

الف) $y = |2x-2| - |x-3|$

$\frac{-2}{-x-1} \quad \frac{2}{3x-5} \quad \frac{1}{x+1} \Rightarrow$

$\Rightarrow R = [-2, +\infty)$

ب) $y = |x-2| + |x+1|$

$\frac{1}{x-2} \quad \frac{1}{x+1} \Rightarrow$

$\Rightarrow R = [1, +\infty)$

$y = |x-2| - |2x+2|$

$\frac{-1}{x+2} \quad \frac{2}{-3x} \quad \frac{1}{-x-2} \Rightarrow$

$y=1$

$|x-2| - |2x+2| \leq 1$

$x \leq -2 \leq x \leq -\frac{1}{3}$

$\Rightarrow R = (-\infty, -2] \cup [-\frac{1}{3}, +\infty)$

$y = 2x - |2x+1| + |x|$

$\frac{-1}{2x+1} \quad \frac{0}{-1} \quad \frac{1}{x-1} \Rightarrow$

$\Rightarrow R = \mathbb{R}$

الف) $y = [x] + [-x] + 3$

$[x] + [-x] = 0 \text{ or } -1 \Rightarrow [x] + [-x] + 3 = 3 \text{ or } 2$

$R = \{2, 3\}$

ب) $y = \begin{cases} 2x+2 & -2 \leq x < -1 \\ 2x+1 & -1 \leq x < 0 \\ 2x & 0 \leq x < 1 \\ 2x-1 & 1 \leq x < 2 \\ 2x-2 & x \geq 2 \end{cases}$

$\Rightarrow R = [-2, \infty)$

الف) $y = \sin^2 x - \sin x + 1$

$-1 < \sin x \leq 1 \Rightarrow \frac{b}{a} = \frac{1}{4}$

$\Rightarrow \begin{cases} \sin x = 1 \Rightarrow y = 1 \\ \sin x = -1 \Rightarrow y = 3 \\ \sin x = \frac{1}{4} \Rightarrow y = \frac{17}{16} \end{cases} \Rightarrow \frac{17}{16} \leq y \leq 3 \Rightarrow R = [\frac{17}{16}, 3]$

ب) $y = \sin^4 x + \sin^2 x + 1$

$0 \leq \sin^2 x \leq 1 \Rightarrow \frac{b}{a} = \frac{-1}{4} \Rightarrow \sin^2 x \geq 0 \Rightarrow \begin{cases} \sin^2 x = 1 \Rightarrow y = 3 \\ \sin^2 x = 0 \Rightarrow y = 1 \end{cases} \Rightarrow R = [1, 3]$