یازدهم دختر C — فرانک آقایی — تکلیف شماره 6

1

الف) $x^3-3x^2+3x=y \to \underbrace{x^3-3x^2+3x-1}_{(x-1)^3}+1=y \to (x-1)^3=y-1 \to x=\sqrt[3]{y-1}+1$

$R_f=\mathbb{R}$

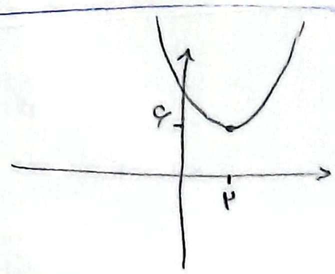
ب) $\frac{1}{x^2-2x}=y \to yx^2-2xy=1 \to yx^2-2xy-1=0 \to \frac{-b\pm\sqrt{\Delta}}{2a} \to \frac{+2y\pm\sqrt{\Delta}}{2y}$

$y\neq 0$ $\quad \Delta\geq 0 \to b^2-4ac\geq 0 \to 4y^2+4y\geq 0$ $\quad R_f=(-\infty,-1]\cup(0,+\infty)$

$4y(y+1)\geq 0 \to$ $\begin{array}{c|c|c} & -1 & 0 \\ + & - & + \end{array}$

2

الف) $y=x^2-4x+10 \to x=\frac{-b}{2a}=\frac{4}{2}=2 \to y=4-8+10=6 \to$



$R_f=[6,+\infty)$

ب) $y=-x^2+6x+3 \to \frac{-b}{2a}=\frac{-6}{-2}=+3 \to -9+18+3=12=y$

$R_f=(-\infty,12]$

ج) $y=\sqrt{x^2-4x-3} \to \frac{-b}{2a}=\frac{+4}{2}=2 \to \underset{y}{4-8-3=-7} \to [0,+\infty)=R_f$

د) $y=\sqrt{6x-x^2} \to \frac{-b}{2a}=\frac{-6}{-2}=3 \to y=18-9=9 \to [0,3]=R_f$

3

الف) $R_f=R$ $\qquad$ د) $[0,+\infty)$

ب) $R_f=R$

ج) $R_f=[0,+\infty)$

4

الف) $R_f\ R-\{3\}$ $\qquad$ ب) $R_f=R-\{2\}$

5

الف) $y=\sqrt{\frac{2x+4}{x+1}} \to$ همواره مثبت $\to [0,+\infty)-\{\sqrt{2}\}=R_f$

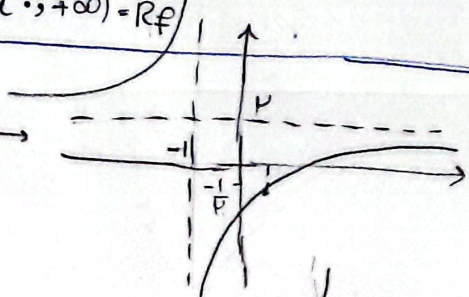
ب) $y=\sqrt{\frac{3x+1}{2-x}} \to$ " $\to [0,+\infty)=R_f$

6

الف) $y=\frac{2x-3}{x+1} \to x=-1$

$y=2 \to$

$x=1 \to y=\frac{2-3}{2}=-\frac{1}{2}$

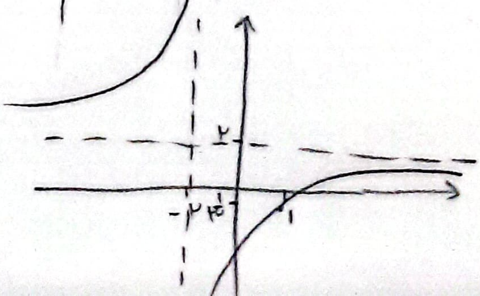


$R-\{2\}=R_f$

ب) $\frac{2x-1}{x+2}=y \to x=-2$

$y=2 \to$

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



$R-\{2\}=R_f$

7

الف) $y=\sin x+\frac{1}{\sin x} \longrightarrow (-\infty,-2]\cup[2,+\infty)=R_f$

ب) $\frac{x^6+1}{x^3}=y \longrightarrow x^3+\frac{1}{x^3}=y \longrightarrow (-\infty,-2]\cup[2,+\infty)=R_f$

ج) $\sqrt[3]{x}+\frac{1}{\sqrt[3]{x}}=y \longrightarrow (-\infty,-2]\cup[2,+\infty)=R_f$

د) $[2,+\infty)=R_f$

8

الف) $x^2+3+\frac{1}{x^2+3}-3=y \longrightarrow x=0 \longrightarrow y=\frac{1}{3} \longrightarrow [\frac{1}{3},+\infty)=R_f$

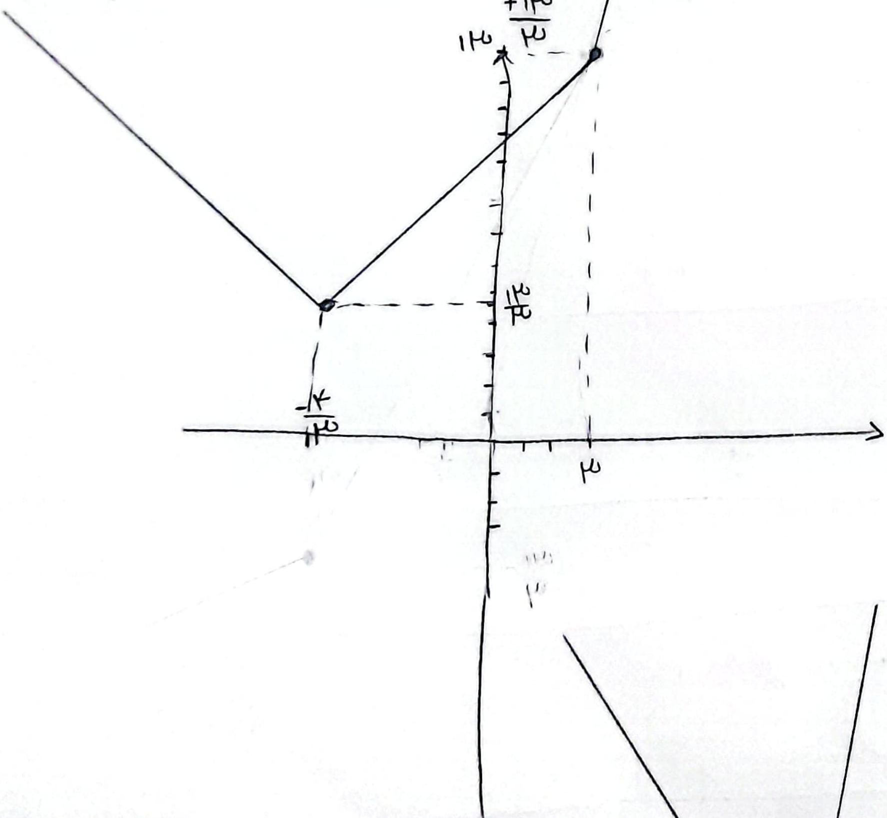
ب) $\frac{x^2+4+1}{\sqrt{x^2+4}} \longrightarrow \sqrt{x^2+4}+\frac{1}{\sqrt{x^2+4}}=y \longrightarrow x=0 \longrightarrow y=\sqrt{4}+\frac{1}{\sqrt{4}}=\frac{5}{2} \longrightarrow [\frac{5}{2},+\infty)=R_f$

9

$y=|x-3|+|3x+4| \longrightarrow$

	$-\frac{4}{3}$	3
$3-x-4-3x=-4x-1$	$3-x+3x+4=2x+7$	$4x+1$
	$+\frac{13}{3}$	13

$\frac{-4}{3}-3=\frac{-13}{3}$

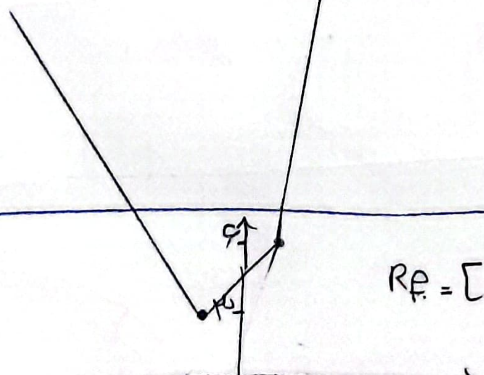


$R_f=[\frac{13}{3},+\infty)$

10

الف)

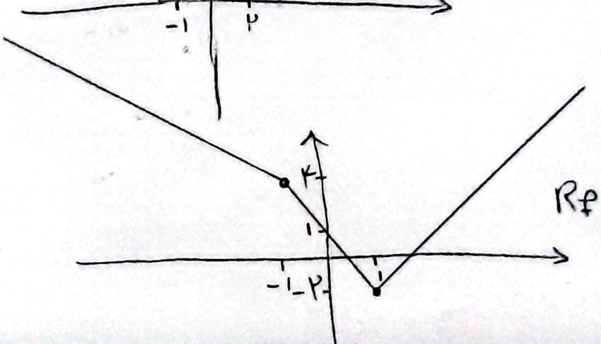
	-1	2
$2-x-2x-2=-3x$	$2-x+2x+2=x+4$	$3x$
	$+3$	6



$R_f=[3,+\infty)$

ب)

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



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