

المعادلة

IV

الف) $y = x^2 - 8 \rightarrow x^2 = y + 8 \rightarrow x = \pm \sqrt{y+8} \Rightarrow R_f = [8, +\infty)$

ب) $y = x^2 + 1 \rightarrow x^2 = y - 1 \rightarrow x = \pm \sqrt{y-1} \Rightarrow R_f = R$ ✓

$R_f = [-8, +\infty)$

(1.5)

الف) $y = x^3 - 8x + 4 \rightarrow y = (x-2)^3 + 4 \rightarrow (x-2)^3 = y - 4 \rightarrow x = \pm \sqrt[3]{y-4} + 2$

$\Rightarrow R_f = [4, +\infty)$ ✓

ب) $x^3 - 8x + (1-y) = 0 \rightarrow \Delta \geq 0 \rightarrow \Delta = 48 - 4 + 4y = 44 + 4y$

$\Rightarrow 44 + 4y \geq 0 \rightarrow R_f = [-11, +\infty)$ ✓

(2)

الف) $x^2 = \frac{y+3}{y-1} \rightarrow x = \pm \sqrt{\frac{y+3}{y-1}} \rightarrow \frac{-3}{+0} - \frac{1}{-0} +$

$\rightarrow R_f = (-\infty, \frac{3}{2}] \cup (1, +\infty)$ ✓

ب) $|x| = \frac{y+1}{y-2} \rightarrow \frac{-1}{+0} - \frac{2}{-0} + \rightarrow R_f = (-\infty, \frac{1}{2}] \cup (2, +\infty)$

$y = \frac{1}{x^2 - 4x} \rightarrow x^2 y - 4xy - 1 = 0 \rightarrow x = \frac{4y \pm \sqrt{16y^2 + 4y}}{2y} \rightarrow \Delta \geq 0$

$\rightarrow 16y^2 + 4y \geq 0 \rightarrow R_f = R$ $\frac{-1/4}{+1} - \frac{1}{+} \rightarrow R_f = (-\infty, -\frac{1}{4}] \cup (0, +\infty)$

الف) $y = x^2 - 4x + 4 \rightarrow \begin{cases} x_{\min} = 2 \\ y_{\min} = -4 \end{cases} \rightarrow R_f = [-4, +\infty)$ ✓

ب) $y = -x^2 + 4x + 4 \rightarrow \begin{cases} x_{\max} = 2 \\ y_{\max} = 4 \end{cases} \rightarrow R_f = (-\infty, 4]$ ✓

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

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

الف) $R_f = R$ ✓ ب) $R_f = \sqrt{R} = [0, +\infty)$ ✓

الف) $R_f = \mathbb{R} - \{ \frac{1}{2} \}$ ✓

ب) $R_f = [0, +\infty) - \{ \frac{1}{2} \}$ ✓

(4)

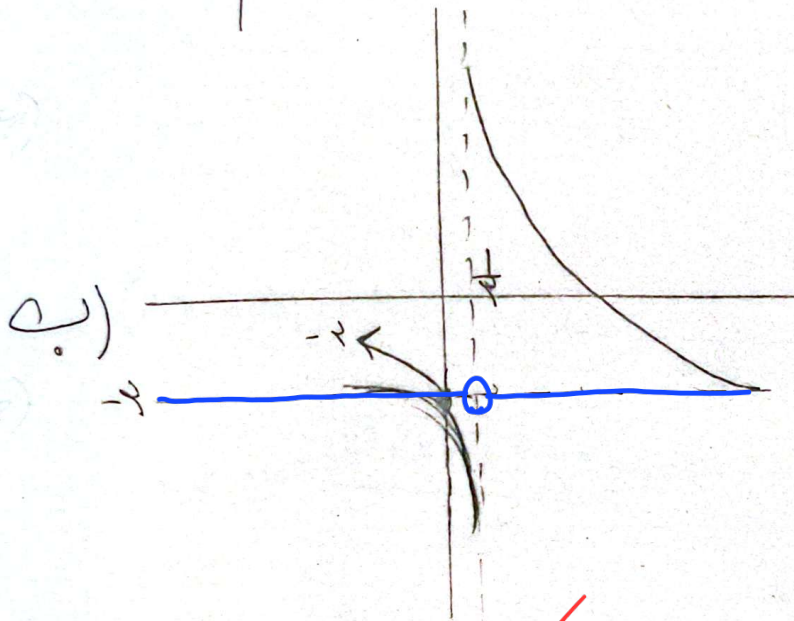
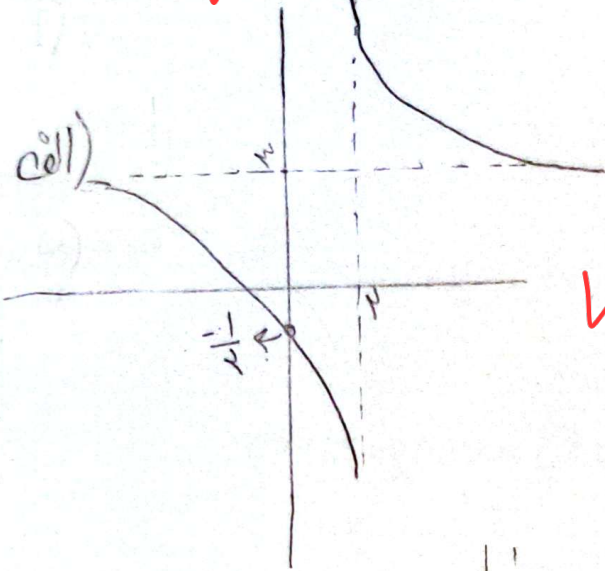
(1)

(9)

الحدود: $x = \frac{1}{2}$

الحدود: $y = \frac{1}{2}$

(1)



الحدود: $x = \frac{1}{2}$

الحدود: $y = -\frac{1}{2}$

$$y = -\frac{1}{2}$$

$$x \neq \frac{1}{2}$$

الف) $R_f = [1, +\infty)$ ✓

ب) $\frac{x^2+1}{x} = x + \frac{1}{x} \rightarrow R_f = \sqrt[3]{[1, +\infty)} = [\sqrt[3]{1}, +\infty)$

$$R_f = (-\infty, \sqrt[3]{-1}] \cup [\sqrt[3]{1}, +\infty)$$

(10)

(110)