

سوال ۱

$$\text{الف) } x^2 = y + a \quad x = \pm \sqrt{y + a} \quad y + a \geq 0 \quad y \geq -a$$

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

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

$$\text{الف) } x^2 - 4x + 4 - y = 0 \quad \text{سوال ۲}$$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4 \times 1 \times (4 - y)}}{2} \quad x = \frac{4 \pm \sqrt{16 - 4(4 - y)}}{2}$$

$$\frac{4 \pm \sqrt{4y - 4}}{2} \Rightarrow 4y - 4 \geq 0 \quad y \geq 1 \quad R_f = [1, +\infty)$$

$$\text{ب) } y(n+r)^2 + r \rightarrow (n+r)^2 = y - r \quad x = \pm \sqrt{y - r - r} \quad y \geq 2r$$

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

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

$$x = \sqrt{y + \frac{1}{2}} + \frac{2}{2} \Rightarrow \frac{-\frac{1}{2}}{-\sqrt{y + \frac{1}{2}}} \quad y + \frac{1}{2} \geq 0 \Rightarrow$$

$$R_f(p) = [-\frac{1}{2}, +\infty)$$

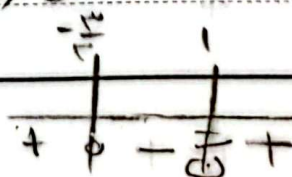
$$\text{الف) } x^2 + r = yx^2 - ry \quad yx^2 - x^2 = r + ry \quad \text{سوال ۳}$$

$$x^2(y - 1) = r + ry$$

$$x^2 = \frac{r + ry}{y - 1} \quad x = \sqrt{\frac{r + ry}{y - 1}} - \frac{r}{y - 1}$$

$$R_f = (-\infty, -\frac{r}{y-1}) \cup (1, +\infty)$$

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$$y|x| + 1 = y|x| - \epsilon y$$

$$y|x| - y|x| = 1 + \epsilon y$$

$$\begin{array}{r} -\frac{1}{\epsilon} \quad y \\ \hline + \quad - \quad + \end{array}$$

$$|x|(y - y) = 1 + \epsilon y$$

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

$$1 = yx^2 - \epsilon xy \quad yx^2 - \epsilon xy - 1 = 0$$

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$$x = \frac{-(-\epsilon y) \pm \sqrt{(-\epsilon y)^2 - \epsilon xy(-1)}}{\epsilon y}$$

$$x = \frac{\epsilon y \pm \sqrt{\epsilon^2 y^2 + \epsilon y}}{\epsilon y}$$

$$x = \frac{\epsilon y \pm y \sqrt{\epsilon y^2 + 1}}{\epsilon y}$$

$$x = \frac{y \pm \sqrt{\epsilon y^2 + 1}}{\epsilon}$$

$$\epsilon y^2 + 1 \geq 0$$

$$y = 0 \quad y = -\frac{1}{\epsilon}$$

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

$$\text{الف) } \frac{-b}{2a} \quad \frac{y}{y} = x \quad y - 1 + x = -y$$

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$$R_f [-y, +\infty)$$

$$\text{ب) } \frac{-f}{-r} = y \quad -f + 1 + r = y$$

$$R_f = (-\infty, y]$$

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سوال ٦) $\frac{+4}{2} = 2$ $9 - 18 + 2 = 7$ $[\sqrt{7}, +\infty)$ (الف)

ب) $\frac{-4}{-2} = 2$ $-4 + 8 + 10 = 14$ $[0, \sqrt{14}]$

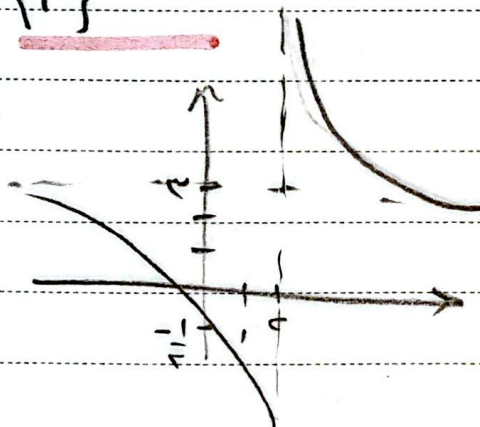
سوال ٧) (الف) $R_f = \mathbb{R}$

ب) $x^3 + 4x^2 + 4x + 1 \geq 0$ $R_f = [0, +\infty)$

سوال ٨) (الف) $R_f = \mathbb{R} - \{3\}$

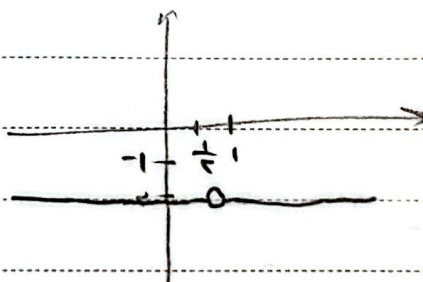
ب) $R_f = [0, +\infty) - \{2\}$

سوال ٩) (الف) $x = 2$ $y = 3$



ب) $y = \frac{4x-2}{-2x+1}$

$2 \cdot \frac{(2x-1)}{(-2x+1)} = -2$



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الف) $[2, +\infty)$

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ب) $\sqrt[3]{x + \frac{1}{x}}$ $(-\infty, \sqrt[3]{-2}] \cup [\sqrt[3]{2}, +\infty)$