

الف) $f(x)+2$	ب) $2f(x)$	ج) $f(x-1)$	د) $-f(x)$	۱

الف) $(x-2)(x-3) > 0$ ۲ ← ۳ $(3, +\infty) \cup (-\infty, 2)$	$x = \begin{array}{c c c c} 2 & & 3 & \\ \hline + & - & + & + \end{array}$	ج) $(x+1)(x+5) \geq 0$ -1 ← -5 $[-1, +\infty) \cup (-\infty, -5]$	$x = \begin{array}{c c c c} -5 & & -1 & \\ \hline + & - & + & + \end{array}$	۲
ب) $(x-1)(x-5) < 0$ ۱ ← ۵ $(1, 5)$	$x = \begin{array}{c c c c} 1 & & 5 & \\ \hline + & - & + & + \end{array}$	د) $(x-1)(x-9) \leq 0$ ۱ ← ۹ $[1, 9]$	$x = \begin{array}{c c c c} 1 & & 9 & \\ \hline + & - & + & + \end{array}$	

الف) $\frac{(x-2)(x-1)}{x-5} < 0$ ۵ ← $(-\infty, 1) \cup (2, 5)$	$x = \begin{array}{c c c c} 1 & 2 & 5 & \\ \hline - & + & - & + \end{array}$	ب) $\frac{(x-1)(x+1)}{(x-1)(x-5)} \geq 0$ ۱ ← ۵ $(-\infty, -1] \cup (5, +\infty)$	$x = \begin{array}{c c c c} -1 & * & 5 & \\ \hline + & - & - & + \end{array}$	۳
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الف) $\begin{cases} x^3 - x \neq 0 & x \neq 0, 1, -1 \\ \frac{x^3 - 1}{x^3 - x} \geq 0 \end{cases}$ ⊕ ✓ جز ۱ ⊖ ✓ جز -۱ ⊙ ✗ $D_f = \mathbb{R} - \{0, 1, -1\}$	$D_f = (-\infty, -1] \cup (1, 1) \cup (1, +\infty)$	ب) $\frac{x^2 - 16}{x^2 - 5x + 4} \geq 0 \rightarrow \frac{(x-4)(x+4)}{(x-1)(x-4)} \geq 0$ ۱ ← ۴ $x = \begin{array}{c c c c} -4 & 1 & 4 & * \\ \hline + & - & + & + \end{array}$	۴
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الف) $\begin{cases} 2-x \geq 0 \rightarrow x \leq 2 \\ 4-\sqrt{2-x} \geq 0 \rightarrow \sqrt{2-x} \leq 2 \rightarrow 2-x \leq 4 \rightarrow x \geq -2 \end{cases}$ $D_f = [-2, 2]$	ب) $\begin{cases} x-2 \geq 0 \rightarrow x \geq 2 \\ 3-\sqrt{x-2} \geq 0 \rightarrow \sqrt{x-2} \leq 3 \rightarrow x-2 \leq 9 \rightarrow x \leq 11 \end{cases}$ $D_f = [2, 11]$	۵
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الف) $4 - 2x^2 \geq 0$ $2x^2 \leq 4$ $x^2 \leq 2$ $-\sqrt{2} \leq x \leq \sqrt{2}$ $[-\sqrt{2}, \sqrt{2}]$

ب) $3|x| - 9 \geq 0$ $3|x| \geq 9$ $|x| \geq 3$ $x \geq 3$ $x \leq -3$
 $[3, +\infty) \cup (-\infty, -3]$

الف) $|x| - 3 \neq 0$ $|x| \neq 3$ $x \neq 3, -3$

$D_f = \mathbb{R} - \{3, -3\}$

ب) $\sqrt{x} - 3 \neq 0$ $\sqrt{x} \neq 3$ $x \neq 9$ $D_f = \mathbb{R} - \{9\}$

الف) $2\cos x - 1 \neq 0$ $2\cos x \neq 1$

$\cos x \neq \frac{1}{2}$ $\cos x \neq \frac{\pi}{3}, \frac{5\pi}{3}$
 $D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{3}, 2k\pi + \frac{5\pi}{3}\}$

ب) $2\sin x + 1 \neq 0$ $2\sin x \neq -1$

$\sin x \neq -\frac{1}{2}$ $\sin x \neq \frac{7\pi}{6}, \frac{11\pi}{6}$

$D_f = \mathbb{R} - \{2k\pi + \frac{7\pi}{6}, 2k\pi + \frac{11\pi}{6}\}$

ج) $\frac{\sin x}{\cos x} + 2$ $\cos \neq 0 \rightarrow \frac{\pi}{2}, \frac{3\pi}{2}$

$\frac{\cos x}{\sin x} - 1$ $\sin \neq 0 \rightarrow k\pi, \pi$
 $\frac{\cos}{\sin} - 1 \neq 0 \rightarrow \frac{\pi}{4}, \frac{5\pi}{4}$

$D_f = \mathbb{R} - \{\frac{k\pi}{2}, k\pi + \frac{\pi}{4}\}$

د) $f \sin^2 x - 3 \neq 0$ $f \sin^2 x \neq 3$

$\sin x \neq \frac{\sqrt{3}}{2}$ $\sin x \neq \frac{\pi}{3}, \frac{2\pi}{3}$

$D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{3}, 2k\pi + \frac{2\pi}{3}\}$

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

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

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

$|x-2| > \frac{1}{4}$

$\begin{cases} x-2 > \frac{1}{4} \rightarrow x > \frac{9}{4} \\ x-2 < -\frac{1}{4} \rightarrow x < \frac{7}{4} \end{cases}$

$\rightarrow \cap \rightarrow x > \frac{9}{4}$ $(\frac{9}{4}, +\infty)$

الف) $4 - 2|x| \geq 0$ $2|x| \leq 4$ $|x| \leq 2$ $-2 \leq x \leq 2$

$D_f = [-2, 2]$

ب) $\frac{|x|}{|x|} \geq 0$ $\oplus \checkmark$
 $\ominus \checkmark$

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

$\odot \times \rightarrow$ داخل مخرج تعريف نشده