

(الف) $y = x^2 - 5 \rightarrow x^2 = y + 5$
 $x = \sqrt{y+5}$
 $x = y+5 > 0$
 $y > -5$
 $R_f = [-5, +\infty)$

(ب) $y = x^3 + 1 \rightarrow x^3 = y - 1 \rightarrow x = \sqrt[3]{y-1}$
 $y-1 \in R$
 $R_f = R$

(الف) $y = x^2 - 4x + 7$
 $|x-2| = \sqrt{y-2}$
 $y-2 > 0 \rightarrow y > 2$
 $R_f = [2, +\infty)$

(ب) $y = x^2 - 5x + 1$
 $y = (x + \frac{5}{2})^2 - \frac{21}{4}$
 $|x + \frac{5}{2}| = \sqrt{y + \frac{21}{4}}$
 $y > -\frac{21}{4}$
 $R_f = [-\frac{21}{4}, +\infty)$

$y = \frac{x^2+3}{x^2-2} \rightarrow x^2 = \frac{y+3}{y-2}$
 $x^2(y-2) = y+3 \Rightarrow x^2(y-1) = y+3 \Rightarrow x = \frac{\sqrt{y+3}}{\sqrt{y-1}}$
 $R_f = (-\infty, -\frac{1}{2}] \cup (\frac{1}{2}, +\infty)$

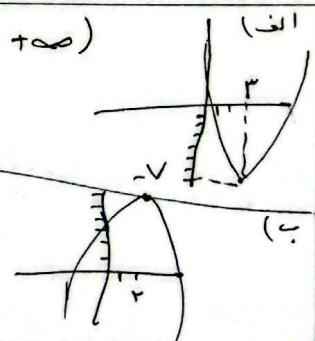
$y = \frac{2x^2+2}{x^2-4} \Rightarrow y|x^2-4| = 2|x^2+1|$
 $|x| = \frac{y+1}{y-2}$
 $R_f = (-\infty, -\frac{1}{2}] \cup (\frac{1}{2}, +\infty)$

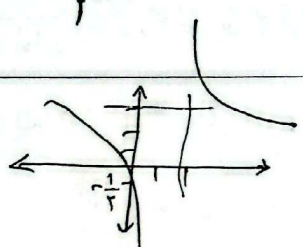
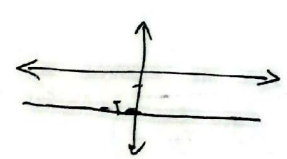
(الف) $y = \frac{1}{x^2-4x} = \frac{1}{(x-2)^2-4}$
 $D_f = U(2, \infty)$

$R_f = \frac{1}{(-\infty, 0) \cup (4, \infty)} \rightarrow (\frac{1}{4}, \infty) \cup (-\infty, 0)$

(الف) $y = x^2 - 4x + 2 \rightarrow x = \frac{y}{2}$
 $y = -4$
 $R_f = [-4, +\infty)$

(ب) $y = -x^2 + 4x + 2 \rightarrow x = 2$
 $y = 6$
 $R_f = [-\infty, 6]$



$y = \sqrt{x^2 - 7x + 12}$ $x^2 - 7x + 12 \geq 0$ $y = \frac{(b^2 - 4ac)}{4a} = -\frac{49}{4}$ (الف)	
$R_f = [0, \infty)$ $\sqrt{-\frac{49}{4} + \infty}$	۶
$y = \sqrt{x^2 + 4x + 10}$ $-x^2 + 4x + 10 > 0$ $\frac{-(b^2 - 4ac)}{4a} = 14$ (ب)	
$R_f = [0, \sqrt{14}]$ $y = \sqrt{14}$	۷
$y = x^5 + 3x^4 + 2x + 1$ $R_f = R$ بزرگترین توان فرد است	
$y = \sqrt{x^4 + 4x^2 + 4x + 1} \Rightarrow \sqrt{R} \rightarrow R_f = [0, \infty)$ (ب)	۷
$y = \frac{3x+1}{1x-2}$ $R_f = R - \{2\}$ $\frac{x}{1} = 2$ (الف)	
$y = \sqrt{\frac{4x+1}{1x+3}}$ $= \sqrt{R - \{2\}}$ $\frac{x}{1} = 4$ $[0, \infty) - \{2\}$ (ب)	۸
$y = \frac{3x+1}{x-2}$ 	(الف)
	(ب)
$y = \cos^2 x + \frac{1}{\cos^2 x} \Rightarrow z^2 \geq 0$ $R_f = [2, \infty)$	۹
$y = \frac{\sqrt{2x+1}}{x} \Rightarrow \frac{2x^2}{x} + \frac{1}{x} \Rightarrow x + \frac{1}{x} \Rightarrow R_f = (-\infty, -2] \cup [2, \infty)$	۱۰