

نام و نام خانوادگی شماره کلاس پایانه پاسنامه تشریحی تکلیف شماره ۹۰۰

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

الف) $x_{\min} = \frac{-b}{2a} = \frac{-4}{2} = -2$ $y_{\min} = 4 - 16 + 4 = -8 \Rightarrow R_f = [-8, +\infty)$ ✓

ب) $x_{\max} = \frac{-b}{2a} = \frac{-4}{-2} = 2$ $y_{\max} = -9 + 16 + 4 = 11 \Rightarrow R_f = (-\infty, 11]$ ✓

ج) $x_{\min} = \frac{-b}{2a} = \frac{-2}{2} = -1$ $y_{\min} = 4 - 4 + 1 = 1 \Rightarrow R_f = [1, +\infty)$ ✓

د) $x_{\max} = \frac{-b}{2a} = \frac{-4}{-2} = 2$ $y_{\max} = 16 - 4 = 12 \Rightarrow R_f = (-\infty, 12]$ ✓

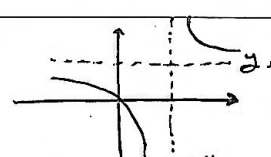
الف) $R_f = \mathbb{R}$ ✓

ب) $R_f = \mathbb{R}$ ✓

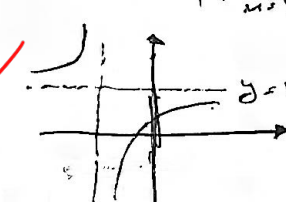
ج) $R_f = \sqrt{(-\infty, +\infty)} \Rightarrow R_f = [0, +\infty)$ ✓

د) $R_f = (-\infty, +\infty)^2 \Rightarrow R_f = [9, +\infty)$ ✓

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



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



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

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

الف) $y = \frac{x_1 - 3}{x_1 + 1}$ مجاوب قائم : $x_1 = -1$ مجاوب افقي : $y = 2$ $x_1 = -1$	ب) $y = \frac{x_1 - 1}{x_1 + 2}$ مجاوب قائم : $x_1 = -2$ مجاوب افقي : $y = 2$ $x_1 = -2$	٢ ٦			
الف) $y = 8 \sin x + \frac{1}{8 \sin x} \leadsto R_f, (-\infty, -2] \cup [2, +\infty)$ ✓ ب) $y = \frac{x_1^4 + 1}{x_1^4} = x_1^4 + \frac{1}{x_1^4} \leadsto R_f, (-\infty, -2] \cup [2, +\infty)$ ✓ ج) $y = \frac{\sqrt[3]{x_1^3 + 1}}{\sqrt[3]{x_1}} = \sqrt[3]{x_1} + \frac{1}{\sqrt[3]{x_1}} \leadsto R_f, (-\infty, -2] \cup [2, +\infty)$ ✓ د) $\sqrt{x_1} + \frac{1}{\sqrt{x_1}} \xrightarrow{\sqrt{x_1} \geq 0} R_f, [2, +\infty)$ ✓		٢ ٧			
الف) $y = x_1^2 + \frac{1}{x_1^2 + 3} = x_1^2 + 3 + \frac{1}{x_1^2 + 3} - 3 \Rightarrow R_f, [\frac{1}{3}, +\infty)$ ✓ $[3\frac{1}{3}, +\infty)$		٢ ٨			
ب) $y = \frac{x_1^2 + 2}{\sqrt{x_1^2 + 4}} = \frac{x_1^2 + 4 + 1}{\sqrt{x_1^2 + 4}} = \sqrt{x_1^2 + 4} + \frac{1}{\sqrt{x_1^2 + 4}} \xrightarrow{\sqrt{x_1^2 + 4} \geq 2} [2, 2, +\infty)$ ✓		٢ ٩			
$-\frac{5}{3} \qquad 3$ <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">$3 - x_1 - x_1 = 5$ $= -x_1 - 1$</td> <td style="padding: 5px;">$3 - x_1 + x_1 + 5$ $= 8$</td> <td style="padding: 5px;">$x_1 - 3 + x_1 + 5$ $= 2x_1 + 2$</td> </tr> </table>		$3 - x_1 - x_1 = 5$ $= -x_1 - 1$	$3 - x_1 + x_1 + 5$ $= 8$	$x_1 - 3 + x_1 + 5$ $= 2x_1 + 2$	٢ ٩
$3 - x_1 - x_1 = 5$ $= -x_1 - 1$	$3 - x_1 + x_1 + 5$ $= 8$	$x_1 - 3 + x_1 + 5$ $= 2x_1 + 2$			
الف) $y = x_1 - 2 + x_1 + 2$ $\Rightarrow R_f, [3, +\infty)$ ✓	ب) $y = x_1 - 2 - x_1 + 1$ $\Rightarrow R_f, [-2, +\infty)$ ✓	٢ ١٠			