

الف) $y''' = x = 1x^1 \rightarrow y'' = 1x^1 + x, y' = 1x^1 + x \rightarrow y_1 = y_2 \Rightarrow y_1 = y_2 \checkmark$

ب) $|y| + x^2 = x + 3 \rightarrow x = 0 \rightarrow |y| = 3 \rightarrow y = \pm 3 \checkmark$

ج) $\sqrt{x-4} + |y-2| = 0 \rightarrow \sqrt{x-4} = |y-2| = 0 \rightarrow x = 4, y = 2 \checkmark$

د) $x = \cos y \rightarrow x = 0 \rightarrow y = 90, 270 \checkmark$

الف) $y = \frac{x+f}{x^2-fx} = \frac{x+f}{x(x-f)} \rightarrow x \neq 0, f, D_f = \mathbb{R} - \{0, f\} ; D = (-\infty, 0) \cup (1, 3) \cup (f, +\infty)$

ب) $y = \frac{x+f}{x^2-14x+14} \rightarrow \Delta = b^2-4ac = 49-4f = -15 \rightarrow \Delta < 0 \rightarrow D = \mathbb{R}$

ج) $y = \frac{x+f}{x^2+x+f} \rightarrow \Delta = b^2-4ac = 1-4 = -3 \rightarrow \Delta < 0 \rightarrow D = \mathbb{R}$

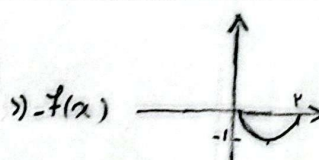
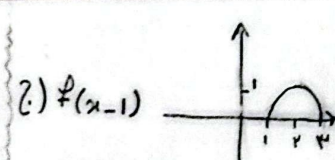
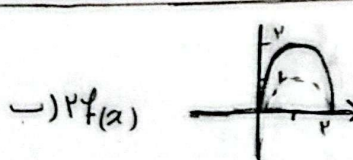
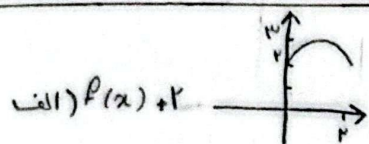
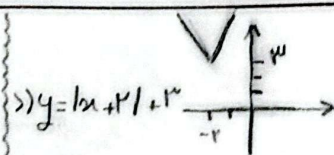
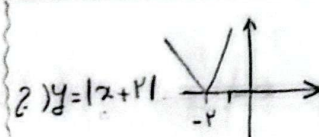
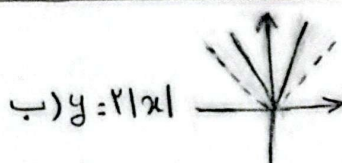
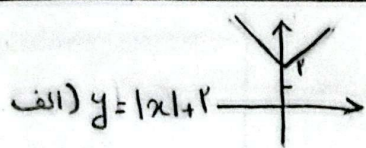
د) $y = \frac{x+f}{x^2-fx} = \frac{x+f}{x^2(x-2)} \rightarrow D = \mathbb{R} - \{0, \pm 2\} ; D = (-\infty, -2) \cup (-2, 0) \cup (0, 2) \cup (2, +\infty)$

الف) $y = \sqrt{4-x} + \sqrt{x-2} \rightarrow 4-x \geq 0 \rightarrow x \leq 4, x-2 \geq 0 \rightarrow x \geq 2 \Rightarrow 2 \leq x \leq 4 \rightarrow D = [2, 4]$

ب) $y = \frac{x^3+1}{x^2+1} \rightarrow D = \mathbb{R}$

ج) $y = \frac{\sqrt{x-2}}{x-f} \rightarrow x-f \neq 0 \rightarrow x \neq f, x-2 \geq 0 \rightarrow x \geq 2 \Rightarrow D = [2, f) \cup (f, +\infty)$

د) $y = \frac{x^3+3}{|x|+x^2} \rightarrow |x|+x^2 \neq 0 \rightarrow x \neq 0 \Rightarrow D = (-\infty, 0) \cup (0, +\infty)$



الف) $y = (x-2)(x-3)(x-4)$

$\frac{2}{-}$	$\frac{3}{+}$	$\frac{4}{-}$	$+$
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ب) $y = (x-2)(x-3)^2(x-4)$

$\frac{2}{+}$	$\frac{3}{-}$	$\frac{4}{-}$	$+$
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الف) $y = \frac{(x-2)(x-4)}{x-3}$

$\frac{2}{-}$	$\frac{3}{+}$	$\frac{4}{-}$	$+$
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ب) $y = \frac{(x-2)(x-4)}{(x-3)^2}$

$\frac{2}{+}$	$\frac{3}{-}$	$\frac{4}{-}$	$+$
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الف) $y = \frac{x^3-3x^2+2}{x-3} = \frac{(x-1)(x+2)}{x-3}$

$\frac{2}{+}$	$\frac{1}{-}$	$\frac{3}{-}$	$+$
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ب) $y = \frac{x^3-3x^2+2}{(x-1)(x-3)}$

$\frac{1}{+}$	$\frac{2}{+}$	$\frac{3}{-}$	$+$
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الف) $y = \frac{x^4 - x^2}{x^2 + x + 2} = \frac{x^2(x+1)(x-1)}{x^2 + x + 2} \leadsto x^2 + x + 2 > 0$
 $\Delta < 0 \quad \uparrow$

$$\begin{array}{c} -1 \quad 0 \quad 1 \\ \hline + \quad - \quad - \quad + \end{array}$$

ب) $y = \frac{x^4 + 3x + 4}{x^2 + 2x + 3} \leadsto x^2 + 3x + 4 > 0, x^2 + 2x + 3 > 0$
 $\Delta < 0 \quad \uparrow \quad \Delta < 0 \quad \uparrow \Rightarrow$ همواره مثبت

الف) $y = \sqrt{\frac{x^3 - 1}{x^3 - x}} = \sqrt{\frac{x^3 - 1}{x(x+1)(x-1)}}$

$$\begin{array}{c} -1 \quad 0 \quad 1 \\ \hline + \quad - \quad + \end{array}$$

$D = (-\infty, -1) \cup (0, 1) \cup (1, +\infty)$

ب) $y = \sqrt{\frac{x^2 - 14}{x^2 - 5x + 4}} = \sqrt{\frac{(x-4)(x+4)}{(x-1)(x-4)}}$

$$\begin{array}{c} -4 \quad 1 \quad 4 \\ \hline + \quad - \quad + \end{array}$$

$D = (-\infty, -4] \cup (1, 4) \cup (4, +\infty)$