = -1$	$3x - x - 1 + x = x - 1$

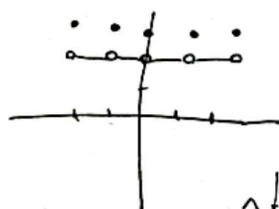
$$R = (-\infty, +\infty)$$

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$$a) y = [x] + [-x] + x$$



→

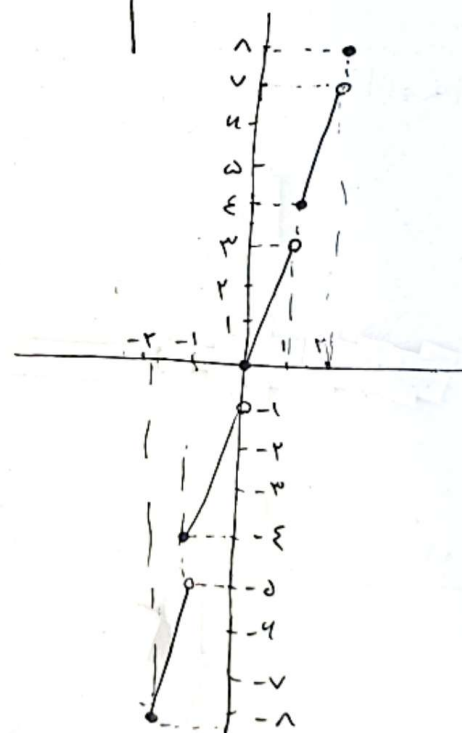


$$R = \{x, y\}$$

$$b) y = 3x - [x]$$

$$\begin{aligned} -2 \leq x < -1 &\rightarrow 3x - 2 \\ -1 \leq x < 0 &\rightarrow 3x - 1 \\ 0 \leq x < 1 &\rightarrow 3x \\ 1 \leq x < 2 &\rightarrow 3x + 1 \\ x = 2 &\rightarrow 3x + 2 = 8 \end{aligned}$$

$$R = [-1, -2) \cup [-1, -1) \cup [0, 3) \cup [3, 4) \cup \{8\}$$



- 10

$$a) \sin^2 x - \sin x + 1 \quad \left\{ \begin{array}{l} 1 \rightarrow 1 \\ \frac{-b}{2a} = \frac{1}{2} \rightarrow \frac{1}{2} \\ -1 \rightarrow 0 \end{array} \right\} R = \left[\frac{1}{2}, 1 \right]$$

$$b) \sin^2 x + \sin x + 1 \rightarrow (\sin x)^2 + \sin x + 1 \quad \left\{ \begin{array}{l} 1 \rightarrow 1 \\ \frac{-b}{2a} = \frac{-1}{2} \rightarrow -\frac{1}{2} \\ 0 \rightarrow 1 \end{array} \right\} R = [1, 3]$$