

۲۰ آفرین

الف) $f(x) + 2$	ب) $2f(x)$	ج) $f(x-1)$	د) $-f(x)$	
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الف) $x^2 - 5x + 6 > 0 \rightarrow (x-2)(x-3) > 0 \rightarrow \frac{2}{+} \frac{3}{-} \frac{+}{+} \quad (-\infty, 2) \cup (3, +\infty)$	ب) $x^2 - 6x + 5 < 0 \rightarrow (x-1)(x-5) < 0 \rightarrow \frac{1}{+} \frac{5}{-} \frac{+}{+} \quad (1, 5)$	ج) $x^2 + 4x + 5 \geq 0 \rightarrow (x+2)(x+1) \geq 0 \rightarrow \frac{-2}{+} \frac{-1}{-} \frac{+}{+} \quad (-\infty, -2] \cup [-1, +\infty)$	د) $x^2 - 7x + 6 \leq 0 \rightarrow (x-1)(x-6) \leq 0 \rightarrow \frac{1}{+} \frac{6}{-} \frac{+}{+} \quad [1, 6]$	۲
الف) $\frac{x^2 - 3x + 2}{x-5} < 0 \rightarrow \frac{(x-1)(x-2)}{x-5} < 0 \rightarrow \frac{1}{-} \frac{2}{+} \frac{5}{-} \frac{+}{+} \quad (-\infty, 1) \cup (2, 5)$	ب) $\frac{x^2 - 1}{x^2 - 4x + 5} \geq 0 \rightarrow \frac{x^2 - 1}{(x-2)(x-1)} \geq 0 \rightarrow \frac{-1}{+} \frac{1}{-} \frac{2}{-} \frac{5}{+} \frac{+}{+} \quad (-\infty, -1] \cup (2, +\infty)$			۳
الف) $y = \sqrt{\frac{x^2 - 1}{x^2 - x}} \rightarrow \frac{x^2 - 1}{x^2 - x} \geq 0 \rightarrow \frac{x^2 - 1}{x(x-1)} \geq 0 \rightarrow \frac{-1}{+} \frac{0}{-} \frac{1}{+} \frac{+}{+} \quad (-\infty, -1) \cup (0, 1) \cup (1, +\infty)$	ب) $y = \sqrt{\frac{x^2 - 14}{x^2 - 5x + 6}} \rightarrow \frac{x^2 - 14}{x^2 - 5x + 6} \geq 0 \rightarrow \frac{(x-2)(x+7)}{(x-2)(x-3)} \geq 0 \rightarrow \frac{-2}{+} \frac{7}{-} \frac{3}{-} \frac{+}{+} \quad (-\infty, 2] \cup (3, 7) \cup (7, +\infty)$			۴
الف) $y = \sqrt{4 - \sqrt{2-x}} \rightarrow \begin{cases} 4 - \sqrt{2-x} \geq 0 \rightarrow 4 \geq \sqrt{2-x} \rightarrow -1 \leq 2-x \\ 2-x \geq 0 \rightarrow 2 \geq x \end{cases} \quad x = [-1, 2]$	ب) $y = \sqrt{3 - \sqrt{x-2}} \rightarrow \begin{cases} x-2 \geq 0 \rightarrow x \geq 2 \\ 3 - \sqrt{x-2} \geq 0 \rightarrow 3 \geq \sqrt{x-2} \rightarrow x \leq 11 \end{cases} \quad x = [2, 11]$			۵

$$\text{الف) } y = \sqrt{4-x^2} \rightarrow 4-x^2 \geq 0 \rightarrow x^2(4-x^2) \geq 0 \rightarrow \frac{-4}{-4+4} \quad [-2, 2]$$

(P) ✓

$$\text{ب) } y = \sqrt{3|x|-9} \rightarrow 3|x|-9 \geq 0 \rightarrow 3(|x|-3) \geq 0 \rightarrow \frac{-3}{+3-3} \quad (-\infty, -3] \cup [3, +\infty)$$

$$\text{الف) } y = \sqrt[3]{\frac{|x|+1}{|x|-3}} \rightarrow |x|-3 \neq 0 \rightarrow |x| \neq 3 \rightarrow \mathbb{R} - \{-3, 3\}$$

(P) ✓

$$\text{ب) } y = \sqrt[3]{\frac{\sqrt{x}+1}{\sqrt{x}-3}} \rightarrow \sqrt{x}-3 \neq 0 \rightarrow \sqrt{x} \neq 3 \quad \left. \begin{array}{l} x > 0 \end{array} \right\} D_f = [0, +\infty) - \{9\}$$

$$\text{الف) } y = \frac{\sin x}{y \cos x - 1} \rightarrow y \cos x - 1 \neq 0 \rightarrow y \cos x \neq 1 \rightarrow \cos x \neq \frac{1}{y} \rightarrow D_f = \mathbb{R} - \left\{ yk\pi \pm \frac{\pi}{y} \right\}$$

$$\text{ب) } y = \frac{\cos x + 1}{y \sin x + 1} \rightarrow y \sin x + 1 \neq 0 \rightarrow y \sin x \neq -1 \rightarrow \sin x \neq -\frac{1}{y} \rightarrow D_f = \mathbb{R} - \left\{ yk\pi - \frac{\pi}{y}, yk\pi - \frac{3\pi}{y} \right\}$$

(P) ✓

$$\text{ج) } y = \frac{\tan x + y}{\cot x - 1} \rightarrow \begin{cases} \frac{\sin x}{\cos x} \rightarrow \cos x \neq 0 \\ \frac{\cos x}{\sin x} \rightarrow \sin x \neq 0 \end{cases}, \frac{\cos x}{\sin x} - 1 \neq 0 \rightarrow \frac{\cos x}{\sin x} \neq 1 \rightarrow D_f = \mathbb{R} - \left\{ \frac{yk\pi}{y}, yk\pi + \frac{\pi}{y}, yk\pi + \frac{3\pi}{y} \right\}$$

$$\text{د) } y = \frac{\sin x + 1}{f \sin^2 x - 3} \rightarrow f \sin^2 x - 3 \neq 0 \rightarrow f \sin^2 x \neq 3 \rightarrow \sin^2 x \neq \frac{3}{f} \rightarrow D_f = \mathbb{R} - \left\{ yk\pi + \frac{\pi}{y}, yk\pi + \frac{3\pi}{y}, yk\pi + \frac{5\pi}{y}, yk\pi + \frac{7\pi}{y} \right\}$$

$$y = \frac{1}{\sqrt{2|x-2| - \frac{1}{y}}} \rightarrow 2|x-2| - \frac{1}{y} > 0 \rightarrow 2|x-2| > \frac{1}{y} \rightarrow |x-2| > \frac{1}{2y}$$

(P) ✓
 $(-\infty, \frac{y}{2}) \cup (\frac{y}{2}, +\infty)$

$$\frac{\frac{y}{2}}{+0-0+}$$

$$\text{الف) } y = \sqrt{4-2|x|} \rightarrow 4-2|x| \geq 0 \rightarrow 2(2-|x|) \geq 0 \rightarrow \frac{-2}{-2+2} \quad [-2, 2]$$

(P) ✓

$$\text{ب) } y = \sqrt{\frac{|x|}{|x|}} \quad \mathbb{R} - \{0\} \quad \sqrt{\frac{|||}{|||}} = 1 \leq \sqrt{\frac{|-1|}{|-1|}} = \sqrt{\frac{1}{1}} = 1$$