

نام و نام خانوادگی: پاسخنامه تشریحی تکلیف شماره: کلاس: و/یا: درس:

$$\begin{aligned}
 -x &\rightarrow (f(x) + x f(-x)) = 2|x| + 1 \\
 x &\rightarrow (f(-x) - x f(x)) = 2|x| + 1 \Rightarrow f(-x) = x f(x) + 2|x| + 1 \\
 \Rightarrow f(x) + x [x f(x) + 2|x| + 1] &= 2|x| + 1 \Rightarrow (1+x^2) f(x) + 2x|x| + x \\
 &= 2|x| + 1 \Rightarrow f(x) = \frac{2|x| + 1 - 2x|x| - x}{x^2 + 1} \Rightarrow \begin{cases} \frac{-2x^2 + x + 1}{x^2 + 1} & x \geq 0 \\ \frac{2x^2 + x + 1}{x^2 + 1} & x < 0 \end{cases}
 \end{aligned}$$

$$\begin{aligned}
 x=0 &\rightarrow 2f(0) = 1 \Rightarrow f(0) = \frac{1}{2} \\
 f(x) &= x^2 - 3x + \frac{1}{2} \Rightarrow f(x^2) = x^4 - 3x^2 + \frac{1}{2}
 \end{aligned}$$

$$\begin{aligned}
 yx - y &= x^2 + x + 2 \Rightarrow x^2 + (1-y)x + 2 + y = 0 \\
 \Delta \geq 0 &\Rightarrow (1-y)^2 - 4(y+2) \geq 0 \Rightarrow y^2 - 6y - 7 \geq 0 \\
 \Rightarrow (y-7)(y+1) &\geq 0 \\
 \begin{matrix} -1 & 7 \\ + & - & + \end{matrix} &\rightarrow R_f = (-\infty, -1] \cup [7, +\infty)
 \end{aligned}$$

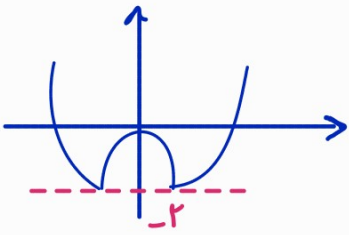
$$\begin{aligned}
 \text{الف)} \quad \frac{-b}{2a} &= \frac{0}{2} = 0 \xrightarrow{x=0} y = -\frac{2}{1} = -2 \Rightarrow R_f = [-2, +\infty) \\
 \text{ب)} \quad \frac{-b}{2a} &= \frac{-4}{-2} = 2 \xrightarrow{x=2} y = 2 \Rightarrow R_f = [2, +\infty)
 \end{aligned}$$

$$\begin{aligned}
 \text{ج)} \quad \int x^2 - 2x^2 + 2x + 1 &\rightarrow R_f = \mathbb{R} \Rightarrow R_f = [0, +\infty) \\
 > \quad R_f &= \log(-\infty, +\infty) \Rightarrow R_f = \mathbb{R}
 \end{aligned}$$

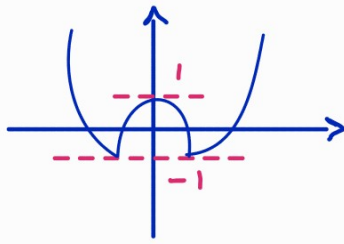
$$\begin{aligned}
 \text{الف)} \quad \text{همرأفند} &\rightarrow R_f = \mathbb{R} - \left\{ \frac{a}{c} \right\} \Rightarrow R_f = \mathbb{R} - \left\{ \frac{3}{2} \right\} \\
 \text{ب)} \quad \text{شکل} &\Rightarrow x = -\frac{2y-1}{y-2} \Rightarrow x = \frac{2y+1}{2-y} \Rightarrow R_f = \mathbb{R} - \left\{ \frac{1}{2} \right\}
 \end{aligned}$$

$$\begin{aligned}
 \text{ج)} \quad y &= \sqrt{x^2 + 3} + \frac{1}{\sqrt{x^2 + 3}} \xrightarrow{a + \frac{1}{a} \geq 2} y \geq 2 \\
 > \quad y &\geq 2 \rightarrow x^2 + 3 + \frac{1}{x^2 + 3} - 2 \\
 y_{\min} &\rightarrow 2 + \frac{1}{2} - 2 = \frac{1}{2} \\
 R_f &= \left[\frac{1}{2}, +\infty \right) \\
 y &= 3 + \frac{1}{\sqrt{3}} = \frac{3\sqrt{3} + 1}{\sqrt{3}} \\
 \Rightarrow R_f &= \left[\frac{3\sqrt{3} + 1}{\sqrt{3}}, +\infty \right)
 \end{aligned}$$

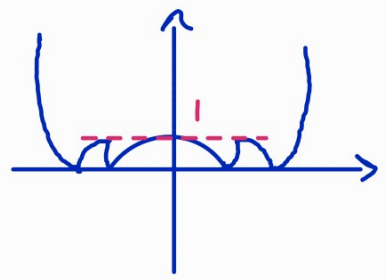
1) $y = n^2$ $y = n^2 - y = 2n^2 + 4$ $\Rightarrow (y-4)n^2 = y+4$ $\Rightarrow n^2 = \frac{y+4}{y-4}$ $n^2 \geq 0 \Rightarrow \frac{y+4}{y-4} \geq 0$ $\Rightarrow R_f = (-\infty, -4] \cup (4, +\infty)$	2) $\square = n^2$ $\frac{a}{c} = \frac{1}{1} = 1 \quad x \rightarrow \frac{b}{d} = -4$ $n^2 = 1 \Rightarrow x \rightarrow \dots$ $(-\infty, -4] \cup (4, +\infty)$ ملاحظة!
$y \sin x + 4 = y(\sin x - 4) + 10 \Rightarrow f(x) = \frac{y(\sin x - 4) + 10}{\sin x - 4}$ $\Rightarrow f(x) = y + \frac{10}{\sin x - 4}$ $-1 \leq \sin x \leq 1$ $\frac{10}{-4} \leq \frac{10}{\sin x - 4} \leq \frac{10}{-1} \Rightarrow -\infty \leq \frac{10}{\sin x - 4} \leq -\frac{10}{3}$ $-\infty + y \leq f(x) \leq -\frac{10}{3} + y \Rightarrow -4 \leq f(x) \leq -\frac{1}{3}$ $R_f = [-4, -\frac{1}{3}]$	3) $x = -\frac{1}{4y-4}$ $\Rightarrow x = \frac{-1}{4y-4} \rightarrow R_f = \mathbb{R} \setminus \{\frac{1}{4}\}$ $\Rightarrow R_f = [0, +\infty)$
الف) $x = -\frac{1}{4y-4}$ $\Rightarrow x = \frac{-1}{4y-4} \rightarrow R_f = \mathbb{R} \setminus \{\frac{1}{4}\}$ $\Rightarrow R_f = [0, +\infty)$	ب) $y = \sqrt{\frac{9(x-2)}{16(x-2)}}$ $\Rightarrow y = \sqrt{\frac{9}{16}} = \frac{3}{4}$ $R_f = \{\frac{3}{4}\}$
$\begin{cases} x \geq 0 \Rightarrow y = x^2 - 2x \quad \frac{b}{4a} = \frac{1}{2} \rightarrow R_f = [-1, +\infty) \\ x < 0 \Rightarrow y = -x^2 - 2x \quad \frac{b}{4a} = -\frac{1}{2} \rightarrow R_f = (-\infty, 1] \end{cases}$ اجتماع: $(-\infty, 1] \cup [-1, +\infty) \rightarrow R_f = \mathbb{R}$	4) $y = f(x) + 1$ ملاحظة: $f(x)$ ملاحظة
5) $y = f(x) + 1$ ملاحظة: $f(x)$ ملاحظة	6) $y = f(x) + 1$ ملاحظة: $f(x)$ ملاحظة



$$y = f(|x|)$$



$$y = f(|x|) + 1$$



$$y = |f(|x|) + 1|$$

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