

11.10

1-5

الف) $y = x + |2x - 4|$

$y = x + (2x - 4) = 3x - 4$

اگر $2x - 4 < 0 \rightarrow x < 2$

$y = x - (2x - 4) = -x + 4$

در حالت $0 < 2x - 4 \Rightarrow 4 \leq 2x \rightarrow 2 \leq x$

برای $x \rightarrow +\infty$ و $y \rightarrow +\infty$ چون $y = 3x - 4$ و $x = 2$ و $y \in (2, +\infty) \leftarrow x \geq 2$

برای $y \in (2, +\infty) \quad y = -x + 4 \leftarrow x < 2$

$Ry = [2, +\infty)$

ب) $y = |x - 2| + |x - 1| - |x|$

نقطه‌ها را در نظر بگیرید و به دست آورید $x = 0, 1, 2$

$(-\infty, 0), [0, 1), [1, 2), [2, +\infty)$

اگر $x < 0$ $y = 2 - x + (x - 1) - (-x) = 3 - x \quad y \in (3, +\infty)$

اگر $0 \leq x < 1$ $y = (2 - x) + (1 - x) - x = 3 - 2x \quad y \in [3, 0)$

اگر $1 \leq x < 2$ $y = (2 - x) + (x - 1) - x = 1 - x \quad y \in (-1, 0]$

اگر $x \geq 2$ $y = (x - 2) + (x - 1) - x = x - 2 \quad y \in [-1, +\infty)$

$Ry = [-1, +\infty)$

2

$|3x - 3| - |x + 2| = k$

① $x < -2 \Rightarrow -(3x - 3) - (-(x + 2)) = k \Rightarrow$

$-3x + 3 + x + 2 = k \Rightarrow -2x + 5 = k \Rightarrow x = \frac{5 - k}{2}$

$\frac{5 - k}{2} < -2 \Rightarrow 5 - k < -4 \Rightarrow 9 < k$

1, No

② $-2 \leq x < 1 \Rightarrow -(3x - 3) - (x + 2) = k \Rightarrow k = -3x + 3 - x - 2 \Rightarrow k - 1 = -4x \Rightarrow x = \frac{1 - k}{4}$

$-2 \leq \frac{1 - k}{4} < 1 \Rightarrow 1 - k \geq -8 \Rightarrow k \leq 9$

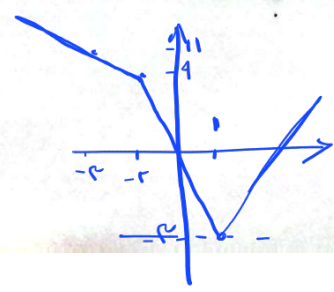
$\frac{1 - k}{4} < 1 \Rightarrow -3 < k$

③ $1 \leq x \Rightarrow (3x - 3) - (x + 2) = k \Rightarrow 3x - 3 - x - 2 = k \Rightarrow 2x - 5 = k \Rightarrow x = \frac{k + 5}{2}$

$1 \leq \frac{k + 5}{2} \Rightarrow -3 \leq k$

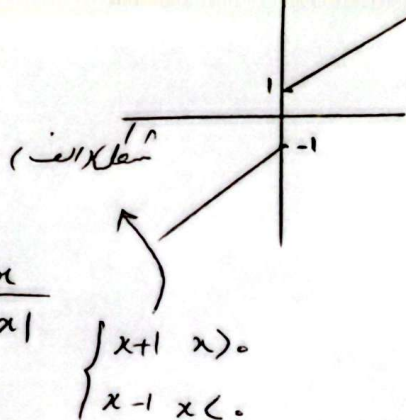
برای تعیین اینکه چه بازه‌ای است

$-3 \leq k \leq 9$



$k = -3$

الف) $y = x + \frac{x}{|x|}$



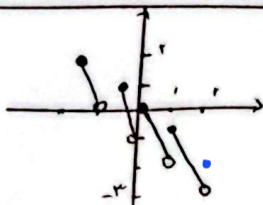
ب) $y = x/|x| - \frac{x}{|x|}$

$$\begin{cases} x+1 > 0 \\ x-1 < 0 \end{cases}$$

شکل ب

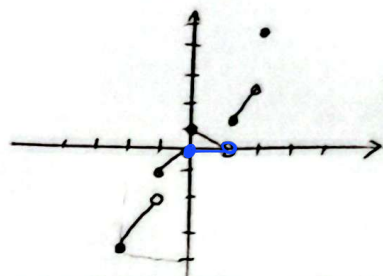
$$\begin{cases} x^2 - 1 > 0 \\ -x^2 + 1 < 0 \end{cases}$$

الف) $y = [x] - 2x$



ب) $y = [x]/x$

نقاطها نوشته شود



الف) $y = 3x - [3x] \rightarrow Ry = [0, 1)$

ب) $y = 4x - 4[x] \rightarrow 4(x - [x]) \Rightarrow Ry = [0, 4]$

ج) $y = x - \omega \left[\frac{x}{\omega} \right] \Rightarrow k \leq \frac{x}{\omega} < k+1 \Rightarrow \omega k \leq x < \omega(k+1) \Rightarrow 0 \leq x - \omega k < \omega \Rightarrow$

$y = [x] - 2x \Rightarrow Ry = (-1, 0]$

$Ry = [0, \omega)$

الف) $y = 3 \sin x + 2 \cos x$

$a \sin x + b \cos x$

$-\sqrt{a^2 + b^2} \leq 3 \sin x + 2 \cos x \leq \sqrt{a^2 + b^2} \rightarrow Ry = [-\sqrt{13}, \sqrt{13}]$

ب) $y = 4 \sin x - 3 \cos x$

$a \sin x + b \cos x$

$a = 4, b = -3 \Rightarrow \sqrt{4^2 + (-3)^2} = 5 \Rightarrow Ry = [-5, 5]$

ج) $y = [3 \sin x + 5 \cos x] =$

$-\sqrt{34} \leq 3 \sin x + 5 \cos x \leq \sqrt{34}$

$Ry = \{ \pm 1, \pm 2, \pm 3, \pm 4, \pm 5 \}$

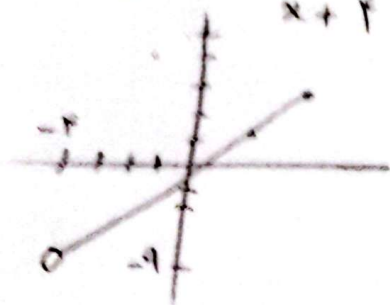
د) $y = \sqrt{\cos x - 2 \sin x}$

$-\sqrt{5} \leq \cos x - 2 \sin x \leq \sqrt{5} \Rightarrow Ry = [0, \sqrt{5}]$

1.

$$y = \frac{1x^2 + 7x - 2}{x+2} \Rightarrow \frac{(x+2)(1x-1)}{(x+2)} \quad D_f = \mathbb{R} - \{-2\}$$

1.75

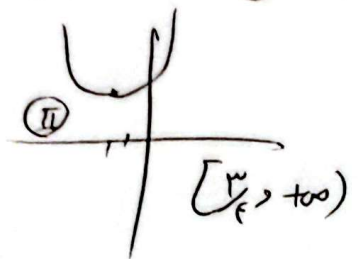


$$y = 1x - 1$$

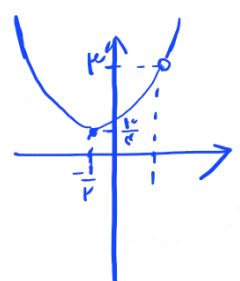
$$y = \frac{x^2 - 1}{x - 1} \Rightarrow \frac{(x-1)(x+1)}{(x-1)} \quad D_f = \mathbb{R} - \{1\}$$

$$x^2 + x + 1$$

$$x = -\frac{b}{2a} = -\frac{1}{2}, y = \frac{5}{4}$$



$$I \cap II \Rightarrow \left[+\frac{1}{2}, 1 \right) \cup (1, +\infty)$$



$$R = \left[\frac{1}{2}, +\infty \right)$$