

الف) $y = x^2 - \omega \Rightarrow x + \omega = x^2 \Rightarrow x = \sqrt{x^2 - \omega} \Rightarrow x \geq 0$ $R_f = [0, \infty)$ (1)
 ب) $y = x^2 + 1 \Rightarrow y - 1 = x^2 \Rightarrow x = \sqrt{y - 1}$ $R_f = R$ (2)

الف) $y = x^2 - 6x + 4 \Rightarrow (x - 3)^2 = y - 5 \Rightarrow y - 5 \geq 0 \Rightarrow y \geq 5 \Rightarrow R_f = [5, \infty)$ $\Delta = 36 - 4ac = 36$ (3)

ب) $y = x^2 - 6x + 1 \Rightarrow (x - 3)^2 = y - 8 \Rightarrow y - 8 \geq 0 \Rightarrow y \geq 8 \Rightarrow R_f = [8, \infty)$ (4)

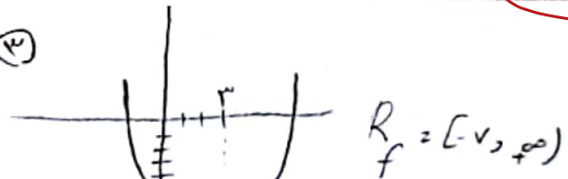
الف) $y = \frac{x^2 + 3}{x^2 - 2} \Rightarrow y(x^2 - 2) = x^2 + 3 \Rightarrow yx^2 - 2y = x^2 + 3 \Rightarrow yx^2 - x^2 = 2y + 3 \Rightarrow x^2(y - 1) = 2y + 3 \Rightarrow x^2 = \frac{2y + 3}{y - 1}$
 $\Rightarrow x = \pm \sqrt{\frac{2y + 3}{y - 1}} \Rightarrow \frac{2y + 3}{y - 1} \geq 0 \Rightarrow y - 1 \neq 0 \Rightarrow y \neq 1 \Rightarrow R_f = R - \{1\}$ (5)

ب) $y = \frac{|x| + 1}{|x| - 2} \Rightarrow y(|x| - 2) = |x| + 1 \Rightarrow y|x| - 2y = |x| + 1 \Rightarrow y|x| - |x| = 2y + 1 \Rightarrow |x|(y - 1) = 2y + 1$

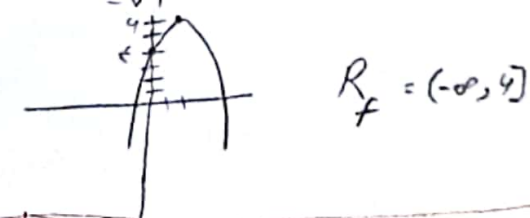
$|x| = \frac{2y + 1}{y - 1} \Rightarrow y - 1 \neq 0 \Rightarrow y \neq 1 \Rightarrow R_f = R - \{1\}$ (6)

$y = \frac{1}{x^2 - 5x} \Rightarrow y(x^2 - 5x) = 1 \Rightarrow x^2 - 5x = \frac{1}{y} \Rightarrow x(x - 5) = \frac{1}{y} \Rightarrow x = \frac{1}{y(x - 5)}$ $R_f = R - \{0\}$ (7)

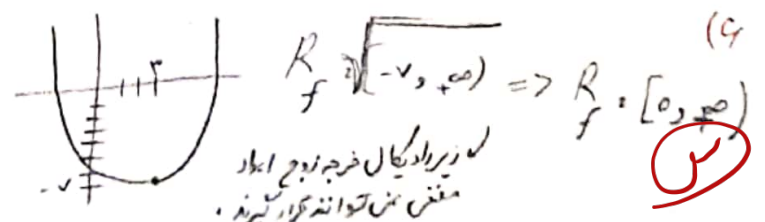
الف) $y = x^2 - 4x + 2$ $a > 0$ min $x = -\frac{b}{2a} = \frac{4}{2} = 2$ $y = -2$



ب) $y = -x^2 + 4x + 2$ $a < 0$ max $x = -\frac{b}{2a} = \frac{4}{-2} = -2$ $y = 6$



الف) $y = \sqrt{x^2 - 4x + 2}$ $a > 0$ min $x = -\frac{b}{2a} = \frac{4}{2} = 2$ $y = -2$



ب) $y = \sqrt{-x^2 + 5x + 10}$
also Max

$x = \frac{-b}{2a} \Rightarrow \frac{-5}{-2} = \frac{5}{2}$
 $y = \frac{17}{2}$



$R_f = [-\infty, 10] \Rightarrow$
 $R_f = (0, \frac{17}{2}]$

الف) $y = x^3 + 3x^2 + 2x + 1$ ^{درجه سوم} $R_f = \mathbb{R}$

ب) $y = \sqrt{x^2 + 5x + 4}$ $\rightarrow R_f = \sqrt{\mathbb{R}} \Rightarrow R_f = [0, +\infty)$

5

الف) $y = \frac{3x+1}{x-2} \rightarrow R_f = \mathbb{R} - \{2\}$ ✓

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

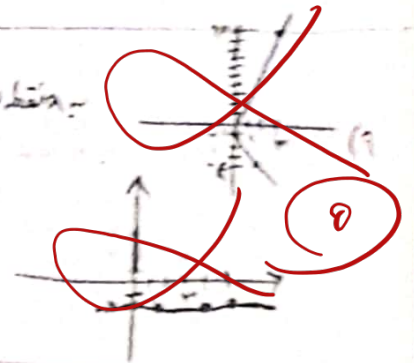
1, 5

ب) $y = \sqrt{\frac{5x+1}{x+3}} \rightarrow R_f = \mathbb{R} - \{\sqrt{5}\} \Rightarrow R_f = \mathbb{R} - \{2\}$

الف) $y = \frac{3x+1}{x-2}$
 $\begin{matrix} 1 & 0 & 1 & 1 \\ -1 & -2 & 2 & 0 \end{matrix}$

ب) $y = \sqrt{\frac{5x+1}{x+3}}$
 $\begin{matrix} 1 & 0 & 1 & 1 \\ -1 & -3 & 3 & 0 \end{matrix}$

نقطه ۱ و ۲ را به یاد دارید



الف) $y = \cos^2 x + \frac{1}{\cos^2 x} \Rightarrow R_f = [2, +\infty)$ ✓

1, 5

ب) $y = \sqrt[3]{\frac{x^2+1}{x}} \Rightarrow y^3 = \frac{x^2+1}{x} \Rightarrow y = \frac{x^2+1}{x} \Rightarrow y = \frac{x^2}{x} + \frac{1}{x} = y = x + \frac{1}{x}$

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

$x > 0 \quad [\sqrt[3]{2}, +\infty)$
 $x < 0 \quad [-\infty, \sqrt[3]{-2})$