نام و نام خانوادگی: علیرضا نگارین   پاسخنامه تشریحی تکلیف شماره ۳ کلاس دوازدهم A

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$yx - y = x^2 + x + 2 \Rightarrow x^2 + (-y+1)x + (y+2)$

$\Delta \geq 0 \longrightarrow (-y+1)^2 - 4(y+2) \geq 0 \Rightarrow y^2 - 6y - 7 \geq 0$

$(y-6)(y+1) \geq 0$ $\begin{array}{ccccc} & -1 & & 6 & \\ \hline + & | & - & | & + \end{array} \Rightarrow R_f = \mathbb{R} - (-1, 6)$

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الف) $R_f = [-\frac{\Delta}{4a}, +\infty)$

$\Delta = 25 - 8 = 17$

$\to -\frac{\Delta}{4a} = -\frac{17}{8}$

$R_f = [-\frac{17}{8}, +\infty)$

ب) $-x^2 + 6x - 5 \in (-\infty, 4]$

$\to \sqrt{-x^2 + 6x - 5} \in (0, 2]$

$\to R_f = (0, 2]$

ج) $x^4 - 2x^3 + 4x + 1 \in \mathbb{R}$

$\to \sqrt{x^4 - 2x^3 + 4x + 1} \in \mathbb{R}^+$

$\to R_f = [0, +\infty)$

د) $x^3 - 6x^2 + 7x + 4 \in \mathbb{R}$

$\to \log x^3 - 6x^2 + 7x + 4 \in \mathbb{R}$

$\to R_f = \mathbb{R}$

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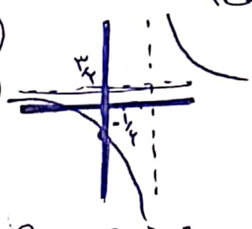
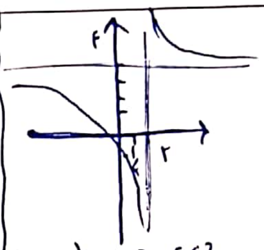
الف)



$R_f = \mathbb{R} - \{\frac{3}{2}\}$

ب)



$\frac{4x+1}{x-2} \to \mathbb{R} - \{4\}$

$R_f = [0, +\infty) - \{2\}$

ج) $\frac{x^2+4}{\sqrt{x^2+3}} = \frac{x^2+3+1}{\sqrt{x^2+3}}$

$= \sqrt{x^2+3} + \frac{1}{\sqrt{x^2+3}}$

$t = \sqrt{3} \to$ در اول

$R_f = [\sqrt{3} + \frac{1}{\sqrt{3}}, +\infty)$

د) $\underbrace{x^2 + 4 + \frac{1}{x^2+4}}_{[4+\frac{1}{4}, +\infty)} - 4$

$\to R_f = [\frac{1}{4}, +\infty)$

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$\frac{3x^2+4}{x^2-1} = y \Rightarrow x^2 = -\frac{-y-4}{y-3} \to x^2 = \frac{y+4}{y-3}$

$\frac{y+4}{y-3} \geq 0$ $\begin{array}{ccccc} & -4 & & 3 & \\ \hline + & | & - & | & + \end{array}$ $R_f = \mathbb{R} - (-4, 3]$

$x^2 \in (0, +\infty)$

$\to 0 \to -4$

$\to +\infty \to 1$

$x^2 - 1 = 0 \to x^2 = 1$

$R_f = (-\infty, -4] \cup (1, +\infty)$

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$\frac{2\sin x - 1}{\sin x + 3} = y \Rightarrow \sin x = -\frac{3y+1}{y-2}$

$-1 \leq \sin x \leq 1$

$\sin x \to 1 \to \frac{1}{4}$

$\sin x \to -1 \to -\frac{3}{2}$

$R_f = [-\frac{3}{2}, \frac{1}{4}]$

$-1 \leq \frac{-3y+1}{y-2} \leq 1 \to \frac{-3y+1}{y-2} \leq 1 \to \frac{-3y+1-y+2}{y-2} \leq 0 \to \frac{-4y+3}{y-2} \leq 0 \to (-\infty, \frac{3}{4}] \cup (2, +\infty)$

$-1 \leq \frac{-3y+1}{y-2} \to \frac{y-2-3y+1}{y-2} \geq 0 \to \frac{-2y-1}{y-2} \geq 0 \;\; [\frac{1}{2}, 2) \longrightarrow [-\frac{3}{2}, \frac{1}{4}] = R_f$

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$x^2 - x + \frac{1}{4} = 0 \Rightarrow \frac{4}{3}$

$x^2 - x + \frac{1}{4} = +\infty \Rightarrow$ [redacted] 1

$(x - \frac{1}{2})^2 + \frac{3}{4} \neq 0$

~~$R_f = [\frac{4}{3}$~~ $R_f = (1, \frac{4}{3})$

$x^2 - x + 1 \neq 0$

$\Rightarrow D_f = \mathbb{R}$

$x^2 - x + \frac{1}{4} \in (0, +\infty)$

$\rightarrow \dfrac{x^2 - x + 1/4}{x^2 - x + 1/4 + 3/4} = \dfrac{(x - \frac{1}{2})^2}{(x - \frac{1}{2})^2 + 3/4}$

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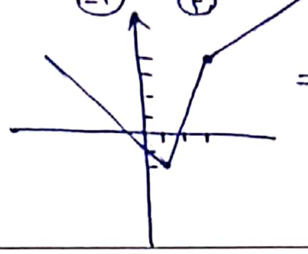
الف)

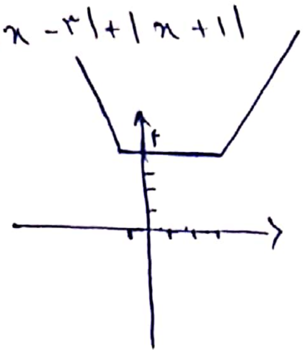
	1		3	
$-x-1$		$3x-5$		$x+1$
	-2		4	



$\Rightarrow R_f = [-2, +\infty)$

ب)

$|x-3| + |x+1|$



$R_f = [4, +\infty)$

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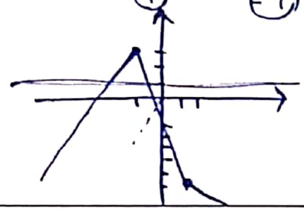
	-1		3	
$x+4$		$-3x$		$-x-4$
	3		-9	



$-3x = 1 \Rightarrow x = -\frac{1}{3}$

$x + 4 = 1 \Rightarrow x = -3$

$\} \rightarrow R_f \Rightarrow \mathbb{R} - \{-\frac{1}{3}, -3\}$

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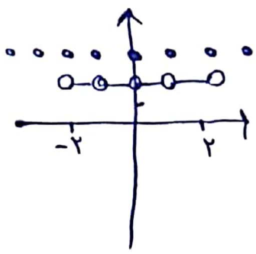
الف)

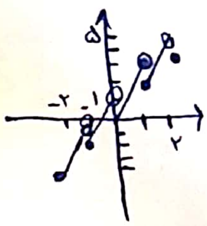
$[x] - [x] + 3$



$R_f = \{3, 2\}$

ب)

$3x - [x]$



$R_{[-2,2]} \Rightarrow = [-4, 5)$

$R_{f} = \mathbb{R}$

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الف)

$\sin x = 1 \rightarrow y = 1$

$\sin x = -1 \rightarrow y = 3$

$\sin x = \frac{1}{2} \rightarrow y = \frac{3}{4}$

$R = [\frac{3}{4}, 1]$

ب)

$\sin^2 x = 1 \rightarrow y = 3$

$\sin^2 x = 0 \rightarrow y = 1$

$\sin^2 x = -\frac{1}{2} \rightarrow \times$

$R = [1, 3]$