۱۹/۷۵ عالی

فاطمه موسوی

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

صفر = حذف ریشه

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

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$\dfrac{x+4}{(x^2 - 16x + 60)(x-1)}$

$(x - 10)(x - 6)$ ، $x = 1$

$\dfrac{10}{4}$ ، $\dfrac{6}{4}$

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

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

ب)

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

-3

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

$(x-6)(x+2)$ ، -1

$\dfrac{6}{3} = 2$ ، $\dfrac{-2}{3}$

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

۲-

۱/۷۵

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

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

$x^2 \neq 3 - 2x$ ، $\dfrac{3}{2} \geq \dfrac{2x}{2}$

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

$(x+3)(x-1) \neq 0$ ، $x \leq \dfrac{3}{2}$

$x = -3$

$y = \dfrac{-2}{-9}$

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

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ب) $\dfrac{x+2}{x-\sqrt{3x-2}}$ $\qquad x \neq \sqrt{3x-2}$

$x^2 \neq 3x-2$

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

$3x \geq 2 \Rightarrow x \geq \frac{2}{3}$ $\qquad (x-2)(x-1) \neq 0$

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

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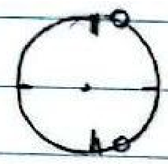
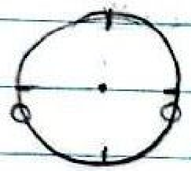
الف) $2\cos x \neq 1 \qquad \cos x \neq \frac{1}{2}$



$D_f: \mathbb{R} - \{2k\pi + \frac{\pi}{3}, 2k\pi - \frac{\pi}{3}\}$

ب) $\dfrac{2\sin}{2} \neq \dfrac{-1}{2}$

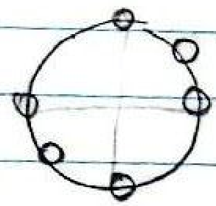


$D_f: \mathbb{R} - \{2k\pi + \frac{7\pi}{6} , 2k\pi - \frac{\pi}{6}\}$

ج) $\tan = \dfrac{\sin}{\cos} \quad \cos \neq 0$

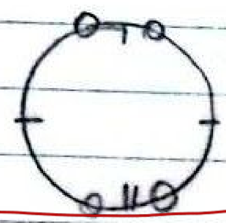
$\cot = \dfrac{\cos}{\sin} \quad \sin \neq 0$

$\cot x \neq 1$



$\mathbb{R} - \{\frac{k\pi}{2}$ و $2k\pi + \frac{\pi}{4}\}$

د) $\dfrac{4\sin^2 x}{4} \neq \dfrac{3}{4} \qquad \sin x \neq \pm\dfrac{\sqrt{3}}{2}$



$\mathbb{R} - \{k\pi + \frac{\pi}{3} , k\pi - \frac{\pi}{3}\}$

۴

الف) $(x-3)(x-2) > 0$ $\qquad$ $2, 3$: $+ \; - \; +$ $\qquad D_f = (-\infty, 2) \cup (3, \infty)$

ب) $(x-1)(x-5) < 0$ $\qquad$ $1, 5$: $+ \; - \; +$ $\qquad D_f = (1, 5)$

ج) $(x+5)(x+1) \geq 0$ $\qquad$ $-5, -1$: $+ \; - \; +$ $\qquad D_f = (-\infty, -5] \cup [-1, +\infty)$

د) $(x-1)(x-9) \leq 0$ $\qquad$ $1, 9$: $+ \; - \; +$ $\qquad D_f = [1, 9]$

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٦ـ (٢)

الف) $(x-1)(x-5) < 0$ ، $x = 5$

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

ب) $\dfrac{(x-1)(x+1)}{(x-1)(x-5)} \geq 0$ ، $D_f : (-\infty, -1] \cup (5, +\infty)$

٦ـ (٢)

الف) $\sqrt{\dfrac{(x-1)(x-3)}{(x-1)(x^2+x+1)}}$ ، $D_f : [3, +\infty)$

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

٧ـ (٢)

الف) $(x^2 - 3x) > 0$ ، $x(x-3) > 0$ ، $D_f : (-\infty, 0) \cup (3, +\infty)$

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

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

$(-4, 4)$ ، $x > 2$ یا $x < -2$ ، $x \neq 3, -3$

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

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

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

$\dfrac{(x-4)(x-3)}{x-3} > 0$ ، $(4, +\infty)$ ، $D_f : (4, 10) - \{9\}$

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

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

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

$+ \quad 4 \quad - \quad 7 \quad +$

$- \quad -6 \quad + \quad 6 \quad -$ $(-6, 6)$

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

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

٨ - س٣

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

$+ \quad -1 \ (\text{غ.م}) \quad - \quad 0 \ (\text{غ.م}) \quad - \quad 1 \quad +$

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

		-1		0		1	
$x^2 - x$	+		+	0	−	0	+
$x^2 + x$	+	0	−	0	+		+
y	+	غ.م	−	غ.م	−	صفر	+

٩ - س٣

$-3 \quad -1 \quad 2 \quad 3$

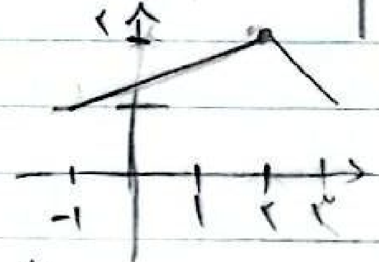
$- \quad \text{غ.م} \quad + \quad -1 \quad - \quad \text{غ.م} \quad + \quad 3 \quad -$

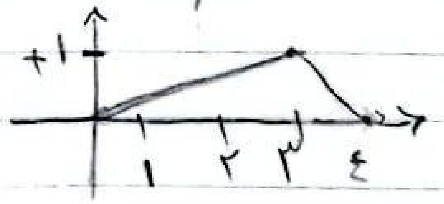
$\sqrt{x - f(x)}$ بعد ٣ $\rightarrow -$

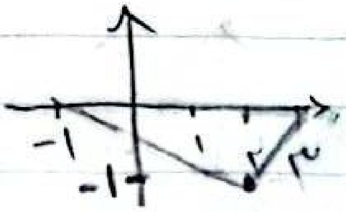
$f(x)$ قبل ٣ $+$

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

١٠ - س٣

أ) 

ب) 

ج) $-f(x)$ 

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