

الف) $y = \frac{x+4}{4x^3 - 10x^2 + 11x - 10} = \frac{x+4}{(x-1)(4x^2 - 14x + 10)(x-1)(2x-3)(2x-5)}$

$Df = R - \{1, \frac{3}{2}, \frac{5}{2}\}$

ب) $y = \frac{x+3}{3x^3 - x^2 - 12x - 4} = \frac{x+3}{(x+1)(3x+2)(x-2)}$

$Df = R - \{-1, -\frac{2}{3}, 2\}$

الف) $y = \frac{x+1}{x - \sqrt{3-2x}}$

$Df = (-\infty, \frac{3}{2}] - \{1\}$

$\begin{aligned} 3-2x &\geq 0 \\ 3 &\geq 2x \\ \frac{3}{2} &\geq x \\ &\rightarrow (-\infty, \frac{3}{2}] \end{aligned}$

$x - \sqrt{3-2x} \neq 0$

$x \neq \sqrt{3-2x}$

$x^2 \neq 3-2x$

$x^2 + 2x - 3 \neq 0$

$(x+3)(x-1) \neq 0$

$\begin{aligned} &\text{ریشه ها} \\ &\begin{cases} x = -3 \\ x = 1 \end{cases} \end{aligned}$

ب) $y = \frac{x+2}{x - \sqrt{3x-2}}$

$Df = [\frac{2}{3}, +\infty) - \{1, 2\}$

$\begin{aligned} 3x-2 &\geq 0 \\ 3x &\geq 2 \\ x &\geq \frac{2}{3} \\ &\rightarrow [\frac{2}{3}, +\infty) \end{aligned}$

$x - \sqrt{3x-2} \neq 0$

$x^2 - 3x + 2 \neq 0$

$(x-1)(x-2) \neq 0$

$\begin{aligned} &\text{ریشه ها} \\ &\begin{cases} x = 1 \\ x = 2 \end{cases} \end{aligned}$

الف) $y = \frac{\sin x}{2\cos x - 1}$

$2\cos x \neq 1$

$\cos x \neq \frac{1}{2} \rightarrow 90^\circ, 330^\circ$

$Df = R - \{2k\pi + \frac{\pi}{3}, 2k\pi + \frac{5\pi}{3}\}$

ب) $y = \frac{\cos x + 1}{2\sin x + 1}$

$\sin x \neq -\frac{1}{2} \rightarrow 210^\circ, 330^\circ$

$Df = R - \{2k\pi + \frac{2\pi}{3}, 2k\pi + \frac{4\pi}{3}, 2k\pi + \pi, 2k\pi + \frac{5\pi}{3}\}$

ج) $y = \frac{\tan x + 2}{\cot x - 1}$

$\begin{aligned} \cot x &\neq 1 \rightarrow 45^\circ, 225^\circ \\ \sin &\neq 0 \rightarrow 0^\circ, 180^\circ, \cos \neq 0 \end{aligned}$

د) $y = \frac{\sin x + 1}{2\sin^2 x - 3}$

$\begin{aligned} 2\sin^2 x &\neq 3 \\ \sin^2 x &\neq \frac{3}{2} \rightarrow \sin \neq \pm \frac{\sqrt{6}}{2} \rightarrow 90^\circ, 150^\circ, 210^\circ, 330^\circ \end{aligned}$

$Df = R - \{k\pi \pm \frac{\pi}{3}\}$

الف) $x^2 - 9x + 4 > 0$ $(x-3)(x-2) > 0$ $\frac{2}{-} \frac{3}{+} \frac{4}{+}$ $(-\infty, 2) \cup (3, +\infty)$

ب) $x^2 - 4x + 5 < 0$ $(x-5)(x-1) < 0$ $\frac{1}{+} \frac{5}{-} \frac{4}{+}$ $(1, 5)$

ج) $x^2 + 4x + 5 \geq 0$ $(x+5)(x+1) \geq 0$ $\frac{-5}{+} \frac{-1}{-} \frac{4}{+}$ $(-\infty, -5] \cup [-1, +\infty)$

د) $x^2 - 7x + 4 \leq 0$ $(x-4)(x-1) \leq 0$ $\frac{1}{+} \frac{4}{-} \frac{7}{+}$ $[1, 4]$

$x < \frac{3}{2}$ $\begin{cases} \text{ریشه ها} \\ \text{و علامت} \end{cases}$

$x < \frac{1}{\frac{c}{a}} = \frac{a}{c}$

$x < \frac{-1}{-\frac{c}{a}} = \frac{a}{c} = 5$

$x < \frac{1}{\frac{c}{a}} = 4$

الف) $\frac{x^2 - 3x + 2}{x - 5} < 0$

$\frac{(x-1)(x-2)}{x-5} < 0$

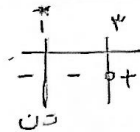
$\frac{1}{-} \frac{2}{+} \frac{5}{-}$ $(-\infty, 1) \cup (2, 5)$

ب) $\frac{x^2 - 1}{x^2 - 4x + 5} \geq 0$

$\frac{(x-1)(x+1)}{(x-1)(x-5)} \geq 0$

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

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



$$Df = [3, +\infty)$$

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

$$Df = \mathbb{R} - \{\pm 1\}$$

مكون فرجه فرد العت
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مفر باب

$$الف) y = \log(x^2 - 3x) \quad x^2 - 3x > 0 \quad + \quad - \quad + \quad Df = (-\infty, 0) \cup (3, +\infty)$$

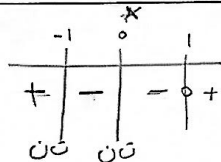
$$ب) y = \log \frac{4-x^2}{x^2-2} \quad \begin{array}{l} 4-x^2 > 0 \quad 4 > x^2 \quad 2 > x > -2 \\ x^2-2 > 0 \quad x^2 > 2 \quad x > \sqrt{2}, x < -\sqrt{2} \\ x^2-2 \neq 0 \quad x^2 \neq 2 \quad x \neq \pm \sqrt{2} \end{array} \quad Df = (-\sqrt{2}, -2) \cup (2, \sqrt{2}) - \{\pm \sqrt{2}\}$$

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$$ج) y = \log \frac{x^2 - 4x + 1}{x-3} \quad \frac{(x-4)(x-1)}{(x-3)} > 0 \quad x > 4 \quad 1 < x < 3 \quad 1 < x < 3 \quad 1 < x < 3 \quad Df = (4, 10) - \{9\}$$

$$د) y = \sqrt{x^2 - 11x + 18} + \log x \quad \sqrt{4-2x^2} \quad (x-4)(x-1) \geq 0 \rightarrow (-\infty, 4] \cup [1, +\infty) \quad Df = (0, 4) - \{1\}$$

$$y = \frac{x^2 - x}{x^2 + 2}$$



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

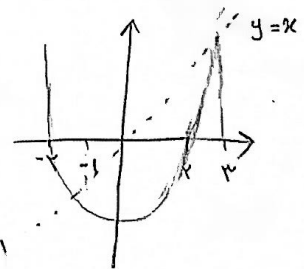
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x	-1	0	1
$x^2 - x$	+	+	-
$x^2 + x$	+	+	+
P	+	-	+

$$y = \sqrt{\frac{x-f(x)}{f(x)}} \quad f(x) \neq 0 \quad \begin{cases} f(x) = 0 \rightarrow x = 2 \\ f(x) = 0 \rightarrow x = -2 \end{cases}$$

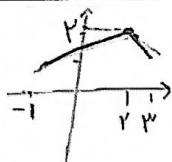
$$x - f(x) = 0 \rightarrow x = f(x) \rightarrow x = 3, -1$$

$$Df = (-2, 1] \cup (2, 3)$$

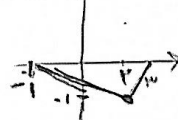


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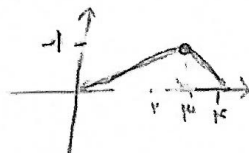
$$الف) f(x) + 1 =$$



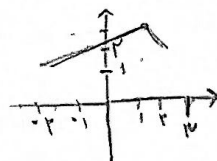
$$ج) -f(x)$$



$$ب) f(x-1)$$



$$د) f(x+1) + 2$$



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