

$$الف) y = \sqrt{14} \sin x + \sqrt{14} \cos x \Rightarrow -\sqrt{14+14} < < \sqrt{14+14} \Rightarrow Ry = [-\sqrt{28}, \sqrt{28}]$$

$$ب) y = \sqrt{14} \sin x - \sqrt{14} \cos x \Rightarrow -\sqrt{14+14} < < \sqrt{14+14} \Rightarrow Ry = [-\sqrt{28}, \sqrt{28}]$$

$$ج) y = [\sqrt{14} \sin x + \sqrt{14} \cos x]$$

$$-\sqrt{28} < < \sqrt{28} \quad [-\sqrt{28}, \sqrt{28}]$$

$$Ry = \{ \omega, \epsilon, \gamma, \iota, \theta, -\iota, -\gamma, -\epsilon, -\omega, -\theta \}$$

$$د) y = \sqrt{\cos x - \sqrt{14} \sin x}$$

$$0 \leq \cos x - \sqrt{14} \sin x \Rightarrow \frac{x}{\sqrt{14}} < < \sqrt{14}$$

$$Ry = [0, \sqrt{14}]$$

$$الف) y = \sin^2 x + \sqrt{14} \sin^2 x + \sqrt{14}$$

$$y = \sqrt{14} \sin^2 x + \sin^2 x + \sqrt{14}$$

$$\sin^2 x \begin{matrix} \xrightarrow{0} \sqrt{14} \\ \xrightarrow{1} \sqrt{14} + 1 + \sqrt{14} = 4 \\ \xrightarrow{\frac{1}{2}} \frac{1}{4} \end{matrix} \quad \sin x = -1 \rightarrow y = \frac{\sqrt{14}}{4}$$

$$Ry = [\frac{\sqrt{14}}{4}, 4]$$

$$ب) y = \sqrt{14} \sin^2 x + \sqrt{14} \sin x + \sqrt{14}$$

$$\sin x \begin{matrix} \xrightarrow{1} \sqrt{14} + \sqrt{14} + \sqrt{14} = 3\sqrt{14} \\ \xrightarrow{-1} \sqrt{14} - \sqrt{14} + \sqrt{14} = \sqrt{14} \\ \xrightarrow{\frac{1}{2}} \frac{\sqrt{14}}{4} \end{matrix} \rightarrow y = \frac{\sqrt{14}}{4}$$

$$Ry = [\frac{\sqrt{14}}{4}, 3\sqrt{14}]$$

$$الف) y = \sin^2 x + \sqrt{14} \cos^2 x$$

$$1 - \sin^2 x = \cos^2 x$$

$$\sin^2 x - \sqrt{14} \sin^2 x + \sqrt{14} \Rightarrow \sqrt{14} \sin^2 x$$

$$\sqrt{14} \sin^2 x - \sin^2 x + \sqrt{14} = y$$

$$\sqrt{14} \sin^2 x \leq 1 \Rightarrow 1) \sin^2 x = 0 \quad y = \sqrt{14}$$

$$2) \sin^2 x = 1 \quad y = 0$$

$$Ry = [0, \sqrt{14}]$$

$$ب) y = \frac{\sqrt{14} \cot x}{1 + \cot^2 x}$$

$$\frac{\sqrt{14} \cos x}{\sin x} \times \sin^2 x \Rightarrow \sqrt{14} \cos x \sin x$$

$$\sqrt{14} \cos x \sin x = \sin x$$

$$Ry = [-1, 1]$$

$$الف) y = \sin^4 x + \cos^4 x$$

$$\sin^4 x + \cos^4 x - \sin^2 x \cos^2 x$$

$$\hookrightarrow \sin^2 x \frac{1}{2} \Rightarrow \sin^2 x \frac{1}{2} - 1 = \cos^2 x + \sin^2 x$$

$$\frac{1}{2} \leq \sin^4 x + \cos^4 x \leq 1$$

$$Ry = [\frac{1}{2}, 1]$$

$$ب) y = [\sin^4 x + \cos^4 x] \Rightarrow \{1\}$$

$$(\cos^4 x + \sin^4 x) - \sqrt{14} (\sin^2 x \cos^2 x)$$

$$\hookrightarrow \sin^2 x \cos^2 x - 1 = \cos^2 x + \sin^2 x$$

$$\sin^2 x \frac{1}{2} = (\sin^2 x \frac{1}{2})^2 = \sin^2 x \cos^2 x$$

$$\sin^2 x \frac{1}{2} \neq \sin^2 x - 1 =$$

$$\sqrt{14} \sin^2 x \leq 1 \Rightarrow x=0 \Rightarrow y=1$$

$$x=1 \Rightarrow \frac{1}{2} = y$$

$$\frac{1}{2} \leq \sin^4 x + \cos^4 x \leq 1$$

$$Ry = \{0, 1\}$$

$$الف) y = \frac{\sqrt{14} x^2 + \sqrt{14} x - \sqrt{14}}{x + \sqrt{14}}$$

$$\frac{\sqrt{14} x^2 + \sqrt{14} x - \sqrt{14}}{\sqrt{14} x + \sqrt{14}} \quad \frac{(\sqrt{14} x - 1)(x + \sqrt{14})}{x + \sqrt{14}}$$

$$y = \sqrt{14} x - 1$$

$$x \neq -\sqrt{14}$$

$$y \neq -9$$

$$Ry = R - \{-9\}$$

$$ب) y = \frac{x^2 - 1}{x - 1} \quad (x \neq 1)$$

$$(y \neq \sqrt{14})$$

$$(x-1)(x^2 + x + 1) \Rightarrow x^2 + x + 1$$

$$\frac{-b}{2a} = -\frac{1}{2} \Rightarrow \frac{-1}{2} = \frac{\sqrt{14}}{2}$$



$$Ry = [\frac{3}{4}, +\infty)$$