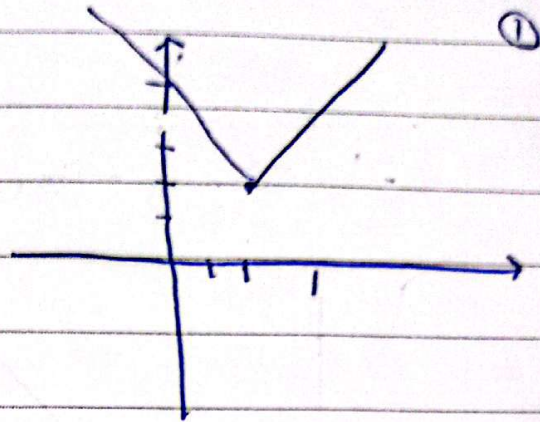


الف) $y = x + |x - 2|$

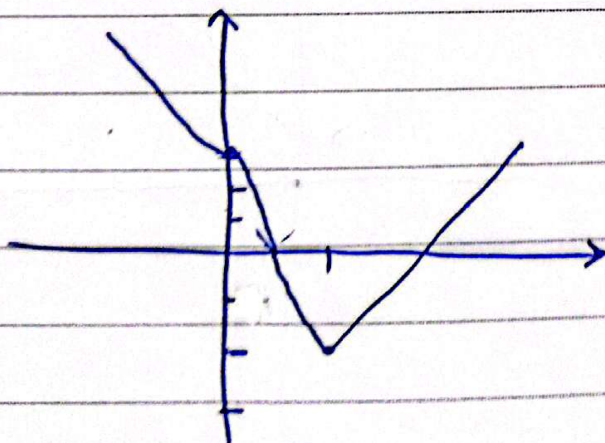
$x - 2 + 2$ $= -x + 2$	$x - 2$
---------------------------	---------



$RP = [2, +\infty)$

ب) $y = |x - 2| + |x - 1| - |x|$

$-x + 2$	$-x + 1 - x$ $= 1 - x$ $= -x + 1$	$-x + 1$	$x - 2$
----------	---	----------	---------



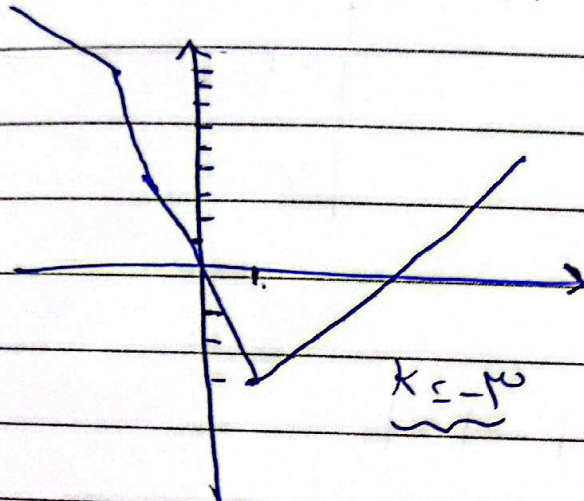
$RP = [-1, +\infty)$

~~شماره~~

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

(۲)

-2	1	
$-3x + 5$	$-x + 1$	$3x - 5$

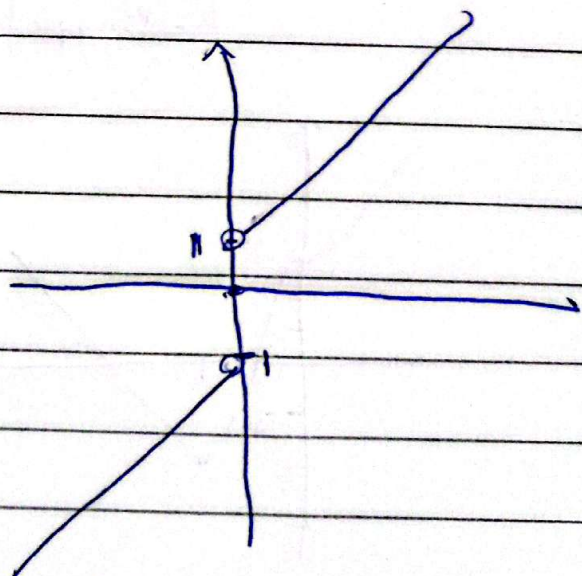


برای اینکه مقدارم فقط یک ریسه
داشته باشم باید فقط در یک
نقطه برابر با ۰ باشد

الف) $y = x + \frac{x}{|x|}$, $x \neq 0$

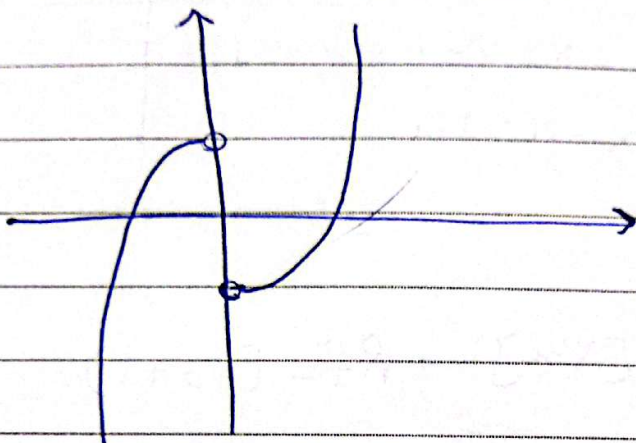
(۳)

0	
$x - 1$	$x + 1$



$$\rightarrow y = \alpha x |x| - \frac{x}{|x|} \quad x \neq 0$$

$$\frac{0}{-x^2+1} \quad | \quad x^2-1$$



$$\text{الف) } y = [x] - \alpha x$$

ⓕ

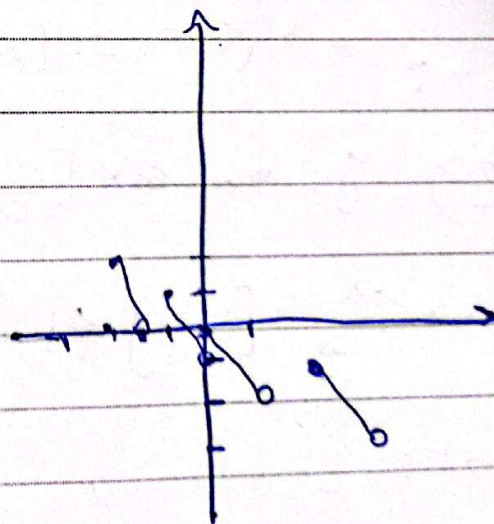
$$\alpha = 2 \rightarrow y - x = -2$$

$$2 > x \geq 1 \rightarrow 1 - 2x$$

$$1 > x \geq 0 \rightarrow 0 - 2x = -2x$$

$$-1 \leq x < 0 \rightarrow -1 - 2x$$

$$-2 \leq x < -1 \rightarrow -2 - 2x$$



$$\rightarrow y = [x] \times |x|$$

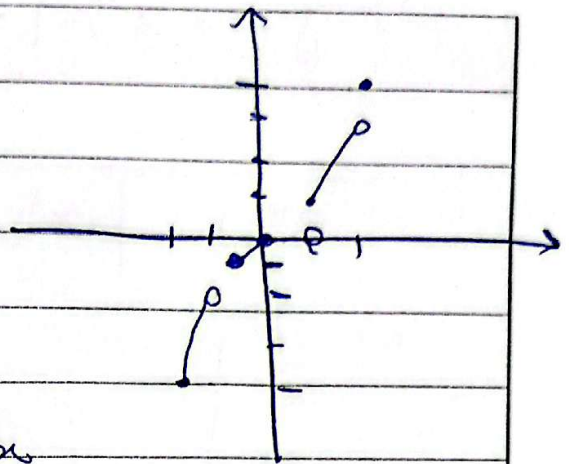
$$x = 2 \rightarrow 2$$

$$1 < x < 2 \rightarrow x$$

$$0 < x < 1 \rightarrow 0$$

$$-1 < x < 0 \rightarrow -x \times -x = x$$

$$-2 < x < -1 \rightarrow 2x - x = x$$



②

$$\text{الف) } y = \sqrt{x} - [\sqrt{x}] \rightarrow Rf = [0, +1)$$

$$0 < \sqrt{x} - [\sqrt{x}] < 1 \rightarrow 0 < \sqrt{x} - [x] < 1$$

$$\rightarrow y = \sqrt{x} - [\sqrt{x}] = \sqrt{x - [x]}$$

$$\xrightarrow{x \geq 0} 0 < \sqrt{x - [x]} < 1 \rightarrow Rf = [0, +1)$$

$$\text{ز) } y = x - \Delta x [\frac{x}{\Delta}] = \Delta x (\frac{x}{\Delta} - [\frac{x}{\Delta}])$$

$$\rightarrow 0 < \frac{x}{\Delta} - [\frac{x}{\Delta}] < 1 \xrightarrow{\times \Delta} 0 < x - \Delta x [\frac{x}{\Delta}] < \Delta$$

$$\rightarrow Rf = [0, +\Delta)$$

$$\rightarrow y = [\sqrt{x}] - \sqrt{x} = -(\sqrt{x} - [\sqrt{x}]) \rightarrow 0 < \sqrt{x} - [\sqrt{x}] < 1$$

$$\xrightarrow{x \geq 1} 0 < [\sqrt{x}] - \sqrt{x} < -1 \rightarrow Rf = (-1, 0]$$

Arman

$$y = p \sin x + r \cos x \rightarrow -\sqrt{p^2 + r^2} \leq p \sin x + r \cos x \quad (4)$$

$$\leq \sqrt{p^2 + r^2} \rightarrow -\sqrt{p^2 + r^2} \leq p \sin x + r \cos x \leq \sqrt{p^2 + r^2}$$

$$Rf = [-\sqrt{p^2 + r^2}, +\sqrt{p^2 + r^2}]$$

$$\rightarrow y = p \sin x - r \cos x \rightarrow -\sqrt{p^2 + r^2} \leq p \sin x - r \cos x \leq \sqrt{p^2 + r^2}$$

$$\rightarrow -\delta < p \sin x - r \cos x < \delta \rightarrow Rf = [-\delta, \delta]$$

$$2) y = [p \sin x + \delta \cos x] \rightarrow$$

$$-\sqrt{p^2 + \delta^2} \leq p \sin x + \delta \cos x \leq \sqrt{p^2 + \delta^2}$$

$$\rightarrow -\sqrt{p^2 + \delta^2} \leq p \sin x + \delta \cos x \leq \sqrt{p^2 + \delta^2} \rightarrow$$

$$-4 \leq [p \sin x + \delta \cos x] \leq \delta \rightarrow Rf = [-4, \delta]$$

$$3) y = \sqrt{\cos x - p \sin x} \rightarrow$$

$$\rightarrow -\sqrt{1^2 + (-p)^2} \leq \cos x - p \sin x \leq \sqrt{1^2 + (-p)^2}$$

$$\rightarrow -\sqrt{a} \leq \cos x - p \sin x \leq \sqrt{a} \rightarrow \sqrt{\cos x - p \sin x} \leq \sqrt{a}$$

Arman

$$\rightarrow Rf = [0, \sqrt{a}]$$

$$\text{الف) } y = \sin^p x + p \sin x + r \rightarrow \sin x = -1 \quad (v)$$

$$\rightarrow 1 - p + r = 0$$

$$\sin x \leq 1 \rightarrow r + p + 1 = 4$$

$$\sin x = -\frac{b}{a} = -p \rightarrow 9 - 9 + r = p$$

$$R_f = [0, 4]$$

$$\text{ب) } y = r \sin^p x + p \sin x + r$$

$$\sin x \leq -1 \rightarrow r - p + r \leq 1 \rightarrow \sin x = 1 \rightarrow$$

$$r + p + r \leq 1, \sin x \leq -\frac{b}{a} = -\frac{p}{r} \Rightarrow r \times \frac{9}{2} - \frac{9}{r} + r = r$$

$$\rightarrow R_f \leq [1, v]$$

$$y = \sin^p x + K \cos^p x = \sin^p x + K(1 - \sin^p x) \quad (n)$$

$$= \sin^p x + K - K \sin^p x = K - p \sin^p x$$

$$\sin^p x \leq 1 \rightarrow K - p \sin^p x \geq a - \frac{1}{p}$$

$$+ 1 \quad K - p \sin^p x \geq K \rightarrow R_f = [1, K]$$

Arman

$$\rightarrow y = \frac{y \cos n}{1 + \cos^2 n} = \frac{\frac{y \cos n}{\sin n}}{1 + \frac{1}{\sin^2 n}} = \frac{y \cos n \sin^2 n}{\sin n}$$

$$= y \cos n \sin n = \sin^2 n \rightarrow -1 \leq \sin^2 n \leq 1$$

$$\rightarrow R.P.s [-1, 1]$$

$$ii) y = \sin^4 n + \cos^4 n \quad (9)$$

$$\frac{1}{2} \leq \sin^4 n + \cos^4 n \leq 1 \rightarrow R.P.s \left[\frac{1}{2}, 1 \right]$$

$$\rightarrow y = [\sin^4 n + \cos^4 n]$$

$$\rightarrow \frac{1}{2} \leq \sin^4 n + \cos^4 n \leq 1 \rightarrow [\sin^4 n + \cos^4 n]$$

$$\rightarrow \Rightarrow 1 \rightarrow R.P.s \{0, 1\}$$

$$iii) \frac{y_n + \sqrt{n} - \varepsilon}{n + \varepsilon} = y_{n-1} \xrightarrow{n \neq \varepsilon} y \neq y(-\varepsilon) - 1 = -9 \quad (10)$$

$$\frac{y_n + \sqrt{n} - \varepsilon}{n + \varepsilon} \xrightarrow{n \rightarrow \infty} y_{n-1} \Rightarrow R.P.s R - \sqrt{-9}$$

$$\frac{y_n + \sqrt{n} - \varepsilon}{n + \varepsilon} \leq \frac{y_{n-1}}{n-1}$$

$$- n - \varepsilon$$

$$- n - \varepsilon$$

Arman

$$\rightarrow y = \frac{n^k - 1}{n - 1} = \frac{(n-1)(n^{k-1} + n^{k-2} + \dots + 1)}{n-1}$$

$$\rightarrow n^k + n^{k-1} + \dots + 1 \xrightarrow{n \neq 1} y \neq k \rightarrow R \neq R - \{1\}$$