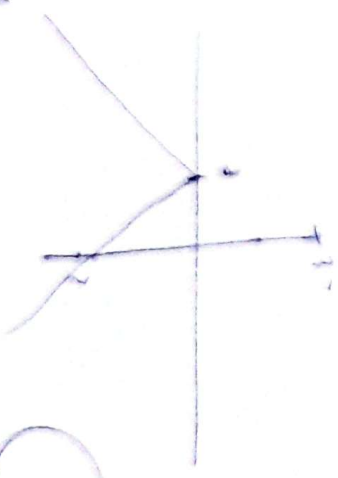


$y = x + |x - 2|$
 $|x - 2| = y - x$
 $x \geq 2 \rightarrow y = x + x - 2 = 2x - 2$
 $x < 2 \rightarrow y = x + 2 - x = 2$
 $R_f = \{0, 2, +\infty\}$
 $\left(\frac{1}{2}\right)$



ملاحظات حواتر نوشته شود

(1)

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

$\Rightarrow R_f(x, +\infty)$

$x < 0$	$0 - x$	$1 - x$	$2 - x$
x	x	x	x
$1 - x$	$1 - x$	$1 - x$	$1 - x$
$2 - x$	$2 - x$	$2 - x$	$2 - x$

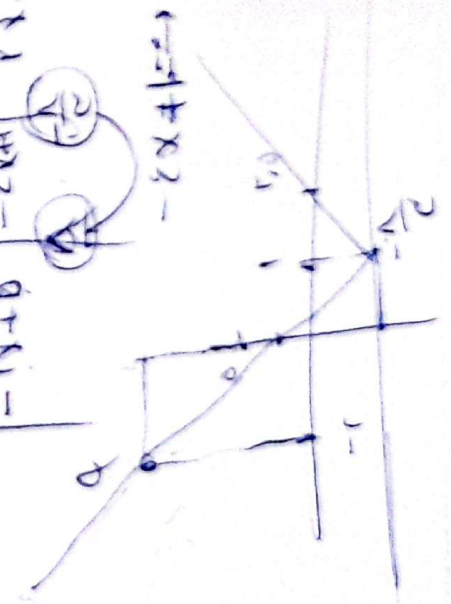
$\begin{matrix} \nearrow \\ \nwarrow \end{matrix}$

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

$0 - x$	$1 - x$	$2 - x$
x	x	x
$1 - x$	$1 - x$	$1 - x$
$2 - x$	$2 - x$	$2 - x$

(10)

$|1 - \frac{2}{2}| \leftarrow \frac{3}{2} = x$
 $x = \frac{3}{2}$



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

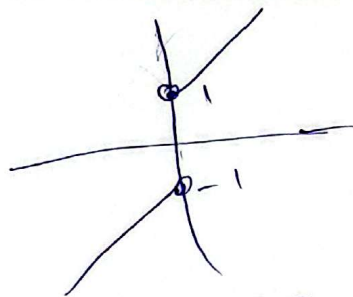
$\frac{3}{2} = x \leftarrow 1 + x = 2$

$K = -1$

$y = 0$

$$\frac{c}{|x|} \quad y = x + \frac{x}{|x|}$$

(1) $x > 0 \rightarrow y = x + 1$
 $x \neq 0$ ✓
 $x < 0 \rightarrow y = x - 1$
 $x \neq 0$



$$R_f = R - \{0\}$$

$$R_f = R - (-1, 1)$$

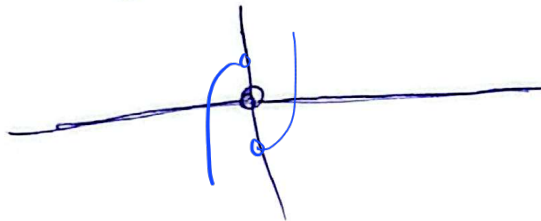
$$\left(\frac{c}{x}\right) \quad y = x|x| - \frac{x}{|x|}$$

$$x > 0 \rightarrow y = x^2 - x^2 = 0 \rightarrow y = 0$$

$$x \neq 0$$

$$x < 0 \rightarrow y = -x^2 + x^2 = 0 \rightarrow y = 0$$

$$x \neq 0$$



$$الف - \sqrt{9+\epsilon} \leq \cos x + \cos x \leq \sqrt{9+\epsilon}$$

$$Rf = [-\sqrt{10}, \sqrt{10}]$$

$$ب - \sqrt{17+9} < \epsilon \sin x - \cos x < \sqrt{17+9}$$

$$Rf = [-0, 0]$$

$$2.) -\sqrt{10} \leq \cos x + \cos x \leq \sqrt{10}$$

$$-4 \leq [\cos x + \cos x] \leq 0$$

$$Rf = [-4, 0] \rightarrow \text{نقطة الصفر}$$

>

$$y = \sqrt{\cos x - \cos x}$$

$$-\sqrt{0} \leq y \leq \sqrt{0}$$

$$0 \leq y \leq \sqrt{0}$$

$$Rf = [0, \sqrt{0}]$$

$$الف) y = \sin x + \cos x + 1$$

$$\sin x \in [-1, 1]$$

$$\rightarrow 1 + 1 + 1 = 3$$

$$1 - 1 + 1 = 1$$

$$Rf = [1, 3]$$

$$\omega x = -\frac{1}{1} = -1$$

ب

$$y = \sin x + \cos x + 1$$

$$\sin x \in [-1, 1]$$

$$\rightarrow 1 - 1 + 1 = 1$$

$$Rf = [1, 3]$$

$$R = [1, 3]$$

$$\omega x = -\frac{1}{1} \rightarrow 1 \times \frac{1}{14} + \frac{1}{14} + 1$$

$$\frac{11}{14} - \frac{1}{14} + 1 = \frac{10}{14} + 1 = \frac{12}{14} = \frac{6}{7}$$

$$y = \sin x + \cos x \rightarrow y = 1 + \cos x$$

الف

$$\sin x \in [-1, 1] \rightarrow y = 2$$

$$\rightarrow Rf = [1, 2]$$

$$\omega x = \frac{0}{1} = 0 \rightarrow 1$$

$$\left(\frac{1}{r}\right) \quad y = \frac{r \cos \alpha}{1 + \cos^2 \alpha} = \frac{r A}{1 + A^2} = r \left(A + \frac{1}{A} \right)$$

→ = $\sin^2 \alpha \rightarrow R = [-1, 1]$

$$-r \leq \frac{r}{A} \leq r \rightarrow -\varepsilon \leq r \left(A + \frac{1}{A} \right) \leq \varepsilon$$

$$\Rightarrow R_f = [-\varepsilon, \varepsilon]$$

9
الف

$$y = \sin^2 x + \cos^2 x$$

1, 0

$$\begin{aligned} \sin^2 x + \cos^2 x &= (\sin^2 x + \cos^2 x)^2 - 2 \sin^2 x \cos^2 x \\ &= 1 - 2 \sin^2 x \cos^2 x \\ &= 1 - \frac{2}{\varepsilon} \sin^2 x \end{aligned}$$

Rf

$$\begin{aligned} \alpha = 1 &\rightarrow \frac{1}{\varepsilon} \rightarrow \left[\frac{1}{\varepsilon}, 1 \right] \\ \alpha = -1 &\rightarrow \frac{1}{\varepsilon} \\ \alpha = 0 &\rightarrow y = 1 \end{aligned}$$

$\left(\frac{9}{\varepsilon}\right) \quad y = [\sin^2 x + \cos^2 x]$

$\frac{1}{\lambda} \leq \sin^2 x + \cos^2 x \leq 1$
برای $\rightarrow R = \{1\}$

$$(\sin^2 x + \cos^2 x)^2 - 2 \sin^2 x \cos^2 x$$

$$(\sin^2 x + \cos^2 x)^2 - 2 \sin^2 x \cos^2 x$$

$$(1 - 2 \sin^2 x \cos^2 x)^2 - 2 \sin^2 x \cos^2 x$$

$$\left(1 - \frac{1}{r} \sin^2 x\right)^2 - \varepsilon \times \frac{1}{r} \sin^2 x$$

$$\sin^2 x = 0 \rightarrow 1$$

$$\sin^2 x = -1 \rightarrow \left(\frac{r}{\varepsilon}\right)^2 - \frac{1}{\varepsilon} \times 1 = \frac{r}{\varepsilon} - \frac{1}{\varepsilon} = r$$

$$\sin^2 x = 1 \rightarrow \left(\frac{1}{r}\right)^2 - \frac{1}{\varepsilon} = +\frac{1}{\varepsilon}$$

$$y = [\sin^2 x + \cos^2 x] \rightarrow R_f = [0, r]$$

$$\left(\frac{10}{\text{الف}}\right) y = \frac{2x^2 + vx - 2}{x+2}$$

$$\begin{array}{r} 2x^2 + vx - 2 \quad | \quad x+2 \\ \underline{2x^2 + 4x} \quad \quad | \quad x+2 \\ -2x - 2 \end{array}$$

$$y = 2x - 1 \rightarrow R.F. = R - \left[\frac{1}{x+2} \right]$$

$$x \neq -2$$

$$y \neq v$$

$$\left(\frac{10}{\text{ب}}\right) y = \frac{x^2 - 1}{x-1} = \cancel{(x-1)} \frac{x+1}{\cancel{x-1}} = x^2 + x + 1$$

$$x \neq 1$$

$$y \neq 2$$

$$\begin{array}{r} x^2 - 1 \quad | \quad x-1 \\ \underline{x^2 - x} \quad \quad | \quad x-1 \\ x - 1 \end{array}$$

$$\begin{array}{r} x^2 - 1 \\ \underline{x^2 - x} \\ x - 1 \end{array}$$

$$\begin{array}{r} x - 1 \\ \underline{x - 1} \\ 0 \end{array}$$

$$x_{\min} = -\frac{1}{2} \quad y_{\min} =$$

$$\frac{1}{2} - \frac{1}{4} + \frac{1}{2} = \frac{5}{4}$$

$$R.F. = \left[\frac{5}{4}, +\infty \right) - \{2\}$$

