

الف) $|u|y - |u| = y + 1 \Rightarrow |u|(y-1) = y+1 \rightarrow |u| = \frac{y+1}{y-1} \geq 0 \rightarrow \frac{-1}{+1} \frac{1}{-1} \rightarrow R = (-\infty, -\frac{1}{y}] \cup (1, +\infty)$

ب) $y = \frac{x^r}{|u|} + \frac{1}{|u|} \Rightarrow |u| + \frac{1}{|u|} \xrightarrow{a+\frac{1}{a} \geq 2} [r, +\infty)$

$yx + yx = x^r + rx - r \rightarrow x^r \cdot (r-y)x - (r+y) = 0 \rightarrow \frac{-b \pm \sqrt{\Delta}}{r_a} \rightarrow \Delta \geq 0 \rightarrow \Delta = (y-r)^2 + 1 + 1^2 y$
 $= y^2 + ry + 1r \rightarrow (y+r)(y+y) \geq 0 \rightarrow \frac{r}{+1} \frac{y}{-1} \rightarrow R = (-\infty, -y] \cup [-r, +\infty)$

$D = x^r - x + 1 \neq 0 \rightarrow \Delta < 0 \rightarrow D \cdot \mathbb{R}$

$R = \frac{(x-\frac{1}{r})^r}{(x-\frac{1}{r})^r + \frac{r}{\varepsilon}} \rightarrow (x-\frac{1}{r})^r = t \rightarrow \frac{t}{t+\frac{r}{\varepsilon}} = y \rightarrow t = yt + \frac{r}{\varepsilon}y \rightarrow t(y-1) = \frac{r}{\varepsilon}y \rightarrow t = \frac{ry}{\varepsilon(y-1)}$

$\frac{x-\frac{1}{r}}{t} \xrightarrow{t>0} \frac{0}{+1} \frac{1}{-1} \rightarrow R = [0, 1)$

الف) $\frac{-b}{r_a} = \frac{-\varepsilon}{-r} = r \rightarrow -(\varepsilon) + 1 - 1 = r \rightarrow \sqrt{(-\infty, r]} = [0, r]$

ب) $\frac{-b}{r_a} = \frac{1}{\varepsilon} = r \rightarrow 1 - 1r = -1 \rightarrow R = [-1, +\infty)$

الف) $f(x) = x^r - x + 1 \rightarrow R_f = \mathbb{R} \Rightarrow f: \mathbb{R} \rightarrow \mathbb{R} \rightarrow R = \mathbb{R}$

ب) $\frac{x^{r+1}}{x} = x + \frac{1}{x} \rightarrow (-\infty, -r] \cup [r, +\infty) \rightarrow f_r \xrightarrow{a \rightarrow \infty} \rightarrow f_r [r, +\infty) = [1, +\infty)$

الف) $\frac{-x+2+x-3}{-x-1} \quad \frac{2x-2+x-3}{x-\omega} \quad \frac{2x-2-x+3}{x+1} \rightarrow$ ب) $\rightarrow$ تابع گسسته $\rightarrow$ $\rightarrow R = [\varepsilon, +\infty)$	$\rightarrow R = [-2, +\infty)$	6
$\frac{-x+2+x+2}{x+\varepsilon \leq 1} \quad \frac{-x+2-2x-2}{-3x \leq 1} \quad \frac{x-2-2x-2}{-x-\varepsilon \leq 1} \rightarrow$ $x \leq -3 \quad x \geq \frac{1}{4} \quad x \geq -\omega$	$\rightarrow (-\infty, -\frac{1}{4}] \cup [\frac{1}{4}, +\infty)$	7
$\frac{2x+2x+1-x}{\varepsilon x+1} \quad \frac{2x-2x-1-x}{-1} \quad \frac{2x-2x-1+x}{2x-1}$ $R = \mathbb{R}$		8
الف) $= [x] + [-x] + 3 \rightarrow R = \{3, 2\} \rightarrow$ $R = \{0, -1\}$ ب) $\rightarrow R = [-\varepsilon, \omega)$		9
الف) $\sin \begin{cases} 1 \rightarrow 1-1 =1 \\ \frac{1}{r} \rightarrow \frac{1}{\varepsilon} - \frac{1}{\varepsilon} + \frac{\varepsilon}{r} = \frac{3}{\varepsilon} \\ -1 \rightarrow 1-1 =3 \end{cases} \rightarrow \begin{bmatrix} 3 \\ \varepsilon \end{bmatrix}$ ب) $\sin^2 \begin{cases} 1 \rightarrow 1-1 =3 \\ \frac{1}{r} \rightarrow \frac{1}{\varepsilon} \\ 0 \rightarrow 1 \end{cases} \Rightarrow [1, 3]$	10	