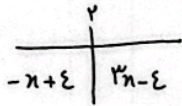
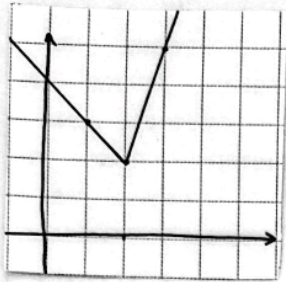


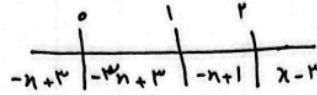
الف) $y = x + |x - 4|$



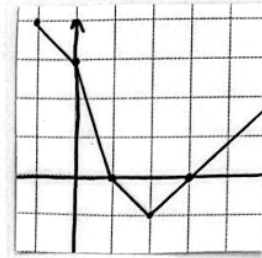
$R_y = [4, +\infty)$



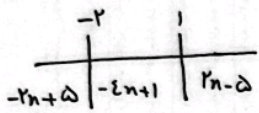
ب) $y = |x - 2| + |x - 1| - |x|$



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



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

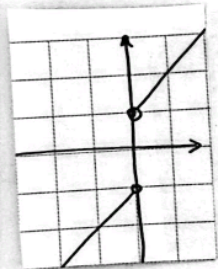


$\rightarrow x = 1 \rightarrow |1 - 3| - |1 + 2| = -3 = k$

نمودار این معادله در صفحه سمت راست است.

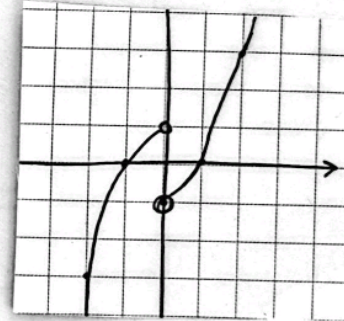
الف) $y = x + \frac{x}{|x|}$

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



ب) $y = x|x| - \frac{x}{|x|}$

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



الف) $y = [x] - 2x$

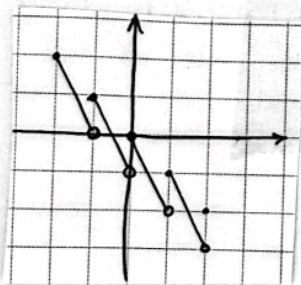
$D_y = \{x\} \rightarrow -2$

$D_y = [1, 2) \rightarrow -2x + 1$

$D_y = [0, 1) \rightarrow -2x$

$D_y = [-1, 0) \rightarrow -2x - 1$

$D_y = [x, -1) \rightarrow -2x - 2$



ب) $y = [x] |x|$

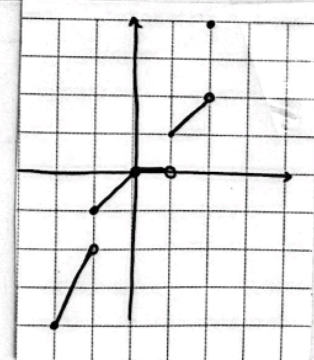
$D_y = \{x\} \rightarrow x$

$D_y = [1, 2) \rightarrow x$

$D_y = [0, 1) \rightarrow 0$

$D_y = [-1, 0) \rightarrow -x$

$D_y = [x, -1) \rightarrow -x$



الف) $y = x - [x] \rightarrow 0 \leq x - [x] < 1 \rightarrow R_y = [0, 1)$

ب) $y = x - f[x] \rightarrow 0 \leq x - [x] < 1 \rightarrow 0 \leq f(x - [x]) < 1 \rightarrow R_y = [0, 1)$

ج) $y = x - 2\left[\frac{x}{2}\right] \rightarrow 0 \leq \frac{x}{2} - \left[\frac{x}{2}\right] < 1 \rightarrow R_y = [0, 1)$

$[0, 1)$

د) $y = [x] - x \rightarrow 0 \leq [x] - x < 1 \xrightarrow{x-1} [x] - [x] > -1 \rightarrow R_y = (-1, 0]$

$$الف) y = 3 \sin n + 4 \cos n \rightarrow -\sqrt{9+16} \leq 3 \sin n + 4 \cos n \leq \sqrt{9+16} \rightarrow R_y = [-5, 5]$$

$$ب) y = 5 \sin n - 3 \cos n \rightarrow -\sqrt{25+9} \leq 5 \sin n - 3 \cos n \leq \sqrt{25+9} \rightarrow R_y = [-\sqrt{34}, \sqrt{34}]$$

$$ج) y = [2 \sin n + 3 \cos n] \rightarrow -\sqrt{13} \leq 2 \sin n + 3 \cos n \leq \sqrt{13} \rightarrow [-\sqrt{13} \leq y \leq \sqrt{13}] \rightarrow R_y = \{n | n \in \mathbb{Z}, -\sqrt{13} \leq y \leq \sqrt{13}\}$$

$$د) y = \sqrt{\cos n - 2 \sin n} \rightarrow -\sqrt{5} \leq \cos n - 2 \sin n \leq \sqrt{5} \rightarrow \sqrt{[-\sqrt{5}, \sqrt{5}]} \rightarrow R_y = [0, \sqrt{5}]$$

$$y = \sin^2 n + 3 \sin n + 2$$

$$\frac{-b}{2a} = \frac{-3}{2} = -\frac{3}{2} \xrightarrow{y} -\frac{1}{2} \text{ min}$$

$$\sin n = 1 \xrightarrow{y} 7 \text{ max}$$

$$\sin n = -1 \xrightarrow{y} 0$$

$$R_y = [-\frac{1}{2}, 7]$$

$$y = 2 \sin^2 n + 3 \sin n + 1$$

$$\frac{-b}{2a} = \frac{-3}{2} \xrightarrow{y} \frac{v}{n} \rightarrow \text{min}$$

$$\sin n = 1 \rightarrow v \rightarrow \text{max}$$

$$\sin n = -1 \rightarrow 1$$

$$R_y = [\frac{v}{n}, v]$$

$$y = \sin^2 n + 4 \cos^2 n \xrightarrow{[0, 2]} [1, 2]$$

$$1 - \cos^2 n + 4 \cos^2 n \rightarrow 1 + 3 \cos^2 n \xrightarrow{[0, 1]}$$

$$R_y = [1, 2]$$

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

$$\frac{2 \cos}{\sin} \times \sin^2 n = 2 \sin \cos = \sin 2n \rightarrow R_y = [-1, 1]$$

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$$الف) y = \sin^2 n + \cos^2 n \rightarrow r^{1-k} \leq \sin^2 n + \cos^2 n \leq 1 \rightarrow r^{1-r} \leq \sin^2 n + \cos^2 n \leq 1 \rightarrow$$

$$r^{-r} \leq \sin^2 n + \cos^2 n \leq 1 \rightarrow R_y = [\frac{1}{2}, 1]$$

$$ب) y = [\sin^2 n + \cos^2 n] \rightarrow [\frac{1-r}{r} \leq \sin^2 n + \cos^2 n \leq 1] \rightarrow [\frac{1}{n} \leq \sin^2 n + \cos^2 n \leq 1] \rightarrow R_y = \{0, 1\}$$

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$$الف) y = \frac{r n^2 + 4n - 2}{n+2} \rightarrow \frac{(n-1)(n+2)}{n+2} \rightarrow r_{n-1} \rightarrow R_y = \mathbb{R} - \{-2\}$$

$$ب) \frac{n^2-1}{n-1} = y \rightarrow \frac{(n^2+n+1)(n-1)}{n-1} = n^2+n+1 \rightarrow R_y = [\frac{r}{2}, +\infty)$$

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