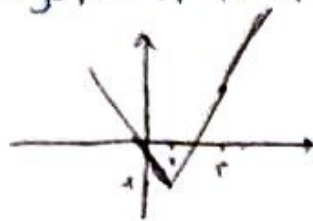


$$3) y = |x-r| - |x-r|$$



$$R = [r, \infty)$$

$$4) y = |x-r| + |x+1|$$



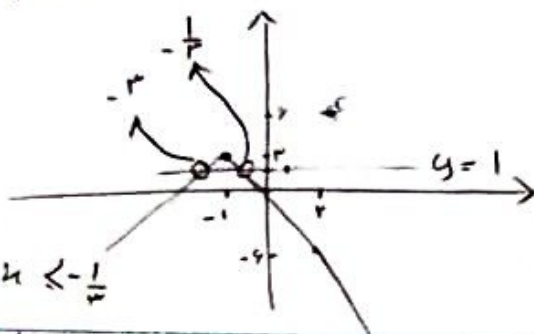
$$R = [r, \infty)$$

$$|x-r| - |x+1| \leq 1$$

$$-2+r+x \leq 1 \sim x \leq -r$$

$$x-r+x \leq 1 \sim x \leq -\frac{1}{2}$$

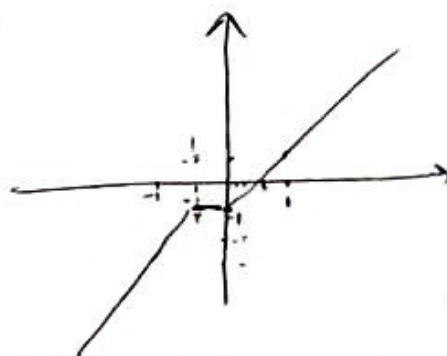
$$x-r-x \leq 1 \sim -x \leq 1 \sim x \geq -1$$



$$R = (-\infty, -r] \cup [-\frac{1}{2}, \infty)$$

$$y = rx - |rx+1| + |x|$$

$$\begin{array}{c|c|c} x-r+1-x & rx-rx-1-x & rx-rx-1+x \\ \hline rx+1 & -1 & rx-1 \end{array}$$

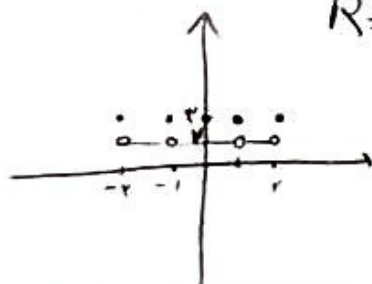


$$R = \mathbb{R}$$

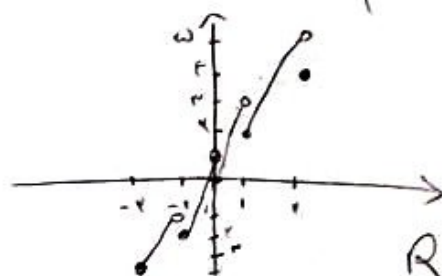
$$5) y = [x] + [r-x]$$

$$y = [x] + [-x] + r$$

$$R = \{r, r\}$$



$$6) y = rx - [x] \begin{cases} rx & x \in \mathbb{Z} \\ rx - [x] & x \notin \mathbb{Z} \end{cases}$$



$$R = [-\frac{1}{r}, \frac{1}{r}]$$

$$7) y = \sin^2 x - \sin x + \frac{1}{4}$$

$$\sin x = 1 \sim y = \frac{1}{4}$$

$$\sin x = -1 \sim y = \frac{1}{4}$$

$$\sin x = \frac{1}{2} \sim y = \frac{1}{4}$$

$$R = [\frac{1}{4}, 1]$$

$$8) y = \sin^2 x + \sin^2 x + 1$$

$$\sin x = 1 \sim y = 2$$

$$\sin x = 0 \sim y = 1$$

$$\sin x = -\frac{1}{2} \sim y = \frac{3}{4}$$

$$R = [1, 2]$$

توجه: دایره مختار

نکته: برای حل این سوال، باید از فرمول استفاده کرد

۱۹، ۲۵

الف) $g = \frac{|x|+1}{|x|-1} \sqrt{y}$

ب) $g = \frac{x^2+1}{|x|}$

(۲)

$Del = -\frac{-2y-1}{y^2-1} = \frac{2y+1}{y^2-1} \sim \frac{-\frac{1}{y}}{1-\frac{1}{y^2}} \sim \frac{-\frac{1}{y}}{1-\frac{1}{y^2}}$



$R = [1, \infty)$

$g = \frac{x^2+2x-1}{x+3} \xrightarrow{-1, +1} \frac{x^2+2x-1+1}{x+3} = \frac{(x+1)(x-1)+1}{x+3} = x-1 + \frac{1}{x+3}$

$\xrightarrow{+\frac{1}{x+3}} x+3 + \frac{1}{x+3} - 4 \rightarrow R = (-\infty, -4] \cup [-2, \infty)$

میتوانست از روش مربع هم استفاده کنیم

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

$D = x^2-x+1 \neq 0$

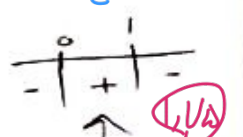
$\Delta = 1-4 = -3 < 0$

$D = \mathbb{R}$

فرض کنیم $y \neq 1$ است
و مجموع در انزای جمع قدری برابر یک میشه پس بره بدیدر است

$R_y = [0, 1)$

$R = [0, 1)$



$\left(\frac{x-\frac{1}{x}}{x^2-x+1} \right)^2 = y \rightarrow yx^2 - yx + y = \left(x - \frac{1}{x} \right)^2$

$(y-1)x^2 + (-y+1)x + y - \frac{1}{x} = 0 \rightarrow (y-1)^2 - 4(y-1)(y-\frac{1}{x}) \geq 0 \sim 1 + y^2 - 2y + 4y - 1 - 4y^2 + 4 \geq 0 \rightarrow 4(y+1) \geq 0$

الف) $g = \sqrt{-x^2+4x-1}$

ب) $g = \sqrt[3]{x^2-11x}$

(۱، ۵)

$\left| \frac{-\frac{1}{x}}{x} \right| \sim (-\infty, 0]$

$\left| \frac{\frac{1}{x}}{-1} \right| = 2$

$\sim R = \sqrt[3]{[-11, \infty)}$

$\sim R = [0, \sqrt{3}]$

$R_y = [-2, +\infty)$

الف) $g = \log(x^2-x+11)$

ب) $g = \log \sqrt{\frac{x^2+1}{x}}$

(۲)

$x^2-x+11 \sim R = \mathbb{R}$

$D = \frac{x^2+1}{x} > 0 \sim x > 0$

$\frac{x^2+1}{x^2} = y \sim y = x + \frac{1}{x} \sim$

$\log \rightarrow R$

$R = [1, \infty)$

$\Rightarrow R = \mathbb{R}$

$\sim y = R = [1, \infty)$