

سؤال 1

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

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

سؤال 2

الف) $y = x^2 - 4x + 7 \rightarrow y = (x-2)^2 + 3 \rightarrow (x-2)^2 = y-3 \rightarrow x-2 = \pm \sqrt{y-3} \rightarrow x = \pm \sqrt{y-3} + 2$
 $\Rightarrow R_f = [3, +\infty)$

ب) $y = x^2 - 5x + 1 \rightarrow y = x^2 - 5x + \frac{25}{4} - \frac{25}{4} + 1 \Rightarrow y = (x - \frac{5}{2})^2 - \frac{21}{4} \rightarrow (x - \frac{5}{2})^2 = y + \frac{21}{4} \rightarrow x - \frac{5}{2} = \pm \sqrt{y + \frac{21}{4}}$
 $\Rightarrow x = \pm \sqrt{y + \frac{21}{4}} + \frac{5}{2} \rightarrow R_f = [-\frac{21}{4}, +\infty)$

سؤال 3

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

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

سؤال 4

الف) $y = \frac{1}{x^2 - 4x} \rightarrow yx^2 - 4xy - 1 = 0 \rightarrow \Delta = 16y^2 + 4y \geq 0 \rightarrow 4y(y+1) \geq 0$
 $4y+1 \geq 0 \rightarrow y \geq -\frac{1}{4}$
 $(-\infty, 0] \cup [-\frac{1}{4}, +\infty)$

سؤال 5

الف) $x^2 - 4x + 2 = y \xrightarrow{\min} \left| \begin{array}{l} \frac{-b}{2a} = \frac{4}{2} = 2 \\ 9 - 16 + 2 = -5 \end{array} \right. \rightarrow (-5, +\infty)$

ب) $y = -x^2 + 4x + 2 \xrightarrow{\max} \left| \begin{array}{l} \frac{-b}{2a} = \frac{-4}{-2} = 2 \\ -4 + 16 + 2 = 14 \end{array} \right. \rightarrow (-\infty, 14)$

سؤال 6

الف) $y = \sqrt{x^2 - 4x + 2} \rightarrow x_{\min} = \frac{-b}{2a} \rightarrow \frac{4}{2} = 2$
 $y_{\min} \Rightarrow 9 - 16 + 2 = -5 \rightarrow R_f = [0, +\infty)$

ب) $y = \sqrt{-x^2 + 4x + 10} \xrightarrow{\max} \left| \begin{array}{l} \frac{-b}{2a} = \frac{-4}{-2} = 2 \\ -4 + 16 + 10 = 22 \end{array} \right. \rightarrow (0, \sqrt{22})$

۱۱ سوال ۷ ۱۱

الف) $y = x^5 + 13x^4 + 2x + 1 \rightarrow R_f = \mathbb{R}$

c) $y = \sqrt{x^2 + 1} \rightarrow R_f = \sqrt{R} = (0, +\infty)$

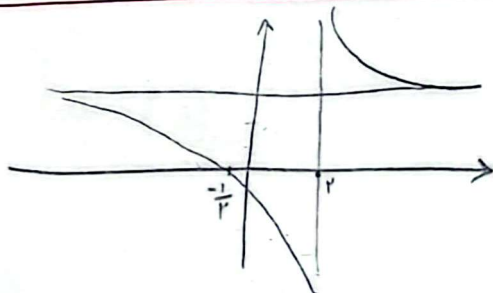
(سؤال ۸)

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

$$\text{ب) } \sqrt{\frac{K n + 1}{n + \mu}} \rightarrow R_f = \sqrt{1R - \{f\}} = (+\infty, 0) - \{r\}$$

(سؤال ۹)

الف) $y = \frac{x+1}{x-2}$



مجاہد قائم : ۲

مجاہد اصفیٰ : ۳

اب $y = \frac{fx - r}{1 - rx}$ $\frac{ad \neq bc}{f = f} \rightarrow$ جو سادگی نہی
یعنی توان شکل نہی

(سوال ۱۰۱)

الف) $y = \cos^2 m + \frac{1}{\cos^2 m} \xrightarrow{a + \frac{1}{a}} [2, +\infty)$

$$\text{ب) } y = \sqrt[n]{\frac{x^r+1}{x}} \rightarrow \sqrt[n]{\frac{x^r}{x} + \frac{1}{x}} = \sqrt[n]{x + \frac{1}{x}} \rightarrow$$