

الف)
$$\begin{cases} x+2x-4 & x>2 \\ 2 & x=2 \\ x-2x+4 & x<2 \end{cases} \rightarrow \begin{cases} 3x-4 & x>2 \\ 2 & x=2 \\ -x+4 & x<2 \end{cases}$$

$R = [2, +\infty)$

$$\begin{array}{c|c|c} -2 & 1 & \\ \hline -3x+3+x+2 & -3x+3-x-2 & 3x-3-x-2 \\ -2x+5 & -4x-1 & 2x-9 \\ x < -2 & -2 < x < 1 & x > 1 \end{array}$$

$1 < -3$

$K = -3$

$K < -3$

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الف) $x \neq 0$

$x > 0 \quad x+1$

$x < 0 \quad x-1$

$\Rightarrow x \neq 0$

$x > 0 \quad x^2-1$

$x < 0 \quad -x^2+1$

الف) $\Rightarrow$

الف) $R = [0, 1)$

$\Rightarrow 4(x-[x]) \rightarrow 0 \leq 4(x-[x]) < 4 \quad R = [0, 4)$

ج) $R = [0, 5)$

د) $(2x-[2x]) [0, 1) \xrightarrow{x-} (-1, 0] \quad R = (-1, 0]$

الف) $-\sqrt{9+k} \leq 4\sin x + k\cos x \leq \sqrt{9+k}$

$R = [-\sqrt{13}, \sqrt{13}]$

$\Rightarrow -\sqrt{14+9} \leq 4\sin x - 4\cos x \leq \sqrt{14+9}$

$R = [-9, 9]$

ج) $-\sqrt{14} \leq 4\sin x + 4\cos x \leq \sqrt{14} \rightarrow [4\sin x + 4\cos x]$

$\left\{ \begin{array}{l} -4 \\ -4 \\ -4 \\ -4 \\ -4 \\ -4 \\ -4 \\ -4 \\ -4 \\ -4 \end{array} \right\}$

$R = \left\{ \begin{array}{l} -4, -4, -4, -4, -4, -4, -4, -4, -4, -4 \\ -1, 0, 1, 2, 3, 4, 9 \end{array} \right\}$

الف) $\sin x = \frac{-b}{ka} = \frac{-4}{4} \rightarrow \frac{-1}{1} \min$

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

$\sin x = 1 \rightarrow 4 \max$

$\sin x = -1 \rightarrow 0$

$\Rightarrow \sin x = \frac{-b}{ka} = \frac{-4}{4} \rightarrow \frac{4}{1} \min$

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

$\sin x = 1 \rightarrow 4 \max$

$\sin x = -1 \rightarrow 0$

الف) $y = \sin^2 x + 4(1 - \sin^2 x) \rightarrow -3\sin^2 x + 4 \rightarrow \sin^2 x \in [0, 1]$

$R = [1, 4]$

$\Rightarrow \frac{\cos x}{\sin x} \times \sin^2 x = \cos x \sin x \rightarrow \frac{1}{2} \sin^2 x \rightarrow R = \left[-\frac{1}{2}, \frac{1}{2} \right]$

الف) $4^{-1} \leq \sin^4 x + \cos^4 x \leq 1$

$\frac{1}{4} \leq \sin^4 x + \cos^4 x \leq 1$

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

$\Rightarrow 4^{-1} \leq \sin^4 x + \cos^4 x \leq 1 \quad \frac{1}{4} \leq \sin^4 x + \cos^4 x \leq 1$

$|\sin^4 x + \cos^4 x| \rightarrow \begin{cases} 0 \\ 1 \end{cases} \rightarrow R = \{0, 1\}$

الف) $y = \frac{(x+4)(x-1)}{x+4} = x-1 \rightarrow 4(-1)-1=-5 \rightarrow R = \mathbb{R} - \{-5\}$

$x+4 \rightarrow x \neq -4$

$\Rightarrow$