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نام و نام خانوادگی: محمد رضا اشراقی ..... پاسخنامه تشریحی تکلیف شماره ۹ ..... کلاس: ریاضی B

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

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

الف)  $y = x^2 - 2x + 4$

$y = (x^2 - 2x + 1) + 3 \Rightarrow y - 3 = (x - 1)^2 \Rightarrow x - 1 = \pm \sqrt{y - 3} \Rightarrow R_f = [3, +\infty)$

ب)  $y = x^2 - 5x + 1$

$x^2 - 5x + 1 - y = 0 \Rightarrow x = \frac{5 \pm \sqrt{25 - 4(1 - y)}}{2} = \frac{5 \pm \sqrt{21 - 4y}}{2}$   
 $25 - 4(1 - y) \geq 0 \Rightarrow 21 - 4y \geq 0 \Rightarrow y \leq \frac{21}{4} \Rightarrow R_f = (-\infty, \frac{21}{4}]$

الف)  $y = \frac{x^2 + 2}{x^2 - 1} \Rightarrow x^2 + 2 = y(x^2 - 1) \Rightarrow yx^2 - x^2 = y + 2 \Rightarrow x^2(y - 1) = y + 2 \Rightarrow x^2 = \frac{y + 2}{y - 1}$

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

ب)  $y = \frac{2|x| + 1}{|x| - 2}$

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

$y = \frac{1}{x^2 - 4x} \Rightarrow yx^2 - 4yx = 1 \Rightarrow yx^2 - 4yx - 1 = 0$

$14y^2 + 4y \geq 0 \Rightarrow y(4y + 1) \geq 0 \Rightarrow y \leq -\frac{1}{4} \text{ or } y \geq 0$

$y(4y + 1) \geq 0$

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

الف)  $y = x^2 - 4x + 2 \Rightarrow \begin{cases} x_{min} = \frac{b}{2a} = \frac{4}{2} = 2 \\ y_{min} = -1 \end{cases} \Rightarrow R_f = [-1, +\infty)$

ب)  $y = -x^2 + 4x + 2 \Rightarrow \begin{cases} x_{max} = \frac{b}{2a} = \frac{4}{-2} = -2 \\ y_{max} = 6 \end{cases} \Rightarrow R_f = (-\infty, 6]$

الف)  $y = \sqrt{x^2 - 4x + 4} \rightarrow \begin{cases} x_{\min} = -\frac{b}{2a} = 2 \\ y_{\min} = -1 \end{cases} \quad R_f = \sqrt{E_{\infty, +\infty}} = [0, +\infty)$

ب)  $y = \sqrt{-x^2 + 4x + 4} \rightarrow \begin{cases} x_{\max} = \frac{-b}{2a} = \frac{-4}{-2} = 2 \\ y_{\max} = 1 \end{cases} \quad R_f = \sqrt{(-\infty, 1]} \cup [0, \sqrt{12}]$

الف)  $y = x^4 + 3x^2 + 2x + 1 \quad R_f = \mathbb{R}$

ب)  $y = \sqrt{x^4 + 3x^2 + 4x + 1} \rightarrow R_f = [0, +\infty)$

الف)  $y = \frac{3x+1}{x^2} \quad R_f = \mathbb{R} - \left\{\frac{a}{c}\right\} = \mathbb{R} - \{3\} = R_f$

ب)  $y = \sqrt{\frac{3x+1}{x+3}} \rightarrow R_f = \sqrt{\mathbb{R} - \{3\}} \Rightarrow R_f = [0, +\infty) - \{3\}$

الف)  $y = \frac{3x+1}{x-2} \quad \text{رشته منقطع: میانبندگی} \Rightarrow \frac{a}{c} = \frac{3}{1} = 3 \Rightarrow \begin{matrix} y=3 \\ x=2 \end{matrix}$

ب)  $y = \frac{2x-2}{1-2x} \Rightarrow y = -2 \frac{(1-2x)}{1-2x} = -2 \quad x \neq \frac{1}{2}$

$R_f = \{-2\}$

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

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

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