فاطمه موسوی

۱- الف) $y = \dfrac{x+4}{4x^3-20x^2+31x-15}$

صفر = مخرج

$$\begin{array}{l} 4x^3-20x^2+31x-15 \;\big|\; x-1 \\ -(4x^3-4x^2) \quad\quad 4x^2-16x+15 \\ \hline -16x^2+31x \\ -(-16x^2+16x) \\ \hline 15x-15 \\ -(15x-15) \\ \hline 0 \end{array}$$

$\dfrac{x+4}{(4x^2-16x+15)(x-1)}$

$x=1$

$(x-\frac{10}{4})(x-\frac{6}{4})$

$\dfrac{10}{4} \quad \dfrac{6}{4}$

$D_f = \mathbb{R} - \{\frac{10}{4}, \frac{6}{4}, 1\}$

$D_f = \mathbb{R} - \{2.5, 1.5, 1\}$

ب)

$$\begin{array}{l} 3x^3-x^2-8x-4 \;\big|\; x+1 \\ -(3x^3+3x^2) \quad\quad 3x^2-4x-4 \\ \hline -4x^2-8x \\ -(-4x^2-4x) \\ \hline -4x-4 \\ \hline 0 \end{array}$$

-3

$\dfrac{x+3}{(x^2-4x-12)(x+1)}$

$(x-6)(x+2) \quad -1$

$\frac{6}{3}=2 \quad \frac{-2}{3}$

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

۲-

الف) $y = \dfrac{x+1}{x-\sqrt{3-2x}}$

$3-2x \geq 0$

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

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

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

$x^2 \neq 3-2x$

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

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

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

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ب) $\frac{x+2}{x-\sqrt{2x-2}}$ $\quad x \neq \sqrt{2x-2}$

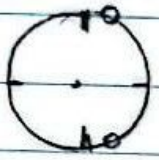
$x^2 \neq 2x-2$

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

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

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

ج) $2\cos x \neq 1$ $\quad \cos x \neq \frac{1}{2}$



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

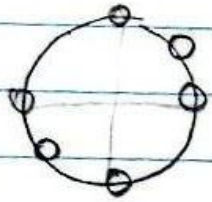
د) $\frac{2\sin x}{2} \neq \frac{1}{2}$

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

ه) $\tan = \frac{\sin}{\cos}$ $\quad \cos \neq 0$

$\cot = \frac{\cos}{\sin}$ $\quad \sin \neq 0$

$\cot x \neq 1$

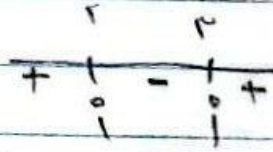


$\mathbb{R} - \left\{\frac{k\pi}{2}, 2k\pi + \frac{\pi}{4}\right\}$

و) $4\sin^2 x \neq 2$ $\quad \sin x \neq \pm\frac{\sqrt{2}}{2}$

$\mathbb{R} - \left\{k\pi + \frac{\pi}{4}, k\pi - \frac{\pi}{4}\right\}$

ز) $(x-3)(x-2) > 0$

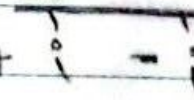


$D_f = (-\infty, 2) \cup (3, +\infty)$

ب) $(x-1)(x-5) < 0$

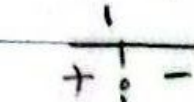
$D_f = (1, 5)$

ج) $(x+5)(x+1) \geq 0$



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

د) $(x-1)(x-9) \leq 0$



$D_f = [1, 9]$

٥ -

أ) $\frac{(x-1)(x-2)}{x-5} < 0$

$1 \quad 2 \quad 5$
$- \quad + \quad - \quad +$

$D_f = (-\infty, 1) \cup (2, 5)$

ب) $\frac{(x-1)(x+1)}{(x-1)(x-5)} \geq 0$

$-1 \quad 1 \quad 5$
$+ \quad - \quad - \quad +$

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

٦ -

أ) $\sqrt{\frac{(x-1)(x-3)}{(x-1)(x^2+x+1)}}$

$1 \quad 3$
$- \quad - \quad +$

$D_f = [3, +\infty)$

ب) $(x-1)(x+1) \neq 0$ $\quad \mathbb{R} - \{-1, +1\}$

٧ -

أ) $(x^2 - 2x) > 0$ $\quad x(x-2) > 0$

$0 \quad 2$
$+ \quad - \quad +$

$D_f = (-\infty, 0) \cup (2, +\infty)$

ب) $16 - x^2 > 0$ $\quad |x| - 2 > 0$ $\quad |x| - 2 \neq 1$

$(4-x)(4+x) > 0$ $\quad |x| > 2$ $\quad |x| \neq 3$

$(-4, 4)$ $\quad -4 \quad -2 \quad 2 \quad 4$ $\quad x > 2$ أو $x < -2$ $\quad x \neq 3, -3$

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

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

ج) $\frac{x^2 - 7x + 12}{x-3} > 0$ $\quad x \neq 3$ $\quad x < 10$ $\quad x \neq 9$

$\frac{(x-4)(x-3)}{x-3} > 0$ $\quad D_f = (4, 10) - \{9\}$

$(4, +\infty)$

$3 \quad 4$
$- \quad +$

د) $x^2 - 11x + 28 \geq 0$ $\quad \sqrt{36 - x^2} > 0$ $\quad x \neq 1$

$(x-7)(x-4) \geq 0$ $\quad 36 - x^2 > 0$ $\quad x > 0$

$(-\infty, 4] \cup [7, \infty)$ $\quad (6-x)(6+x) > 0$

$(-6, 6)$

$(-\infty, 4] \cup [7, \infty) \cap (0, 6) - \{1\}$

$D_f = (0, 4] - \{1\}$

-٨

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

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

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$x^2 - x$	+	+ ٠ −	٠ +
$x^2 + x$	+ ٠	− ٠ +	+
y	+ ت	− ت −	صفر +

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

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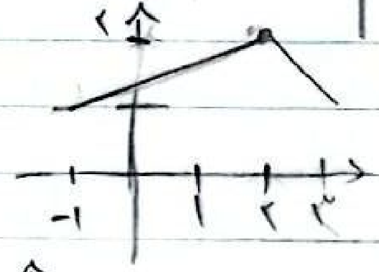
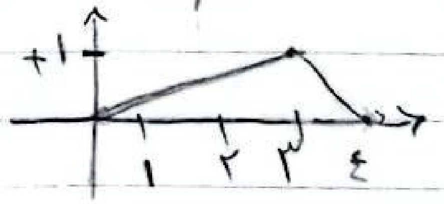
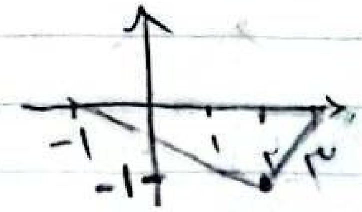
الف)



ب)



ج) $-f(x)$



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