Subject: ۲۵ آفرین — الناز میرزایی — Date: / /

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الف) $y=x^2-5 \rightarrow x^2=y+5 \rightarrow x=\pm\sqrt{y+5}$ $\quad y+5\geq 0$

$y\geq -5 \quad R_f=[-5,+\infty)$

ب) $y=x^3+1 \rightarrow x^3=y-1 \rightarrow x=\sqrt[3]{y-1} \rightarrow R_f=\mathbb{R}$

الف) $y=x^2-4x+4 \rightarrow y=(x-2)^2+2 \rightarrow x=2\pm\sqrt{y-2}$ $\quad y-2\geq 0$

$R_f=[2,+\infty)$

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ب) $y=x^2-5x+1 \rightarrow \overset{a}{1}x^2-\overset{b}{5}x+\overset{c}{1}-y=0 \rightarrow x=\frac{-b\pm\sqrt{\Delta}}{2a}$

$\rightarrow 2a-\varepsilon(1-y)\geq 0 \rightarrow 2a-\varepsilon+\varepsilon y\geq 0 \rightarrow y\geq \frac{-21}{4} \rightarrow R_f=[\frac{-21}{4},+\infty)$

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

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$\rightarrow$

y	$-\infty$	$-\frac{3}{2}$	1	$+\infty$
$y-1$	$-$	$-$	0	$+$

$\rightarrow R_f=(1,+\infty)\cup(-\infty,\frac{-3}{2}]$

ب) $y=\frac{2|x|+1}{|x|-\varepsilon} \rightarrow |x|=\frac{\varepsilon y+1}{y-2} \rightarrow$

y	$-\infty$	$-\frac{1}{\varepsilon}$	2	$+\infty$
$y-2$	$-$	$-$	0	$+$

$\rightarrow R_f=(-\infty,-\frac{1}{\varepsilon}]\cup(2,+\infty)$

الف) $y = \frac{x+3}{x^2-2} \rightarrow \dots \frac{\dots}{y-1}$

$\rightarrow$ $-\frac{3}{2}$, 1 ; $+ \; 0 \; - \; | \; +$ $\rightarrow \mathbb{R}_f = (1, +\infty) \cup (-\infty, -\frac{3}{2}]$

ب) $y = \frac{2|x|+1}{|x|-4} \rightarrow |x| = \frac{4y+1}{y-2} \rightarrow$ $-\frac{1}{4}$, 2 ; $+ \; 0 \; - \; | \; +$ $\rightarrow \mathbb{R}_f = (-\infty, -\frac{1}{4}] \cup (2, +\infty)$

$y = \frac{1}{x^2-4x} \rightarrow yx^2 - 4yx - 1 = 0 \rightarrow x = \frac{-b \pm \sqrt{\Delta}}{2a}$; $b^2 - 4ac$

$16y^2 + 4a \geq 0 \rightarrow 4y(4y+1) \geq 0$; $-\frac{1}{4}$, 0 ; $+ \; 0 \; - \; 0 \; +$ $\rightarrow \mathbb{R}_f = (-\infty, -\frac{1}{4}] \cup (0, +\infty)$

$2a \neq 0 \rightarrow y \neq 0$

۴ - الف) $y = x^2 - 6x + 2 \xrightarrow{a>0} \begin{cases} x_{min} = 3 \\ y_{min} = -7 \end{cases} \rightarrow \mathbb{R}_f = [-7, +\infty)$

ب) $y = -x^2 + 4x + 2 \xrightarrow{a<0} \begin{cases} x_{max} = 2 \\ y_{max} = 6 \end{cases}$ $\mathbb{R}_f = (-\infty, 6]$

الف) $y = \sqrt{x^2 - 6x + 2} \xrightarrow{a>0} \begin{cases} x_{min} = 3 \\ y_{min} = -7 \end{cases} \rightarrow \mathbb{R}_f = [0, +\infty)$

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ب) $y=\sqrt{-x^2+4x+16} \xrightarrow{\text{رأس}} \begin{cases} x_{max}=2 \\ y_{max}=16 \end{cases} \rightarrow [0,\sqrt{16}]$

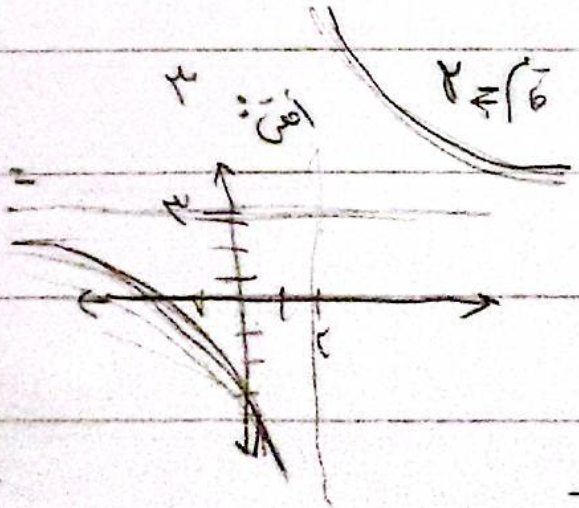
ج) $y=x^7+5x^4+5x+1 \rightarrow R_f=\mathbb{R}$ ✓ ۷

د) $y=\sqrt{x^8+5x^4+4x+1} \rightarrow [0,+\infty)$

ه) $y=\frac{3x+1}{x-5} \rightarrow R_f=\mathbb{R}-\{3\}$ ز) $\sqrt{\frac{4x+1}{x+5}}$ ✓ ۸

$\hookrightarrow R_f=[0,+\infty)-\{3\}$

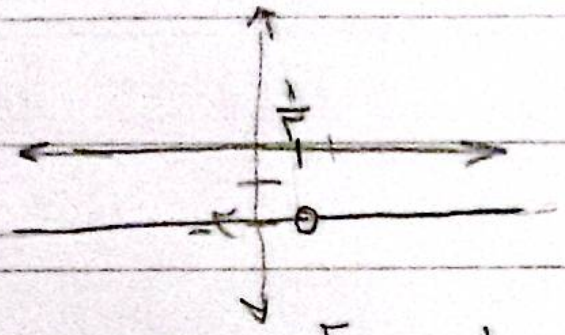
و) $y=\frac{3x+1}{x-2}=$ ✓ ۹



ز) $y=\frac{4x-2}{\quad}$ $\quad=\frac{-2(1-2x)}{\quad}=-2$

ب) $y = \dfrac{4x-2}{1-2x}$ $\quad x \neq \frac{1}{2}$

$= \dfrac{-2(1-2x)}{1-2x} = -2$



ج) $y = \cos^2 x + \dfrac{1}{\cos^2 x} \longrightarrow \cos^2 x \geq 0 \longrightarrow R_f = [2, +\infty)$

د) $y = \sqrt[3]{x + \dfrac{1}{x}} \longrightarrow \begin{cases} x > 0, & y \geq \sqrt[3]{2} \\ x < 0, & y \leq \sqrt[3]{-2} \end{cases}$

$\longrightarrow R_f = (-\infty, -\sqrt[3]{2}] \cup [\sqrt[3]{2}, +\infty)$