

$$\text{الف) } |x-2| > 0 \Rightarrow |x| \leq 2$$

$$\Rightarrow |x| \leq 2 \Rightarrow \begin{cases} x \leq \sqrt{2} \\ x \geq -\sqrt{2} \end{cases}$$

$$D_f: [-\sqrt{2}, \sqrt{2}]$$

✓

$$\text{ب) } 3|x-4| > 0 \Rightarrow 3|x| \geq 4 \Rightarrow |x| \geq \frac{4}{3}$$

$$\begin{cases} x \geq \frac{4}{3} \\ x \leq -\frac{4}{3} \end{cases} \Rightarrow D_f: (-\infty, -\frac{4}{3}] \cup [\frac{4}{3}, +\infty)$$

$$\text{الف) } |x|-3 \neq 0 \Rightarrow |x| \neq 3$$

$$D_f: \mathbb{R} - \{\pm 3\}$$

$$\text{ب) } x \geq 0$$

$$\sqrt{x} \neq 3 \Rightarrow x \neq 9$$

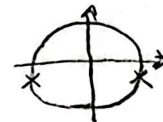
$$D_f: [0, +\infty) - \{9\}$$

✓

$$\text{الف) } 2\cos x - 1 \neq 0 \Rightarrow 2\cos x = 1 \Rightarrow \cos x \neq \frac{1}{2}$$

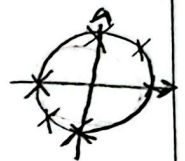
$$D_f: \mathbb{R} - \{2k\pi \pm \frac{\pi}{3}\}$$

$$\text{ب) } \sin x \neq \frac{1}{2} \Rightarrow D_f: \mathbb{R} - \{k\pi - \frac{\pi}{6}, k\pi + \frac{\pi}{6}\}$$

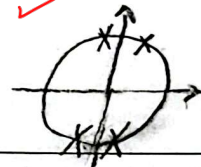


$$\text{ج) } \cos x \neq 0 \Rightarrow \cos x \neq 0 \Rightarrow D_f: \mathbb{R} - \{k\pi, k\pi + \frac{\pi}{2}\}$$

✓



$$\text{د) } \sin x \neq \pm \frac{\sqrt{3}}{2} \Rightarrow D_f: \mathbb{R} - \{k\pi \pm \frac{\pi}{3}\}$$



$$2|x-2| - \frac{1}{x} > 0 \Rightarrow 2|x-2| > \frac{1}{x} \Rightarrow x|x-2| > 1$$

$$\Rightarrow \begin{cases} x-2 > 1 \Rightarrow x > 3 \\ x-2 < -1 \Rightarrow x < 1 \end{cases}$$

$$\Rightarrow D_f: (-\infty, 1) \cup (3, +\infty)$$

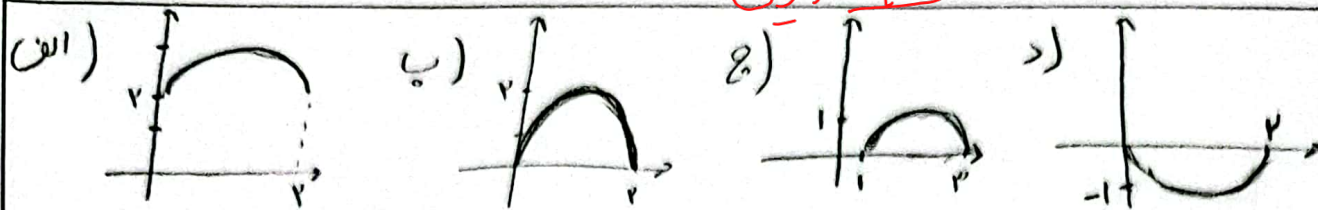
✓

$$\text{الف) } \varepsilon - 2|x| \geq 0 \Rightarrow 2|x| \leq \varepsilon$$

$$|x| \leq \frac{\varepsilon}{2} \quad -\frac{\varepsilon}{2} \leq x \leq \frac{\varepsilon}{2}$$

$$D_f: \mathbb{R} - \{0\}$$

✓



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الف) $x^2 - 5x + 4 > 0 \Rightarrow (x-2)(x-3) > 0$ $\frac{+}{-} \frac{+}{-} \frac{+}{-} \Rightarrow (-\infty, 2) \cup (3, +\infty)$

ب) $f(x) = 1, 5$ $\frac{+}{-} \frac{+}{-} \frac{+}{-} \Rightarrow (1, 5)$

ج) $f(x) = -1, -5$ $\frac{+}{-} \frac{+}{-} \frac{+}{-} \Rightarrow (-\infty, -5] \cup [-1, +\infty)$

د) $f(x) = 1, 9$ $\frac{+}{-} \frac{+}{-} \frac{+}{-} \Rightarrow [1, 9]$ ۲ ✓

الف) $\frac{x^2 - 3x + 2}{x - 5} = 0 \Rightarrow x = 1, 2$
 $\frac{x^2 - 5x}{x - 5} = 0 \Rightarrow x = 5$

$\frac{+}{-} \frac{+}{-} \frac{+}{-} \Rightarrow (-\infty, 1) \cup (2, 5)$ ۲ ✓

$\Rightarrow (-\infty, 1) \cup (2, 5)$

ب) $x^2 - 1 = 0 \Rightarrow x = \pm 1$
 $x^2 - 4x + 5 = 0 \Rightarrow x = 1, 5$

$\frac{+}{-} \frac{+}{-} \frac{+}{-} \Rightarrow (-\infty, -1] \cup (5, +\infty)$

$\Rightarrow (-\infty, -1] \cup (5, +\infty)$

الف) $\sqrt{\frac{x^2 - 1}{x^2 - x}} \geq 0 \Rightarrow \frac{x^2 - 1}{x(x-1)} \geq 0$

$\frac{+}{-} \frac{+}{-} \frac{+}{-} \Rightarrow (-\infty, -1) \cup (0, +\infty) - \{1\}$

$D_f: (-\infty, -1) \cup (0, +\infty) - \{1\}$ ۲ ✓

ب) $\sqrt{\frac{x^2 - 4}{x^2 - 5x + 4}} \geq 0 \Rightarrow f(x) = \pm \varepsilon, 1, \sqrt{\varepsilon}$

$\frac{+}{-} \frac{+}{-} \frac{+}{-} \Rightarrow (-\infty, -\varepsilon] \cup (1, +\infty) - \{4\}$

$\Rightarrow (-\infty, -\varepsilon] \cup (1, +\infty) - \{4\}$

الف) $2 - x \geq 0 \Rightarrow x \leq 2$

$\varepsilon - \sqrt{2 - x} \geq 0 \Rightarrow \sqrt{2 - x} \leq \varepsilon$
 $\Rightarrow 2 - x \leq \varepsilon^2 \Rightarrow x \geq 2 - \varepsilon^2$

$D_f: [2 - \varepsilon^2, 2]$ ۲ ✓

ب) $x - 2 \geq 0 \Rightarrow x \geq 2$

$3 - \sqrt{x - 2} \geq 0 \Rightarrow \sqrt{x - 2} \leq 3$
 $x - 2 \leq 9 \Rightarrow x \leq 11$

$D_f: [2, 11]$