

نام و نام خانوادگی شماره کلاس پایانه پاسنامه تشریحی تکلیف شماره ۹

الف) $y = \frac{x^3 - 3x^2 + 3x - 1 + 1}{(x-1)^3} \Rightarrow (x-1)^3 = y - 1 \Rightarrow x-1 = \sqrt[3]{y-1} \Rightarrow x = \sqrt[3]{y-1} + 1 \Rightarrow R_f = \mathbb{R}$

ب) $y = \frac{1}{x^2 - 2x + 1 - 1} \Rightarrow y = \frac{1}{(x-1)^2 - 1} \Rightarrow y(x-1)^2 - y = 1 \Rightarrow y(x-1)^2 - 1 = 1$
 $\Rightarrow (x-1)^2 - 1 = \frac{1}{y} \Rightarrow (x-1)^2 = \frac{1}{y} + 1 \Rightarrow x-1 = \sqrt{\frac{1}{y} + 1} \Rightarrow x = \sqrt{\frac{1}{y} + 1} + 1$
 $\Rightarrow \frac{1+y}{y} \geq 0 \Rightarrow \frac{1}{y} + 1 \geq 0 \Rightarrow R_f = \mathbb{R} - (-1, 0] \text{ یا } (-\infty, -1] \cup (0, +\infty)$

الف) $x_{\min} = \frac{-b}{2a} = \frac{-4}{2} = -2 \quad y_{\min} = 4 - 16 + 4 = -8 \Rightarrow R_f = [-8, +\infty)$
 ب) $x_{\max} = \frac{-b}{2a} = \frac{-4}{-2} = 2 \quad y_{\max} = -9 + 16 + 4 = 11 \Rightarrow R_f = (-\infty, 11]$
 ج) $x_{\min} = \frac{-b}{2a} = \frac{2}{2} = 1 \quad y_{\min} = 4 - 4 + 3 = 3 \Rightarrow R_f = [3, +\infty) \Rightarrow R_f = [0, +\infty)$
 د) $x_{\max} = \frac{-b}{2a} = \frac{-4}{-2} = 2 \quad y_{\max} = 16 - 4 = 12 \Rightarrow R_f = (-\infty, 12] \Rightarrow R_f = [0, 12]$

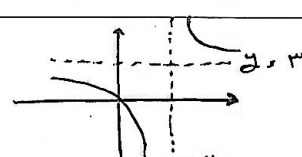
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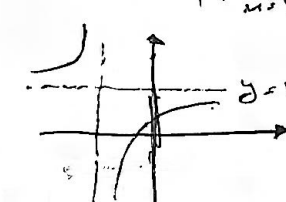
ج) $R_f = \sqrt{(-\infty, +\infty)} \Rightarrow R_f = [0, +\infty)$

د) $R_f = (-\infty, +\infty)^2 \Rightarrow R_f = [0, +\infty)$

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

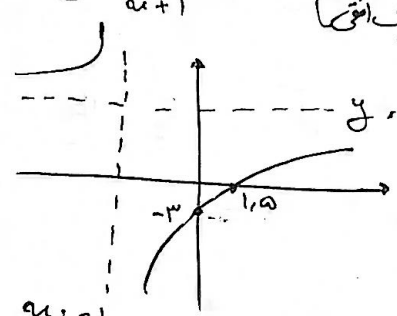
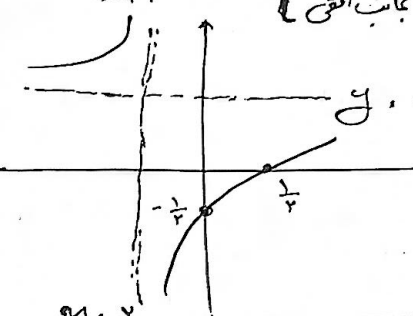
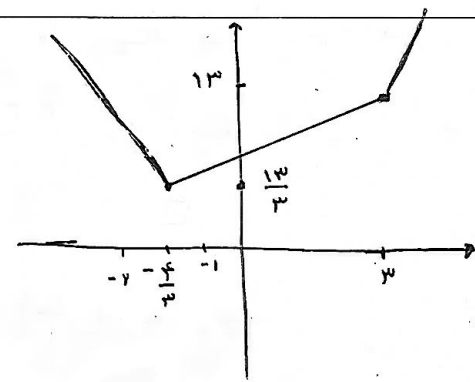
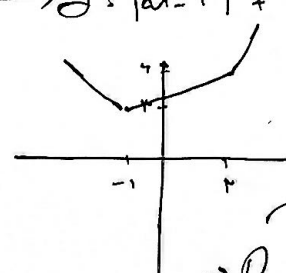
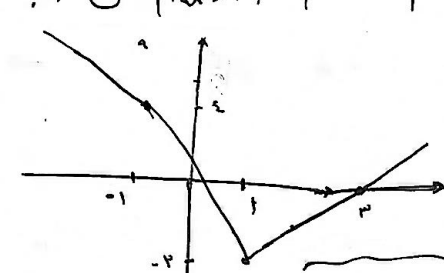


ب) $y = \frac{x^2 + 1}{x + 1} \Rightarrow R_f = \mathbb{R} - \left\{ \frac{1}{2} \right\}$



الف) $y = \sqrt{\frac{x^2 + 2}{x + 1}} \Rightarrow R_f = \sqrt{\mathbb{R} - \left\{ \frac{1}{2} \right\}} \Rightarrow R_f = [0, +\infty) - \{ \sqrt{2} \}$

ب) $y = \sqrt{\frac{x^2 + 1}{x - 1}} \Rightarrow R_f = \sqrt{\mathbb{R} - \left\{ \frac{1}{2} \right\}} \Rightarrow R_f = [0, +\infty)$

الف) $y = \frac{x-3}{x+1}$ $\begin{cases} \text{مجاوب قائم: } x = -1 \\ \text{مجاوب افقي: } y = 2 \end{cases}$  $x = -1$	ب) $y = \frac{x-1}{x+2}$ $\begin{cases} \text{مجاوب قائم: } x = -2 \\ \text{مجاوب افقي: } y = 2 \end{cases}$  $x = -2$	٦
الف) $y = 8\sin x + \frac{1}{8\sin x} \leadsto R_f, (-\infty, -2] \cup [2, +\infty)$ ب) $y = \frac{x^4+1}{x^2} = x^2 + \frac{1}{x^2} \leadsto R_f, (-\infty, -2] \cup [2, +\infty)$ ج) $y = \frac{\sqrt{x^2+1}}{\sqrt{x}} = \sqrt{x} + \frac{1}{\sqrt{x}} \leadsto R_f, (-\infty, -2] \cup [2, +\infty)$ د) $\sqrt{x} + \frac{1}{\sqrt{x}} \xrightarrow{\sqrt{x} \geq 0} R_f, [2, +\infty)$	٧	٧
الف) $y = x^2 + \frac{1}{x^2+3} = x^2+3 + \frac{1}{x^2+3} - 3 \Rightarrow R_f, [\frac{1}{3}, +\infty)$ $[\frac{1}{3}, +\infty)$	ب) $y = \frac{x^2+5}{\sqrt{x^2+4}} = \frac{x^2+4+1}{\sqrt{x^2+4}} = \sqrt{x^2+4} + \frac{1}{\sqrt{x^2+4}} \xrightarrow{\sqrt{x^2+4} \geq 2} [2, 5, +\infty)$	٨
١- $x_1 - x_2 = 4$ $= -4x_1 - 1$ ٢- $x_1 + x_2 + 4 = 4x_1 + 4$ $= 4x_1 + 4$ ٣- $x_1 - 3 + x_2 + 4 = 4x_1 + 1$ $= 4x_1 + 1$		٩
الف) $y = x-2 + x+2$  $\Rightarrow R_f, [2, +\infty)$	ب) $y = x-2 - x+1$  $\Rightarrow R_f, [-2, +\infty)$	١٠