

الف) $\frac{x+3}{x^3-10x^2+31x-15} \Rightarrow x^3-10x^2+31x-15 \neq 0$ باقی‌مانده ۱، ۵، ۷، ۱۵
 $D_f = \mathbb{R} - \{0, 5, 1, 7, 15\}$
 $x^3-10x^2+31x-15 = (x-1)(x-5)(x-3)$

ب) $\frac{x+3}{x^3-x^2-11x-4} \Rightarrow x^3-x^2-11x-4 \neq 0$ باقی‌مانده ۱، ۲، ۳، ۴
 $x^3-x^2-11x-4 = (x-4)(x+1)(x+1)$
 $D_f = \mathbb{R} - \{1, -1, -\frac{1}{2}, -\frac{1}{4}\}$

Polynomial division for $x^3-10x^2+31x-15$ by $x-1$ and $x-5$ to find factors.

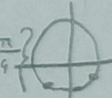
الف) $y = \frac{x+1}{x-\sqrt{3-2x}} \Rightarrow$
 ① $3-2x \geq 0 \Rightarrow -2x \geq -3 \Rightarrow 2x \leq 3 \Rightarrow x \leq \frac{3}{2}$
 ② $x-\sqrt{3-2x} \neq 0 \Rightarrow x \neq \sqrt{3-2x} \Rightarrow x^2 \neq 3-2x \Rightarrow x^2+2x-3 \neq 0 \Rightarrow (x+3)(x-1) \neq 0 \Rightarrow x \neq -3, x \neq 1$
 $D_f = [0, 1) \cup (1, 1.5]$

ب) $y = \frac{x+2}{x-\sqrt{3x-2}} \Rightarrow$
 ① $3x-2 \geq 0 \Rightarrow 3x \geq 2 \Rightarrow x \geq \frac{2}{3}$
 ② $x-\sqrt{3x-2} \neq 0 \Rightarrow x \neq \sqrt{3x-2} \Rightarrow x^2 \neq 3x-2 \Rightarrow x^2-3x+2 \neq 0 \Rightarrow (x-1)(x-2) \neq 0 \Rightarrow x \neq 1, x \neq 2$
 $D_f = [\frac{2}{3}, +\infty) - \{1, 2\}$

الف) $y = \frac{\sin x}{2\cos x - 1} \Rightarrow 2\cos x - 1 \neq 0 \Rightarrow 2\cos x \neq 1 \Rightarrow \cos x \neq \frac{1}{2}$
 $D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{3}, 2k\pi - \frac{\pi}{3}\}$



ب) $y = \frac{\cos x + 1}{2\sin x + 1} \Rightarrow 2\sin x + 1 \neq 0 \Rightarrow 2\sin x \neq -1 \Rightarrow \sin x \neq -\frac{1}{2}$
 $D_f = \mathbb{R} - \{2k\pi - \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}\}$



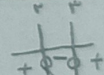
ج) $y = \frac{\tan x + 2}{\cot x - 1} \Rightarrow \cot x - 1 \neq 0 \Rightarrow \frac{\cos x}{\sin x} - 1 \neq 0 \Rightarrow \frac{\cos x - \sin x}{\sin x} \neq 0 \Rightarrow \cos x \neq \sin x$
 $D_f = \mathbb{R} - \{k\pi, k\pi + \frac{\pi}{4}\}$



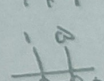
د) $y = \frac{\sin x + 1}{2\sin^2 x - 3} \Rightarrow 2\sin^2 x - 3 \neq 0 \Rightarrow 2\sin^2 x \neq 3 \Rightarrow \sin^2 x \neq \frac{3}{2} \Rightarrow \sin x \neq \pm \sqrt{\frac{3}{2}}$
 $D_f = \mathbb{R} - \{2k\pi + \frac{\pi}{2}, 2k\pi + \frac{3\pi}{2}\}$



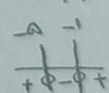
الف) $x^2-5x+4 > 0 \Rightarrow (x-1)(x-4) > 0 \Rightarrow D_f = (-\infty, 1) \cup (4, +\infty)$



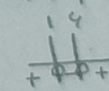
ب) $x^2-4x+5 < 0 \Rightarrow (x-1)(x-5) < 0 \Rightarrow D_f = (1, 5)$



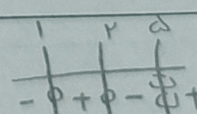
ج) $x^2+4x+5 \geq 0 \Rightarrow (x+1)(x+5) \geq 0 \Rightarrow D_f = (-\infty, -5] \cup [-1, +\infty)$



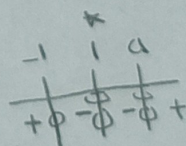
د) $x^2-11x+4 \leq 0 \Rightarrow (x-1)(x-4) \leq 0 \Rightarrow D_f = [1, 4]$



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



ب) $\frac{x^2-1}{x^2-4+5} \geq 0 \Rightarrow \frac{(x-1)(x+1)}{(x-1)(x-5)} \geq 0 \Rightarrow D_f = (-\infty, -1] \cup (5, +\infty)$



$$\begin{array}{r} + \\ - \end{array}$$

$$D_f = 1R - \{ \pm 1 \}$$

$$D_f = (r, f) \cup (-f, -r)$$

下上

$\frac{1}{2}$

دس سترع :

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

روشن آید، همانی :

$$x \in (-1, 4)$$

$$x \in (-\infty, -1) \cup (3, +\infty)$$

$$D_f = (0, 2)$$

(الف)

$$\gg f(x+1) + r$$