

الف) $f(x) = 2x^3 - 20x^2 + 31x + 15 \mid \frac{x-1}{2x^2 - 17x + 15} \Rightarrow (x-1)(2x-1)(2x-15) \neq 0$.
 * جميع مقامات $\neq 0$ $\rightarrow Df = \mathbb{R} - \{1, \frac{1}{2}, \frac{15}{2}\}$

ب) $3x^3 - x^2 - 11x - 4 \neq 0 \Rightarrow 3x^3 - x^2 - 11x - 4 \mid \frac{x+1}{3x^2 - 4x - 4}$
 $\hookrightarrow (x+1)(3x^2 - 4x - 4) \neq 0 \Rightarrow Df \Rightarrow R = \{ -1 \}$ و $f(-1) = 1$
 * فرایه کان های زوج در جدول

الف) $3-2x > 0 \Rightarrow 2x \leq 3 \Rightarrow x \leq \frac{3}{2}$

$\Delta = 1^2 + 4 \Rightarrow x = \frac{1 \pm \sqrt{5}}{2}$

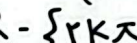
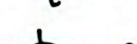
$x - \sqrt{3-2x} \neq 0 \Rightarrow x \neq \sqrt{3-2x} \Rightarrow x^2 \neq 3-2x \Rightarrow x^2 + 2x - 3 \neq 0 \Rightarrow$

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

$x \neq \{-3, 1\}$

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

$$\begin{aligned} & \text{b.) } r_x - r > 0 \Rightarrow r_x > r \Rightarrow x > \frac{r}{r} \\ & x - \sqrt{r_x - r} \neq 0 \Rightarrow x \neq \sqrt{r_x - r} \Rightarrow x^2 \neq r_x - r \Rightarrow x^2 - r_x + r \neq 0 \Rightarrow Df = \left[\frac{r}{r}, \infty \right) \end{aligned}$$

ا) $r(\cos x - 1) \neq 0 \Rightarrow \cos x \neq 1$  $R - \{x = 2k\pi, x = (2k+1)\pi\}$
 ب) $r(\sin x + 1) \neq 0 \Rightarrow \sin x \neq -1$  $R - \{x = (2k+1)\pi\}$
 ج) $\cos x \neq 1$ $\sin x \neq 0$ $\cos x \neq -1$  $R - \{x = 2k\pi, x = (2k+1)\pi\}$
 د) $r \sin^2 x - 3 \neq 0 \Rightarrow \sin^2 x \neq \frac{3}{r} \Rightarrow \sin x \neq \pm \frac{\sqrt{r}}{r}$  $R - \{x = 2k\pi, x = (2k+1)\pi\}$

$$) \quad x^2 - 4x + 9 > 0 \Rightarrow (x-2)(x-3) > 0 \quad \begin{array}{c|cc} & 2 & 3 \\ \hline p(x) & + & - & + \end{array} \quad Df = (-\infty, 2) \cup (3, \infty)$$

$$1) x^2 - 9x + 10 < 0 \Rightarrow (x-1)(x-9) < 0 \Rightarrow \frac{1}{P(x)} \mid \frac{1}{x-1} - \frac{9}{x-9} \Rightarrow (1, 9) = Df$$

3) $x^2 + 9x + 20 \geq 0 \Rightarrow (x+1)(x+20) \frac{1 - 0 - 1}{p(x) + p - p +}$ $Df = (-\infty, -20] \cup [0, \infty)$

g) $x^2 - 4x + 4 \leq 0 \Rightarrow (x-1)(x-4)$

	1	4
$p(x)$	+	-

 $df = [1, 4]$

$$21) \frac{x^2 - 3x + 2}{x - 2} < \frac{(x-1)(x-2)}{x-2} < \frac{1}{p(x)} \begin{array}{c|c|c|c} 1 & 2 & 0 \\ \hline - & + & - & + \end{array} \Rightarrow Df = (2, 0) \cup (-\infty, 1)$$

ج) $\frac{(x-1)(x+1)}{(x-1)(x-0)} \geq 0$ $x \begin{matrix} / & 1^* \\ & -1 \\ & \backslash & 0 \end{matrix}$ $\begin{array}{c|cccc} & -1 & 1 & 0 & \\ \hline p(x) & + & - & + & + \end{array}$ $pf = (-\infty, -1] \cup (0, \infty)$

$$الف) = \sqrt{\frac{(x-1)(x-3)}{x^2-1}} \quad x \begin{cases} < -1 \\ > 3 \end{cases} \quad \begin{array}{c|ccc} & -1 & 1 & 3 \\ \hline p(x) & - & + & - \end{array} \quad Df = [2, \infty)$$

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ب) $\sqrt{\frac{x^2-4x+4}{x^2-1}} \Rightarrow x^2-1 \neq 0 \Rightarrow x^2 \neq 1 \Rightarrow x \neq \{1, -1\} \Rightarrow Df = \mathbb{R} - \{1, -1\}$

الف) $x^2-3x > 0 \Rightarrow x(x-3) > 0 \quad \begin{array}{c|cc} & 3 \\ \hline p(x) & + & - \end{array} \Rightarrow Df = (-\infty, 0) \cup (3, \infty)$

ب) $19-x^2 > 0 \Rightarrow x^2 < 19 \Rightarrow -\sqrt{19} < x < \sqrt{19} \Rightarrow Df = (-\sqrt{19}, \sqrt{19}) - \{-3, 3\}$
 $x \neq \{3, -3\}$

ج) $\frac{x^2-7x+12}{x-2} > 0 \quad \frac{(x-3)(x-4)}{x-2} > 0 \quad \begin{array}{c|ccc} & 2 & 3 & 4 \\ \hline p(x) & - & + & - \end{array} \quad x \neq 2 \Rightarrow Df = (2, \infty) - \{3\}$

د) $x^2-11x+28 > 0 \Rightarrow (x-4)(x-7) > 0 \quad \begin{array}{c|cc} & 4 & 7 \\ \hline p(x) & + & - \end{array} \quad \sqrt{19-x^2} > 0 \Rightarrow 19-x^2 > 0 \Rightarrow x^2 < 19 \Rightarrow -\sqrt{19} < x < \sqrt{19} \Rightarrow Df = (-\sqrt{19}, \sqrt{19})$

$\frac{x^2-x}{x^2+x}$ آیهانی
 $x \begin{cases} < -1 \\ > 1 \end{cases}$

	-1	0	1
x^2-x	+	+	-
x^2+x	+	+	+
$p(x)$	+	+	+

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$x \begin{cases} < -1 \\ > 1 \end{cases}$ ستی

	-1	0	1
$p(x)$	+	+	+

$y = \sqrt{\frac{x-f(x)}{f(x)}}$

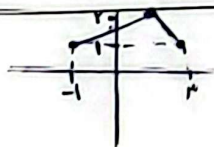
$x \begin{cases} < -1 \\ > 1 \end{cases}$

	-2	-1	2	3
$p(x)$	-	+	-	+

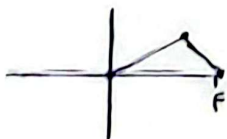
$Df = [-2, -1] \cup (2, 3]$

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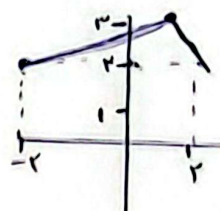
الف) $f(x) + 1$



ب) $f(x-1)$



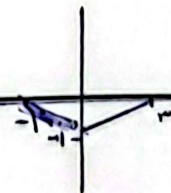
د) $f(x+1) + 2$



ج) $-f(x)$



$-f(x) =$



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