

الف) $y = \frac{x+1}{4x^3 - 2x^2 + 21x - 15} \Rightarrow \frac{x+1}{(x-1)(4x^2 - 14x + 15)} = \frac{x+1}{(x-1)(2x-3)(2x-5)}$

عبارت بر $(x-1)$ ب ب است

$D_f = \mathbb{R} - \{1, 1/5, 2/5\}$

حل: $x=1$, $x=\frac{3}{2}=1/5$, $x=\frac{5}{2}=2/5$

ب) $y = \frac{x+3}{3x^3 - x^2 - 8x - 4} \Rightarrow \frac{x+3}{(x+1)(3x^2 - 4x - 4)}$

عبارت بر $(x+1)$ ب ب است

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

حل: $x=-1$, $x=\frac{2}{3}$, $x=2$

عبارت بر $(x+2)(x-2)$ ب ب است

$x = \frac{-2}{3}$, $x = 2$

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

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

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

$x^2 = 3-2x \Rightarrow x^2 + 2x - 3 = 0$

$(x+3)(x-1) = 0$

$x = -3$, $x = 1$

$\sqrt{3-2x} \geq 0 \Rightarrow 3-2x \geq 0$

$3 \geq 2x$

$\frac{3}{2} \geq x$

$x = 1$

$\frac{1+1}{1-\sqrt{3-2}} = \frac{2}{1-\sqrt{1}} = \frac{2}{1-1} = \frac{2}{0}$

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

ب) $y = \frac{x+2}{x - \sqrt{3x-2}}$

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

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

$x^2 = 3x-2 \Rightarrow x^2 - 3x + 2 = 0$

$(x-1)(x-2) = 0$

$x = 1$, $x = 2$

$\sqrt{3x-2} \geq 0 \Rightarrow 3x-2 \geq 0$

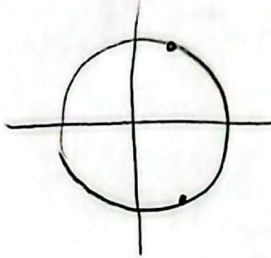
$3x \geq 2$

$x \geq \frac{2}{3}$

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

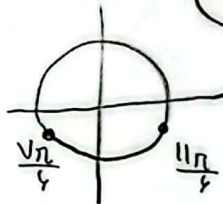
الف) $y = \frac{\sin x}{r \cos x - 1} \Rightarrow r \cos x - 1 \neq 0 \quad r \cos x \neq 1 \quad (\cos x \neq \frac{1}{r})$ (3)

$D_f = \mathbb{R} - \left\{ 2k\pi \pm \frac{\pi}{r} \right\}$



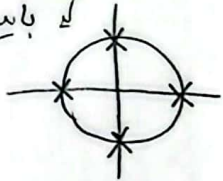
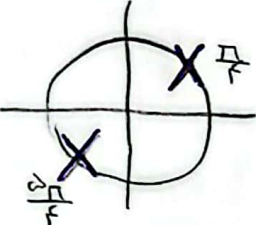
ب) $y = \frac{\cos x + 1}{r \sin x + 1} \quad r \sin x + 1 \neq 0 \quad r \sin x \neq -1 \quad (\sin x \neq -\frac{1}{r})$

$D_f = \mathbb{R} - \left\{ 2k\pi + \frac{\pi}{r}, 2k\pi + \frac{3\pi}{r} \right\}$



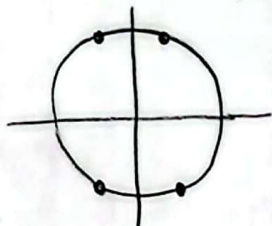
ج) $y = \frac{\tan x + r}{\cot x - 1} \Rightarrow \cot x - 1 \neq 0 \quad \cot x \neq 1$

$D_f = \mathbb{R} - \left\{ \frac{k\pi}{r}, k\pi + \frac{\pi}{r} \right\}$

د) $y = \frac{\sin^2 x + 1}{r \sin^2 x - r} \Rightarrow r \sin^2 x - r \neq 0 \quad r \sin^2 x \neq r \quad \sin^2 x \neq \frac{r}{r} \Rightarrow \sin x \neq \pm \sqrt{\frac{r}{r}}$

$D_f = \mathbb{R} - \left\{ 2k\pi + \frac{\pi}{r}, 2k\pi + \frac{2\pi}{r}, 2k\pi + \frac{3\pi}{r}, 2k\pi + \frac{4\pi}{r} \right\}$



الف) $x^2 - 2x + 1 > 0$
 $(x-1)(x-1) > 0$

	1	1	
+	-	+	

 $(-\infty, 1) \cup (1, +\infty)$
 (4)

ب) $x^2 - 4x + 4 < 0$
 $(x-1)(x-4) < 0$

	1	4	
+	-	+	

 $(1, 4)$

$$:) x^2 + 4x + 5 \geq 0$$

$$(x+1)(x+5) \geq 0$$

$$\begin{array}{c|c|c} -5 & -1 & \\ \hline + & - & + \end{array}$$

$$(-\infty, -5] \cup [-1, +\infty)$$

$$:) x^2 - 4x + 4 \leq 0$$

$$(x-1)(x-4) \leq 0$$

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

$$[1, 4]$$

$$ا) \frac{x^2 - 3x + 2}{x - 2} < 0 \Rightarrow \frac{(x-1)(x-2)}{x-2} < 0$$

$$\begin{array}{c|c|c|c} 1 & 2 & 2 & \\ \hline - & + & - & + \end{array}$$

$$(-\infty, 1) \cup (2, 2)$$

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

$$\frac{(x-1)(x+1)}{(x-1)(x-2)} \geq 0$$

$$\begin{array}{c|c|c|c} -1 & 1 & 2 & \\ \hline + & - & - & + \end{array}$$

$$(-\infty, -1] \cup (2, +\infty)$$

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

$$\begin{array}{c|c|c} 1 & 3 & \\ \hline - & - & + \end{array}$$

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

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

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

$$ا) y = \log(x^2 - 3x)$$

$$x^2 - 3x > 0$$

$$x(x-3) > 0$$

$$\begin{array}{c|c|c} 0 & 3 & \\ \hline + & - & + \end{array}$$

$$(-\infty, 0) \cup (3, +\infty)$$

$$ب) y = \log \frac{14 - x^2}{|x| - 2}$$

$$(14 - x^2) > 0$$

$$|x| - 2 \neq 0$$

$$|x| > 2$$

$$-2 > x > 2$$

$$x \neq \pm 3$$

$$D_f = (-4, -2) \cup (2, 4) - \{\pm 3\}$$

$$y = \log_{1-x} \frac{x^r - vx + 1r}{x-r}$$

$$\frac{(x-r)(x-r)}{x-r} = \frac{r}{-} \frac{r}{+}$$

$1-x > 0 \quad x < 1$
 $1-x \neq 1 \quad 1-1 \neq x \quad \boxed{x \neq 0}$

$D_f = (r, 0) \cup (0, 1)$

$$y = \sqrt{x^r - 11x + 1r} + \log_x \sqrt{r^2 - x^r} \quad \sqrt{(r-x)(r+x)} > 0$$

$$\begin{array}{c|c|c} r & & v \\ \hline + & - & + \end{array}$$

$\sqrt{(x-r)(x-v)}$

$(x-r)(x-v) \geq 0$

$(-\infty, r] \cup [v, +\infty)$

$D_f = (0, r] - \{1\}$

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

	-1	0	1
x	-	-	+
$x-1$	-	-	-
x	-	-	+
$x+1$	-	+	+
y	+	-	+

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

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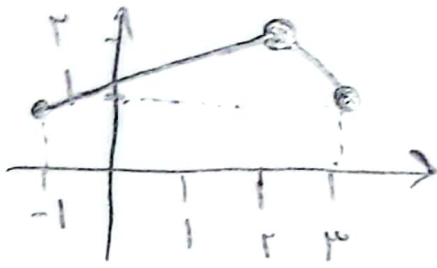
$$y = \sqrt{\frac{x-f(x)}{f(x)}}$$

	-r	-1	r	r
$f(x)$	+	-	-	+
$x-f(x)$	+	+	-	-
y	+	-	+	-

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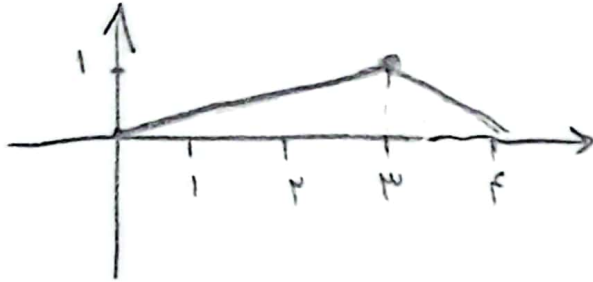
$D_f = (-\infty, -r) \cup [-1, r) \cup [r, +\infty)$

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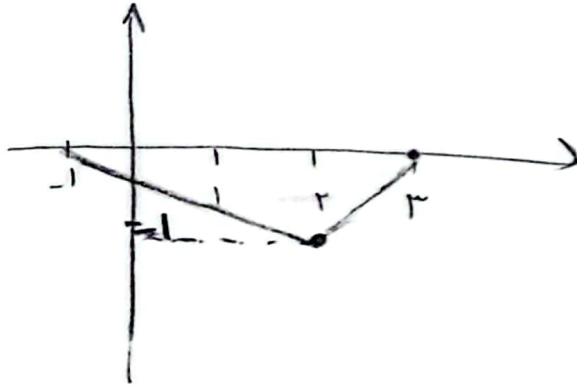


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