

الف) $\frac{x+4}{3x^3-2x^2+31x-10} \rightarrow 3x^3-2x^2+31x-10 = (x-1)(3x^2-14x+10) \quad x \neq 1$

$3x^2-14x+10 \Rightarrow x^2-14x+40 \rightarrow (x-4)(x-10) \rightarrow x \neq \frac{4}{3}, \frac{10}{3}$
 $\rightarrow Df = R - \{1, 0, \frac{4}{3}, \frac{10}{3}\}$ **جواب**

ب) $\frac{x+3}{3x^3-x^2-18x-4} \rightarrow 3x^3-x^2-18x-4 = (x+1)(3x^2-4x-4) \quad x \neq -1$
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$3x^2-4x-4 \rightarrow x^2-4x-12 = (x-6)(x+2) \rightarrow x \neq \frac{6}{3}, -\frac{2}{3}$

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

الف) $\frac{x+1}{x-\sqrt{3-2x}} \rightarrow x-\sqrt{3-2x} \neq 0 \text{ و } 3-2x \geq 0$ **-2**

$3-2x \geq 0 \rightarrow 3 \geq 2x \rightarrow 1.5 \geq x$

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

$x^2+2x-3 = (x-1)(x+3) \neq 0 \rightarrow x \neq 1, -3$

TANDIS $\rightarrow Df = (-\infty, +1, 0] - \{1, -3\}$

Subject:

Date:

$$ب) \frac{x+r}{x-\sqrt{rx-r}} \rightarrow rx-r \geq 0 \rightarrow rx \geq r, x \geq \frac{r}{r}$$

$$x-\sqrt{rx-r} \neq 0 \rightarrow x \neq \sqrt{rx-r} \rightarrow x^2 \neq rx-r \rightarrow x^2-rx+r \neq 0$$

$$\rightarrow (x-1)(x-r) \neq 0 \rightarrow x \neq 1, r \rightarrow \text{DF} = \left\{ \frac{r}{r}, +\infty \right\} - \{1, r\}$$

$$الف) y = \frac{\sin x}{r \cos x - 1} \rightarrow r \cos x - 1 \neq 0 \rightarrow r \cos x \neq 1 \rightarrow \cos x \neq \frac{1}{r}$$

$$\rightarrow \text{DF} = \left\{ r\pi + \frac{\pi}{r}, r\pi + \frac{\Delta\pi}{r} \right\} = R - \left\{ r\pi + \frac{\pi}{r}, r\pi + \frac{\Delta\pi}{r} \right\}$$

$\Delta r\pi + \frac{\pi}{r}$

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

$$\rightarrow \text{DF} = \left\{ r\pi + \frac{\pi}{r}, r\pi + \frac{11\pi}{r} \right\} = R - \left\{ r\pi + \frac{\pi}{r}, r\pi + \frac{11\pi}{r} \right\}$$

$$ج) y = \frac{\tan x + r}{\cot x - 1} \quad \text{cot, tan, sec, csc, tan, cot, sec, csc} \rightarrow \cot x - 1 \neq 0 \rightarrow \cot x \neq 1$$

$$\rightarrow \text{DF} = R - \left\{ \pi, \pi + \frac{1}{r}, \pi + \frac{\pi}{r} \right\}$$

$$د) y = \frac{\sin x + 1}{r \sin^2 x - r} \rightarrow r \sin^2 x - r \neq 0 \rightarrow r \sin^2 x \neq r \rightarrow \sin^2 x \neq \frac{r}{r}$$

$$\sin^2 x \neq \frac{r}{r}$$

$$\rightarrow \text{DF} = R - \left\{ r\pi + \frac{\pi}{r}, r\pi + \frac{\pi}{r} \right\}$$

$$a) x^2 - 0x + 9 > 0 \rightarrow (x-2)(x-3) > 0 \rightarrow$$

$$\begin{array}{c|cc} x & 2 & 3 \\ \hline + & - & + \end{array} \rightarrow Df = (2, +\infty) \cup (-\infty, 2)$$

$$b) x^2 - 9x + 0 < 0 \rightarrow (x-0)(x-1) < 0 \rightarrow$$

$$\begin{array}{c|cc} x & 0 & 1 \\ \hline + & - & + \end{array} \rightarrow Df = (0, 1)$$

$$c) x^2 + 9x + 0 \geq 0 \rightarrow (x+0)(x+1) \geq 0 \rightarrow \begin{array}{c|cc} x & -0 & -1 \\ \hline + & - & + \end{array}$$

$$\rightarrow Df = (-\infty, -1] \cup [0, +\infty)$$

$$d) x^2 - 9x + 9 \leq 0 \rightarrow (x-1)(x-9) \leq 0 \rightarrow \begin{array}{c|cc} x & 1 & 9 \\ \hline + & - & + \end{array}$$

$$\rightarrow Df = [1, 9]$$

الف) $\frac{x^r - rx + r}{x-0} < 0 \rightarrow \frac{(x-r)(x-1)}{x-0} < 0 \rightarrow$ $\begin{array}{c|ccc} x & 1 & r & 0 \\ \hline & - & + & - \end{array}$
 $\rightarrow Df = (-\infty, 1) \cup (r, \infty)$

ب) $\frac{x^r - 1}{x^r - 9x + 0} \geq 0 \rightarrow \frac{x^r - 1}{(x-0)(x-1)} \geq 0 \rightarrow$ $\begin{array}{c|ccc} x & -1 & 1 & 0 \\ \hline & + & - & - \end{array}$
 $\rightarrow Df = (-\infty, -1] \cup (1, +\infty)$

الف) $y = \sqrt{\frac{x^r - rx + r}{x^r - 1}} \rightarrow \frac{x^r - rx + r}{x^r - 1} \geq 0 \rightarrow \frac{(x-r)(x-1)}{(x^r - 1)} \geq 0$
 $\rightarrow \begin{array}{c|ccc} x & 1 & r & \\ \hline & - & + & \end{array} \rightarrow Df = [r, +\infty)$

ب) $y = \sqrt[3]{\frac{x^r - rx + r}{x^r - 1}} \rightarrow x^r - 1 \neq 0 \rightarrow x^r \neq 1 \rightarrow x \neq 1, -1$
 $\rightarrow Df = \mathbb{R} - \{1, -1\}$

الف) $y = \log(x^r - rx) \rightarrow x^r - rx > 0 \rightarrow x(x^r - r) > 0$
 $\rightarrow Df = \frac{x}{x^r - r} \rightarrow Df = (-\infty, 0) \cup (r, +\infty)$

ب) $y = \log_{|x|-r}^{19-x^r} \rightarrow 19-x^r > 0 \rightarrow 19 > x^r \rightarrow -\sqrt[4]{19} < x < \sqrt[4]{19}$

$|x|-r > 0 \rightarrow |x| > r \rightarrow x > r \text{ و } x < -r$ و $|x|-r \neq 1 \rightarrow |x| \neq r+1$
 $\rightarrow x \neq r+1 \text{ و } x \neq -r-1 \rightarrow Df = (-\sqrt[4]{19}, -r-1) \cup (r, \sqrt[4]{19}) - \{r+1, -r-1\}$

ج) $y = \log \frac{x^r - vx + 1r}{1-x} \rightarrow \frac{x^r - vx + 1r}{1-x} > 0 \rightarrow \frac{(x-r)(x-r)}{1-x} > 0$

$\frac{x}{1-x} \begin{matrix} * \\ r & r \end{matrix}$ و $1-x > 0 \rightarrow 1 > x$

$1-x \neq 0 \rightarrow x \neq 1 \rightarrow Df = (r, 1) - \{1\}$

د) $y = \frac{\sqrt{x^r - 11x + 21}}{(x-r)(x-v)} + \log_x \sqrt{19-x^r}$

$(x-r)(x-v) > 0 \rightarrow \frac{x}{x^r - 11x + 21} \begin{matrix} + & - & + \end{matrix}$ و $19-x^r > 0 \rightarrow \sqrt[4]{19} > x$

$\rightarrow \sqrt[4]{19} > x > -\sqrt[4]{19}$ و $x > 0$ و $x \neq 1$

$\rightarrow Df = (0, \sqrt[4]{19}) - \{1\}$

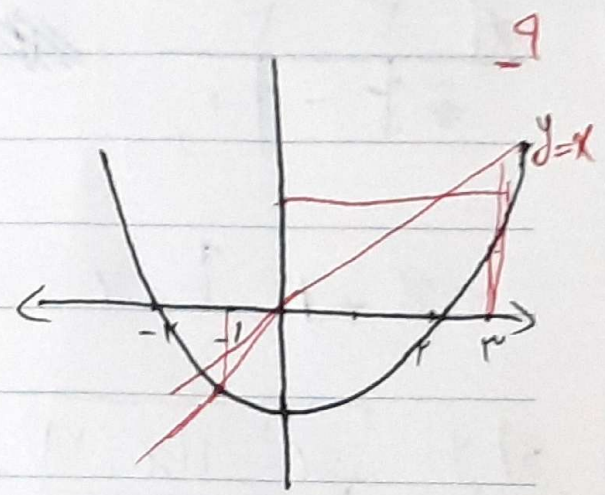
$$y = \frac{x^2 - x}{x^2 + x} \rightarrow \frac{x(x-1)}{x(x+1)}$$

Sign Chart

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

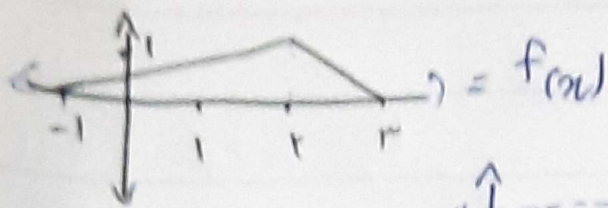
$$y = \frac{x}{x^2 - x + 1}$$

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

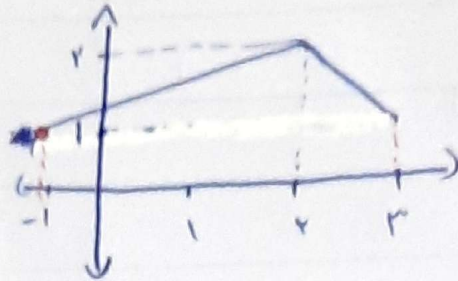


	$-r$	-1	0	r	r	
$x - f(x)$	$-$	$-$	$+$	$+$	$+$	$-$
$f(x)$	$+$	$-$	$-$	$-$	$+$	$+$
$P(x)$	$-$	$+$	$-$	$-$	$+$	$-$

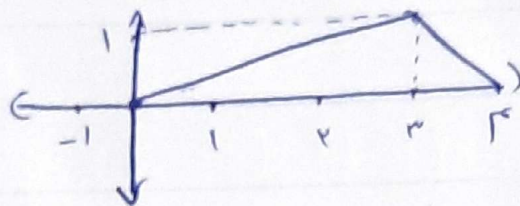
$$\rightarrow Df = [-r, -1] \cup [r, r]$$



الف) $f(x) + 1 \rightarrow$



ب) $f(x-1) \rightarrow$



ج) $-f(x) \rightarrow$



د) $f(x+1) + 2 \rightarrow$

