

$$a) y = \frac{x+1}{5x^3 - 20x^2 + 15x - 12}$$

$$4x^3 + 20x^2 + 15x - 12 \mid x-1$$

$$\hookrightarrow (x-1)(2x-3)(2x-4)$$

$$\hookrightarrow (2x-4)(2x-5)$$

$$\hookrightarrow \frac{1}{2} \quad \hookrightarrow \frac{5}{2}$$

$$D_f = \mathbb{R} - \left\{ \frac{1}{2}, \frac{5}{2}, 1 \right\}$$

(5)

$$b) y = \frac{x+1}{13x^3 - x^2 - 11x - 6}$$

$$13x^3 - x^2 - 11x - 6 \mid x+1$$

$$\hookrightarrow (13x+1)(x-4)$$

$$\hookrightarrow -\frac{1}{13} \quad \hookrightarrow 4$$

$$D_f = \mathbb{R} - \left\{ -\frac{1}{13}, -1, 4 \right\}$$

$$a) \frac{x+1}{x - \sqrt{3-2x}}$$

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

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

$$x^2 \neq 3-2x$$

$$x^2 + 2x - 3 \neq 0$$

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

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

$$3-2x \geq 0$$

$$2x \leq 3 \quad x \leq \frac{3}{2}$$

حاجب برای $x \leq \frac{3}{2}$
و $x \neq 1$

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

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

$$x^2 \neq 3x-2 \quad x^2 - 3x + 2 \neq 0$$

$$(x-1)(x-2) \neq 0$$

$$3x-2 \geq 0 \quad x \geq \frac{2}{3} \quad x \geq \frac{2}{3}$$

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

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الف) $\frac{\sin x}{2 \cos x - 1}$

$2 \cos x - 1 \neq 0 \quad \cos x \neq \frac{1}{2}$
 $D_f = \mathbb{R} - \left\{ 2k\pi + \frac{\pi}{3}, 2k\pi - \frac{\pi}{3} \right\}$



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ب) $\frac{\cos x + 1}{2 \sin x + 1}$

$2 \sin x + 1 \neq 0 \quad \sin x \neq -\frac{1}{2}$



$D_f = \mathbb{R} - \left\{ 2k\pi + \frac{7\pi}{6}, 2k\pi + \frac{11\pi}{6} \right\}$

ج) $y = \frac{\tan x + 2}{\cot x - 1}$

$\cot x \neq 1$



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

د) $y = \frac{\sin x + 1}{8 \sin^2 x - 3}$

$\sin x \neq \pm \frac{\sqrt{3}}{2}$



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

و.ا) $x^2 - 5x + 6 > 0 \quad (x-2)(x-3) > 0$

$D_f = (-\infty, 2) \cup (3, +\infty)$



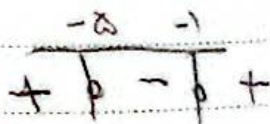
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ب) $x^2 - 4x + 5 < 0 \quad (x-1)(x-5) < 0$

$D_f = (1, 5)$



ج) $x^2 + 4x + 5 \geq 0 \quad (x+1)(x+5) \geq 0$



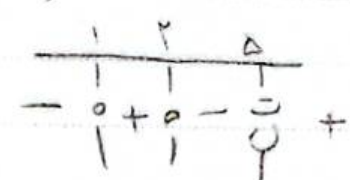
$(-\infty, -5] \cup [-1, +\infty)$

9) $x^2 - 5x + 4 < 0$ $(x-1)(x-4) < 0$

$D_f = [1, 4]$



10) $\frac{x^2 - 4x + 7}{x - 2} < 0$ $(x-1)(x-2)$

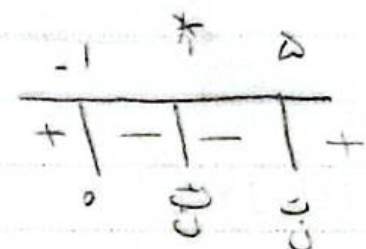


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$D_f = (-\infty, 1) \cup (2, \infty)$

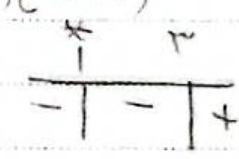
11) $\frac{x^2 - 1}{x^2 - 4x + 6} \geq 0$

$(x-1)(x-5)$



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

12) $y = \sqrt{\frac{x^2 - 5x + 4}{x^2 - 1}}$ $(x-4)(x-1)$



$D_f = [3, +\infty)$

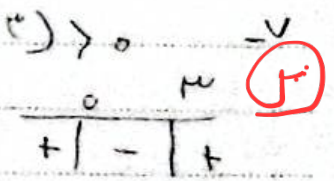
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13) $y = \sqrt{\frac{x^2 - 5x + 4}{x^2 - 1}}$

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

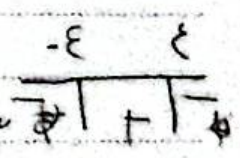
14) $y = \log(x^2 - 4x)$ $x^2 - 4x > 0$ $x(x-4) > 0$

$D_f = (-\infty, 0) \cup (4, +\infty)$



15) $\log \frac{14-x}{|x|-2}$

$14-x > 0$ $(4-x)(4+x) > 0$ $|x| > 2$ $x > 2$ $x < -2$



$D_f = (-\infty, -2) \cup (2, \infty)$

$\left\{ \frac{1}{x}, \frac{1}{y} \right\}$

$$f(x) = \log \frac{x^2 - v_{n+1}x}{x - v} - \frac{(x - v)(x - E)}{x - v} > 0$$

$$\begin{array}{c|c|c} & * & E \\ \hline - & - & + \end{array}$$

$$x - v > 0 \quad x < 10$$

$$x - v \neq 1 \quad n \neq 9$$

$$D_f = (E, 10) - \{9\}$$

$$y = \sqrt{x^2 - 11x + 21} + \log \frac{\sqrt{x^2 - 11x + 21}}{x}$$

$$\sqrt{x^2 - 11x + 21} > 0$$

$$x^2 - 11x + 21 > 0$$

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

$$(y - 1)(y + 2) > 0$$

$$\begin{array}{c|c|c} -4 & 9 & \\ \hline - & + & - \end{array}$$

$$x > 0$$

$$x \neq 1$$

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

$$\begin{array}{c|c|c|c|c|c} x^2 - x & + & + & 0 & - & 0 & + \\ \hline x^2 + x & + & 0 & - & 0 & + & + \\ \hline -1 & 0 & + & 0 & - & 0 & + \end{array}$$

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

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

$$\frac{x - f(x)}{f(x)}$$

$$x - f(x) = 0$$

$$x = f(x)$$

$$\begin{array}{r} -2 \quad -1 \quad 2 \quad 3 \\ \hline - \overbrace{0}^{\downarrow} + \overbrace{0}^{\downarrow} - \overbrace{0}^{\downarrow} + \overbrace{0}^{\downarrow} - \end{array}$$

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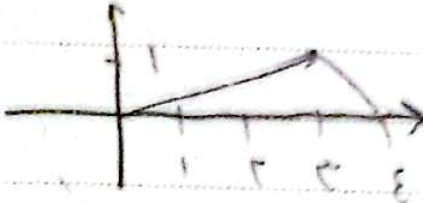
$$(-2, -1] \cup (2, 3]$$

20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

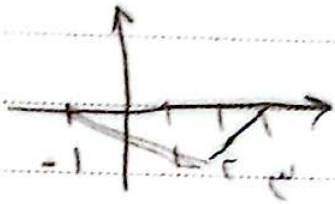
الف) $f(x) + 1$



ب)



ج) $-f(x)$



د) $f(x+1) + 2$

