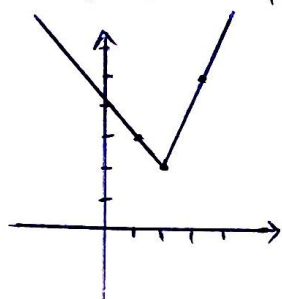
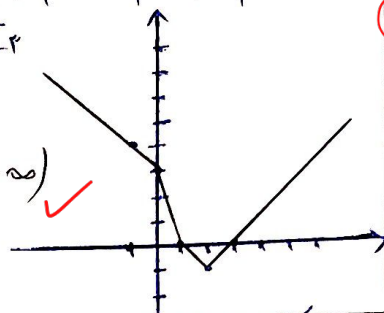


الف) $y = |2x - 4| + x$ $\frac{2}{4 - x} \frac{1}{x - 4}$



$R_f = [2, +\infty)$ ✓

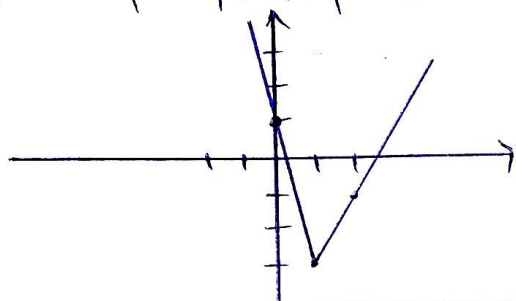
ب) $y = |x - 2| + |x - 1| - |x|$
 $\frac{1}{x - 2} \frac{1}{x - 1} \frac{1}{x}$



$R_f = [-1, +\infty)$ ✓

(۲)

$|3x - 3| - |x + 2| - k = 0$

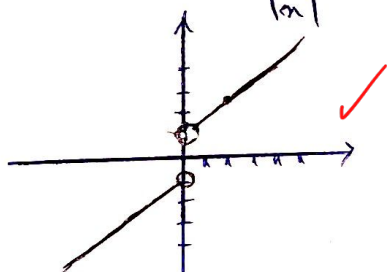


برای اینکه نمودار یک رشته داشته باشد باید در محور x را قطع کند
 نقطه کنگر نمودار باید ۳ واحد بالا باشد $k = 3$

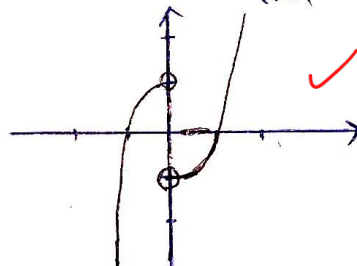
$\rightarrow k = -3$ ✓

(۲)

الف) $y = x + \frac{x}{|x|}$

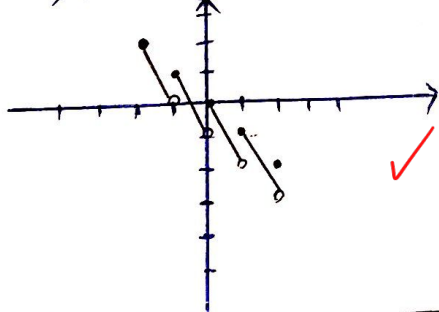


ب) $y = x|x| - \frac{x}{|x|}$

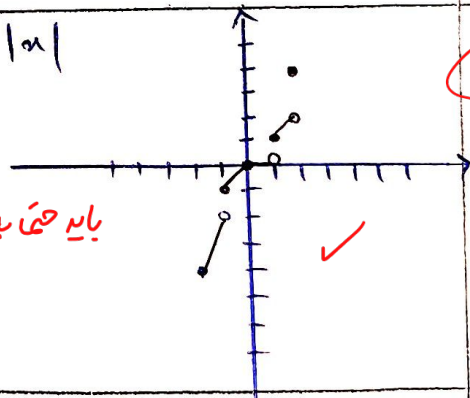


(۲)

الف) $y = [x] - 2x$



ب) $y = [x]|x|$



باید حتی بازه بندی هارو بنویسی

(۱)

الف) $y = 2x - [2x] \rightarrow R_f = [0, 1)$ ✓

ب) $y = 4x - 4[x] = 4(x - [x]) \rightarrow R_f = [0, 4)$ ✓

ج) $y = x - 2[\frac{x}{2}] = 2(\frac{x}{2} - [\frac{x}{2}]) \rightarrow R_f = [0, 2)$ ✓

د) $y = [2x] - 2x \rightarrow R_f = (-1, 0]$ ✓

(۲)

الف) $y = 3\sin x + 4\cos x \rightarrow R_f = [-\sqrt{4+9}, \sqrt{4+9}] = [-5, 5] \checkmark$

ب) $y = 5\sin x - 3\cos x \rightarrow R_f = [-8, 8] \checkmark$

ج) $y = [3\sin x + 8\cos x] \rightarrow -\sqrt{4+9} \leq 3\sin x + 8\cos x \leq \sqrt{4+9} \rightarrow R_f = \{-5, 0, \pm 1, \pm 2, \pm 3, \pm 4, \pm 5\} \checkmark$

د) $y = \sqrt{\cos x - 3\sin x} \rightarrow \sqrt{0} \leq \cos x - 3\sin x \leq \sqrt{0} \rightarrow R_f = [0, \sqrt{0}] \checkmark$

الف) $y = \sin^2 x + 3\sin x + 1$

$$\begin{cases} \sin x = 1 \rightarrow y = 4 \\ \sin x = -1 \rightarrow y = 0 \\ \sin x = -1/2 \rightarrow y = 1/4 \end{cases}$$

$$\rightarrow R_f = [0, 4] \checkmark$$

ب) $y = 3\sin^2 x + 3\sin x + 1$

$$\begin{cases} \sin x = 1 \rightarrow y = 4 \\ \sin x = -1 \rightarrow y = 1 \\ \sin x = -\frac{1}{2} \rightarrow y = \frac{1}{4} \end{cases}$$

$$\rightarrow R_f = [\frac{1}{4}, 4] \checkmark$$

الف) $y = \sin^2 x + 2\cos^2 x = 1 - \cos^2 x + 2\cos^2 x = 1 + \cos^2 x \rightarrow R_f = [1, 2] \checkmark$

ب) $y = \frac{2\cot x}{1+\cot^2 x} = 2\sin x \cos x = \sin 2x \rightarrow R_f = [-1, 1] \checkmark$

الف) $y = \sin^4 x + \cos^4 x \rightarrow 1/2 \leq \sin^4 x + \cos^4 x \leq 1 \rightarrow R_f = [1/2, 1] \checkmark$

ب) $y = [\sin^2 x + \cos^2 x] \rightarrow 1/2 \leq \sin^2 x + \cos^2 x \leq 1 \rightarrow R_f = \{0, 1\} \checkmark$

الف) $y = \frac{2x^2 + 4x - 2}{x+2} = \frac{(2x-1)(x+2)}{(x+2)} = 2x-1 \rightarrow R_f = \mathbb{R} - \{-2\} \checkmark$

$x = -2 \rightarrow y = -5$

ب) $y = \frac{x^2-1}{x-1} = \frac{(x-1)(x+1)}{x-1} = x+1 \rightarrow R_f = [\frac{1}{2}, +\infty) \checkmark$

! لا، حل باطل !