

$$1) y = x^2 - 2x + 1 \Rightarrow y = (x-1)^2 + 1 \Rightarrow (x-1)^2 = y-1$$

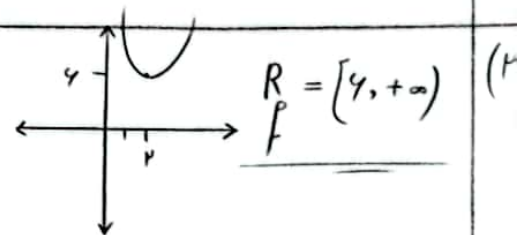
$$\Rightarrow x = \sqrt{y-1} + 1 \Rightarrow R_f = \mathbb{R}$$

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

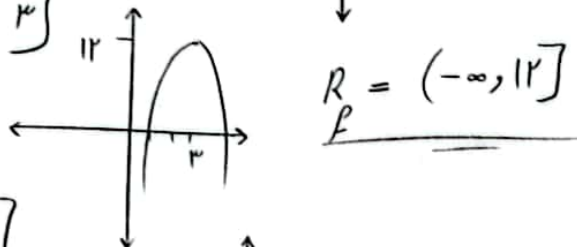
$$\Rightarrow yx(x-2) - 1 = 0 \Rightarrow x(x-2) = \frac{1}{y} \Rightarrow x^2 - 2x = \frac{1}{y} \quad y \neq (-1, 0)$$

$$R_y = \mathbb{R} - (-1, 0)$$

$$1) y = x^2 - 4x + 1 \quad \begin{cases} x = \frac{-b}{2a} = 2 \\ y = 4 - 4 + 1 = 1 \end{cases}$$

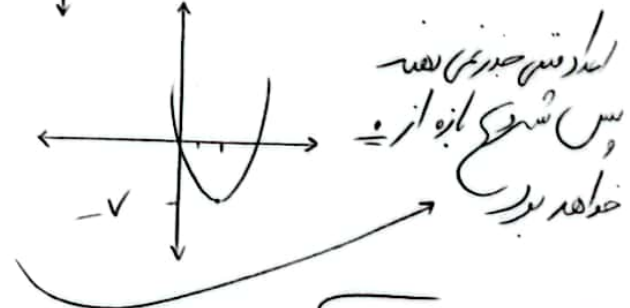


$$2) y = -x^2 + 6x + 3 \quad \begin{cases} x = \frac{-b}{2a} = 3 \\ y = \frac{33}{4} \end{cases}$$

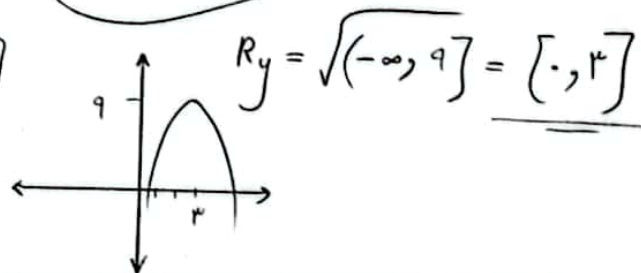


$$3) y = \sqrt{x^2 - 4x - 3} \quad \begin{cases} x = \frac{-b}{2a} = 2 \\ y = -5 \end{cases}$$

$$\Rightarrow R_y = \sqrt{[-5, +\infty)} = [0, +\infty)$$



$$4) y = \sqrt{4x - x^2} \Rightarrow \begin{cases} x = \frac{-b}{2a} = 2 \\ y = 2 \end{cases}$$



$$1) y = x^2 - 5x^2 + 2x + 1 \Rightarrow R_y = \mathbb{R} \quad 2) y = (x^2 - 4x^2 + 2x + 1)^2$$

$$3) y = x^2 - 4x^2 + 2x + 1 \Rightarrow R_y = \mathbb{R} \quad \xrightarrow{\mathbb{R}} R_y = [0, +\infty)$$

$$4) y = \sqrt{x^2 - 4x^2 + 2x + 1} \Rightarrow \sqrt{(-\infty, \infty)} \Rightarrow R_y = [0, +\infty)$$

$$(الف) y = \frac{3x+1}{x-2} \Rightarrow R_y = \mathbb{R} - \{3\}$$

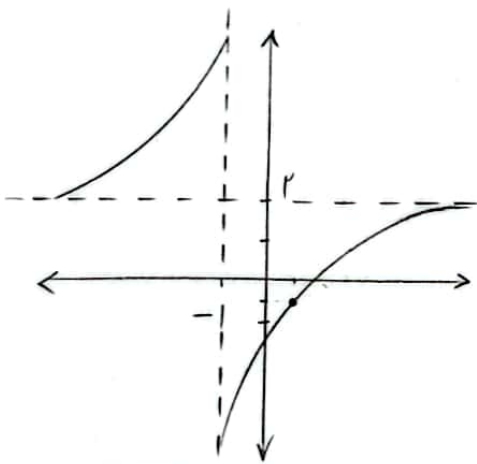
$$(ب) y = \frac{2x+1}{x+1} \Rightarrow R_y = \mathbb{R} - \{2\}$$

$$(الف) y = \sqrt{\frac{2x+4}{x+1}} \Rightarrow \sqrt{\mathbb{R} - \{2\}} \Rightarrow R_y = [0, +\infty) - \{\sqrt{2}\}$$

$$(ب) y = \sqrt{\frac{3x+1}{2-x}} \Rightarrow \sqrt{\mathbb{R} - \{-3\}} \Rightarrow R_y = [0, +\infty)$$

حل درج اولی
مجموعه مقادیر

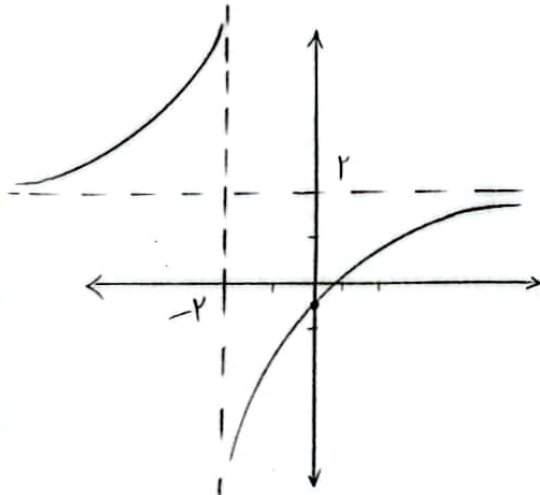
$$(الف) y = \frac{2x-3}{x+1} \quad \left\{ \begin{array}{l} \text{ریشه ی نخج} = x = -1 \\ \text{مجموعه مقادیر} = y = \frac{a}{c} \Rightarrow 2 \end{array} \right.$$



گام ۱
گام ۲ (در دست راست):
1 / -1/2

$$(ب) y = \frac{2x-1}{x+2}$$

$$\left\{ \begin{array}{l} \text{مجموعه مقادیر} = -2 \\ \text{مجموعه مقادیر} = \frac{a}{c} = 2 \end{array} \right.$$



$$(الف) y = \sin x + \frac{1}{\sin x}$$

مجموعه مقادیر است: $\sin x$

$$R_y = (-\infty, -2] \cup [2, +\infty)$$

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

$$ج) y = \frac{\sqrt[p]{x^r + 1}}{\sqrt[p]{x}} \Rightarrow \frac{\sqrt[p]{x^r}}{\sqrt[p]{x}} \times \frac{\sqrt[p]{x^r}}{\sqrt[p]{x^r}} = \frac{\sqrt[p]{x^r}}{x} = \frac{x^{\frac{r}{p}}}{x} = x^{\frac{r}{p}-1} = \sqrt[p]{x^r} \quad (V)$$

$$\sqrt[p]{x} + \frac{1}{\sqrt[p]{x}} \Rightarrow R_y = \underline{(-\infty, -1] \cup [1, +\infty)}$$

$$د) y = \sqrt{x} + \frac{1}{\sqrt{x}} \Rightarrow R_y = \underline{[1, +\infty)}$$

$$الف) y = x^r + \frac{1}{x^r + p} \Rightarrow \underbrace{x^r + p}_{p} + \frac{1}{x^r + p} \Rightarrow x^r + p + \frac{1}{x^r + p} \quad (\wedge)$$

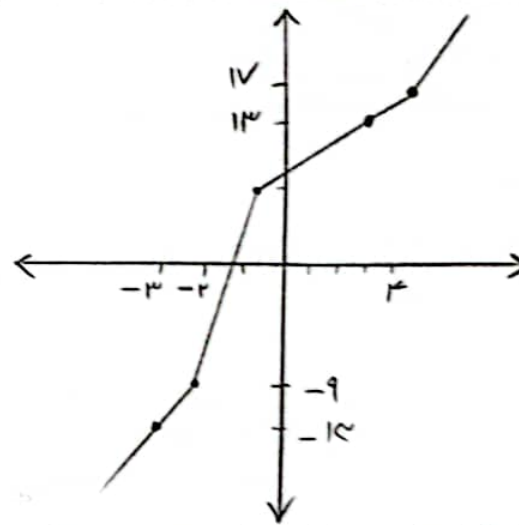
$$\Rightarrow R_f = \left[\frac{1}{p}, +\infty\right) \Rightarrow R_y = \frac{1}{p} - \frac{q}{p} = \left[\frac{1}{p}, +\infty\right)$$

$$ب) y = \frac{x^r + 1}{\sqrt{x^r + r}} \Rightarrow \frac{\cancel{x^r + r} + 1}{\cancel{x^r + r}} \Rightarrow y = \sqrt{x^r + r} + \frac{1}{\sqrt{x^r + r}}$$

$$\Rightarrow R_y = \left[\frac{2}{r}, +\infty\right)$$

$$y = |x - \mu| + |\mu x + \mu|$$

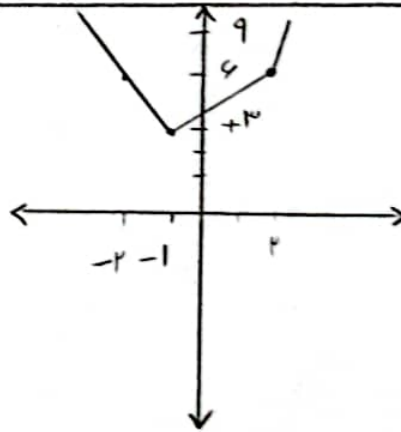
$$\begin{cases} \mu x + 1 & x > \mu \\ \mu x + \mu & -\frac{\mu}{\mu} \leq x \leq \mu \\ -\mu x - 1 & x < -\frac{\mu}{\mu} \end{cases}$$



(9)

الف) $y = |x - \mu| + |\mu x + \mu|$

$$\begin{cases} -\mu x & x < -1 \\ x + \mu & -1 \leq x \leq \mu \\ \mu x & x > \mu \end{cases}$$

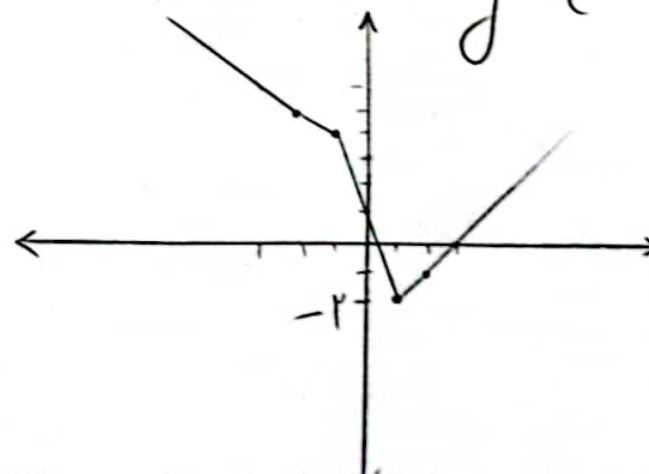


$$R_y = [\mu, +\infty)$$

(10)

ب) $y = |\mu x - \mu| - |x + 1|$

$$\begin{cases} -x + \mu & x < -1 \\ -\mu x + 1 & -1 \leq x \leq 1 \\ x - \mu & x > 1 \end{cases}$$



$$R_y = [-\mu, +\infty)$$