

الف) $x^3 - 2x^2 + 11x - 10 \neq 0 \rightarrow (x-1)(x^2 - 16x + 10) \neq 0 \rightarrow x-1 \neq 0 \rightarrow x \neq 1$ (I)
 بار دیگر $x^2 - 16x + 10 \neq 0 \rightarrow (x-10)(x-1) \neq 0 \rightarrow x \neq 10, x \neq 1$
 $\frac{10}{x} = 10 \rightarrow x = 10$ (II) $\frac{10}{x} = 10 \rightarrow x = 10$ (III) $\frac{10}{x} = 10 \rightarrow x = 10$
 $D_f = \mathbb{R} - \{1, 10, 10, 10\}$

ب) $x^3 - x^2 - 12x - 6 \neq 0 \rightarrow (x+1)(x^2 - 2x - 6) \neq 0 \rightarrow x+1 \neq 0 \rightarrow x \neq -1$
 $x^2 - 2x - 6 \neq 0 \rightarrow x^2 - 2x - 11 \neq 0 \rightarrow x \neq \frac{2 \pm \sqrt{4+44}}{2} = \frac{2 \pm \sqrt{48}}{2} = 1 \pm 2\sqrt{3}$
 $\rightarrow D_f = \mathbb{R} - \{-1, 1+2\sqrt{3}, 1-2\sqrt{3}\}$

الف) $\begin{cases} \text{محدودیت رادیکال} \rightarrow 3-2x \geq 0 \rightarrow 2x \leq 3 \rightarrow x \leq \frac{3}{2} \\ \text{مخرج نباید صفر شود} \rightarrow x - \sqrt{3-2x} \neq 0 \rightarrow x \neq \sqrt{3-2x} \rightarrow x^2 \neq 3-2x \rightarrow x^2 + 2x - 3 \neq 0 \end{cases}$
 $\rightarrow \begin{cases} x \neq 1 \rightarrow 1 - \sqrt{3-2} = 0 \checkmark \\ x \neq -3 \rightarrow -3 - \sqrt{3+6} = -3 - 3 = -6 \neq 0 \end{cases} \rightarrow D_f = (-\infty, 1) \cup (1, \frac{3}{2}]$
 ب) $\begin{cases} \text{محدودیت رادیکال} \rightarrow 2x-2 \geq 0 \rightarrow 2x \geq 2 \rightarrow x \geq 1 \\ \text{مخرج نباید صفر شود} \rightarrow x - \sqrt{2x-2} \neq 0 \rightarrow x \neq \sqrt{2x-2} \rightarrow x^2 \neq 2x-2 \rightarrow x^2 - 2x + 2 \neq 0 \end{cases}$
 $\rightarrow \begin{cases} x \neq 1 \rightarrow 1 - \sqrt{2-2} = 0 \checkmark \\ x \neq 2 \rightarrow 2 - \sqrt{4-2} = 2 - \sqrt{2} \neq 0 \end{cases} \rightarrow D_f = [1, 2) \cup (2, +\infty)$

الف) $2\cos x - 1 \neq 0 \rightarrow 2\cos x \neq 1 \rightarrow \cos x \neq \frac{1}{2} \rightarrow D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{3}, 2k\pi + \frac{5\pi}{3}\}$
 ب) $2\sin x + 1 \neq 0 \rightarrow 2\sin x \neq -1 \rightarrow \sin x \neq -\frac{1}{2} \rightarrow D_f = \mathbb{R} - \{2k\pi + \frac{7\pi}{6}, 2k\pi + \frac{11\pi}{6}\}$
 ج) $\begin{cases} \cos x \neq 0, \sin x \neq 0 \rightarrow x \neq k\pi + \frac{\pi}{2}, x \neq k\pi \\ \cot x - 1 \neq 0 \rightarrow \cot x \neq 1 \rightarrow x \neq k\pi + \frac{\pi}{4} \end{cases} \rightarrow D_f = \mathbb{R} - \{k\pi, k\pi + \frac{\pi}{2}, k\pi + \frac{\pi}{4}\}$
 د) $5\sin^2 x - 2 \neq 0 \rightarrow 5\sin^2 x \neq 2 \rightarrow \sin^2 x \neq \frac{2}{5} \rightarrow \sin x \neq \pm \sqrt{\frac{2}{5}} \rightarrow \sin x \neq \pm \frac{\sqrt{10}}{5}$
 $\rightarrow D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{5}, 2k\pi + \frac{4\pi}{5}, 2k\pi + \frac{3\pi}{5}, 2k\pi + \frac{7\pi}{5}\}$

الف) $x^2 - 5x + 6 > 0 \rightarrow (x-2)(x-3) > 0 \rightarrow \frac{1}{x-2} > \frac{1}{x-3} \rightarrow D_f = (-\infty, 2) \cup (3, +\infty)$

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

ج) $x^2 + 6x + 9 \geq 0 \rightarrow (x+3)(x+3) \geq 0 \rightarrow \frac{1}{x+3} \geq \frac{1}{x+3} \rightarrow D_f = (-\infty, -3] \cup [-3, +\infty)$

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

الف) $\frac{x^2 - 2x + 2}{x-2} < 0 \rightarrow \frac{(x-1)(x-1)}{x-2} < 0 \rightarrow \frac{1}{x-2} < \frac{1}{x-1} \rightarrow D_f = (-\infty, 2) \cup (1, 2)$

ب) $\frac{x^2 - 1}{x^2 - 6x + 9} \geq 0 \rightarrow \frac{x^2 - 1}{(x-3)(x-3)} \geq 0 \rightarrow \frac{-1}{x-3} \geq \frac{1}{x-3} \rightarrow D_f = (-\infty, -1] \cup (3, +\infty)$

الف) $\frac{x^2 - 4x + 3}{x^3 - 1} \geq 0 \rightarrow \frac{(x-3)(x-1)}{x^3 - 1} \geq 0 \rightarrow \frac{+}{-} \frac{+}{-} \frac{+}{+}$ $D_f = (-\infty, 1) \cup (1, 3]$
 $x^3 - 1 \neq 0 \rightarrow x^3 \neq 1 \rightarrow x \neq 1$

ب) $\left. \begin{array}{l} \text{چون فرجه ۳ است زیرا اعداد} \\ \text{محدودیتی نداریم فقط مخرج} \\ \text{نباید صفر شود} \end{array} \right\} \rightarrow x^2 - 1 \neq 0 \rightarrow x^2 \neq 1 \rightarrow x \neq \pm 1$ $D_f = \mathbb{R} - \{\pm 1\}$

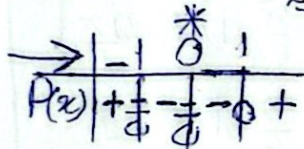
الف) $x^2 - 3x > 0 \rightarrow x(x-3) > 0 \rightarrow \frac{+}{+} \frac{+}{-} \frac{+}{+}$ $D_f = (-\infty, 0) \cup (3, +\infty)$

ب) $\left\{ \begin{array}{l} 12 - x^2 > 0 \rightarrow x^2 < 12 \rightarrow -4 < x < 4 \\ |x| - 2 > 0 \rightarrow |x| > 2 \rightarrow x > 2 \\ |x| - 2 \neq 1 \rightarrow |x| \neq 3 \rightarrow x \neq \pm 3 \end{array} \right\} D_f = (2, 4) \cup (-2, -4) - \{3, -3\}$

ج) $\left\{ \begin{array}{l} (x-3)(x-5) > 0 \rightarrow \frac{+}{+} \frac{+}{-} \frac{+}{+} \\ 10 - x > 0 \rightarrow x < 10 \\ 10 - x \neq 1 \rightarrow x \neq 9 \end{array} \right\} D_f = (4, 10) - \{9\}$

د) $(x-4)(x-7) \geq 0 \rightarrow \frac{+}{+} \frac{+}{-} \frac{+}{+}$ $D_f = (-\infty, 4] \cup [7, +\infty)$

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

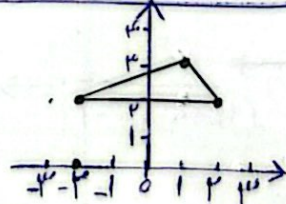
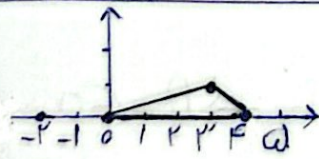
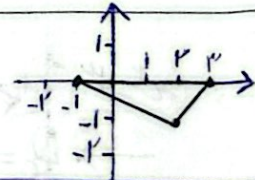
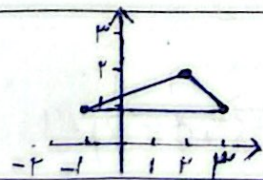


	-	0	+
$x^2 - x$	+	+	-
$x^2 + x$	+	+	-
$P(x)$	+	+	-

باید علامت تعیین کنیم
 یا باید صورت و مخرج هر دو مثبت باشند
 یا باید هر دو منفی باشند

	-2	-1	2	3
$x-4$	-	-	+	+
$x-7$	+	+	-	-
P	-	+	-	+

از جدول تعیین علامت $D_f = (-2, -1] \cup (2, 3]$



از فرجه اول و دوم اکثر اعدادی که می بینیم و با این $D_f = (0, 4] - \{1\}$

وال کافیت د