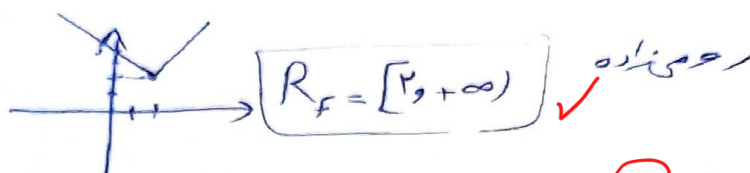
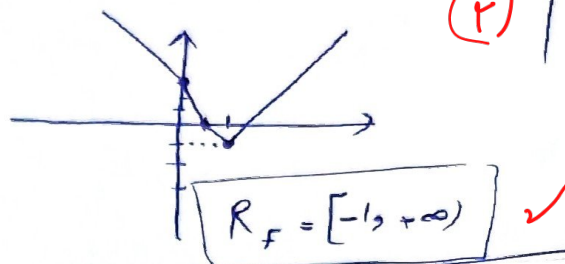


۱۸, ۲, ۵

الف) $x > 2 \rightarrow y = 3x - 2$
 $x < 2 \rightarrow y = 2 - x$

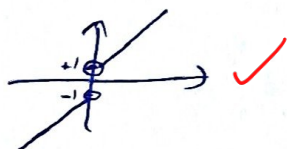


$x = 2 \rightarrow y = 3x - 2 = 4$
 $x > 2 \rightarrow y = 3x - 2 = 3x - 2$
 $x < 2 \rightarrow y = 2 - x$
 $x > 2 \rightarrow y = 3x - 2 = 3x - 2$
 $x < 2 \rightarrow y = 2 - x$

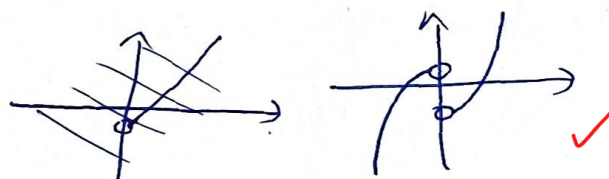


$|3x - 2| = |x + 2| + |k| \rightarrow 9x^2 + 9 - 12x = x^2 + 4x + 4 + k^2 + 2kx + 4k$
 $8x^2 - 2(k+1)x - k^2 - 4k + 5 = 0 \xrightarrow{\Delta \geq 0} 4(1+k)^2 = -4(1)(k^2 + 2k - 5)$
 $\Rightarrow 9k^2 + 12k + 11 = 0 \rightarrow k^2 + 2k + 9 = 0 \rightarrow (k+1)^2 = 0 \rightarrow k = -1$

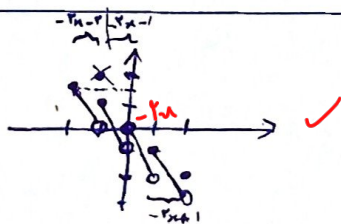
الف) $x > 0 \rightarrow y = x + 1$
 $x < 0 \rightarrow y = x - 1$
 $x = 0 \rightarrow 0$



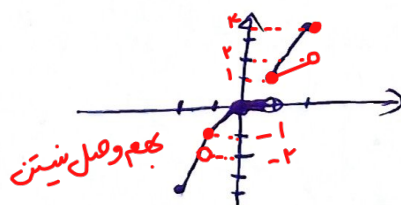
ب) $x > 0 \rightarrow y = x^2 - 1$
 $x < 0 \rightarrow y = -x^2 + 1$
 $x = 0 \rightarrow 0$



الف) $y = [x] - 2x$



ب) $y = [x] |x|$



باید صاف باشد و درونی

الف) $R(x - [x]) = [0, 1)$

ب) $R(x - [x]) = [0, 1)$

ج) $R(x - [x]) = [0, 1)$

د) $R_f = (-1, 0]$

$R(x - [x]) = [0, 1)$

$R([x] - x) = (-1, 0]$

الف) $y = r \sin x + r \cos x$ $-\sqrt{2}r \leq r \sin x + r \cos x \leq \sqrt{2}r$ $\left| [-\sqrt{2}, \sqrt{2}] \right| \checkmark$

ب) $y = r \sin x - r \cos x$ $- \sqrt{2}r \leq r \sin x - r \cos x \leq \sqrt{2}r$ $\left| [-\sqrt{2}, \sqrt{2}] \right| \checkmark$ (2) ✓

ج) $y = [r \sin x + \omega \cos x]$ $-\sqrt{r^2 + \omega^2} \leq r \sin x + \omega \cos x \leq \sqrt{r^2 + \omega^2}$ $\left| R_f = \left\{ -\sqrt{r^2 + \omega^2}, -\sqrt{r^2 + \omega^2} - 1, -\sqrt{r^2 + \omega^2} - 2, \dots, \sqrt{r^2 + \omega^2}, \sqrt{r^2 + \omega^2} + 1, \sqrt{r^2 + \omega^2} + 2, \dots \right\} \right|$

د) $y = \sqrt{\cos x - r \sin x}$ $-\sqrt{\omega} \leq \sqrt{\cos x - r \sin x} \leq \sqrt{\omega}$ $\left| [0, \sqrt{\omega}] \right| \checkmark$

هـ) $y = \sin^2 x + r \sin x + r$ $x_s = -\frac{r}{2} \rightarrow X$ $y_s = \frac{9}{4} - \frac{9}{4} + r = \frac{r}{4}$ $\left| R_f = [0, 4] \right| \checkmark$ (2) ✓

ب) $y = r \sin^2 x + r \sin x + r$ $x_s = \frac{r}{2}$ $y_s = \frac{9}{4} + \frac{9}{4} + r = \frac{9}{2} + r$ $\left| R_f = \left[\frac{9}{2}, \frac{9}{2} + r \right] \right| \checkmark$

الف) $y = \sin^2 x + r \cos^2 x$ $\sin^2 x = 1 - \cos^2 x$ $1 - \cos^2 x + r \cos^2 x = 1 + r \cos^2 x$ $\left| R_f = [1, r] \right| \checkmark$ (2) ✓

ب) $y = \frac{r \cot x}{1 + \cot^2 x} \cdot \frac{1}{\sin^2 x} = r \frac{\cos x}{\sin x} \cdot \sin^2 x = r \cos x \sin x \Rightarrow \sin(2x) \rightarrow \left| R_f = [-1, 1] \right| \checkmark$

الف) $y = \sin^2 x + \cos^2 x$ $\frac{1}{2} \leq \sin^2 x + \cos^2 x \leq 1$ $\left| R_f = \left[\frac{1}{2}, 1 \right] \right| \checkmark$ (2) ✓

ب) $y = [\sin^2 x + \cos^2 x]$ $\frac{1}{2} \leq \sin^2 x + \cos^2 x \leq 1$ $\left| R_f = \left\{ \frac{1}{2}, 1 \right\} \right| \checkmark$

الف) $y = \frac{r x^2 + v x - f}{x + f}$ $D = \{R - f - k\}$ $f(-k) = -9$ $\left| R_f = R - \{ -9 \} \right| \checkmark$ (1, 2, 5) ✓

ب) $y = \frac{x^3 - 1}{x - 1} = x^2 + 1 + x \Rightarrow (x + \frac{1}{x})^2 + \frac{3}{x} = y \rightarrow x = \sqrt{y - \frac{3}{x}} - \frac{1}{x} \rightarrow y \geq \frac{3}{x}$ $\left| R_f = \left[\frac{3}{x}, +\infty \right) \right| \checkmark$ $D = \{R - \{1\}\}$ $f(1) = f(-2) = 3$ $\rightarrow$ به همین علت 3 از 2 بزرگتر است $\rightarrow$ حذف نمیشه