(۱۹)

حل تمرین برد

۱- (۵) الف) $x^3 - 3x^2 + 3x = y \rightarrow x^3 - 3x^2 + 3x - 1 = y - 1$

$(x-1)^3 = y - 1$

$R_f = \mathbb{R}$ $\qquad x = \sqrt[3]{y-1} + 1$

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

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

$\frac{1+y}{y} \geq 0$ $\qquad$ −۱ ۰ (+ − +) $\rightarrow R_f = \mathbb{R} - (-1, 0]$

۲- (۵) الف) min ext $\left| \begin{matrix} \frac{-b}{2a} = 4 \\ y \end{matrix} \right.$ $\qquad R_f = [y, +\infty)$

ب) ext min $\left| \begin{matrix} \frac{-b}{2a} = 3 \\ 13 \end{matrix} \right.$ $\qquad R_f = [-\infty, 13]$

ج) $y = \sqrt{x^2 - 4x - 3}$ $\qquad$ ext max $\left| \begin{matrix} \frac{-b}{2a} = 2 \\ -7 \end{matrix} \right.$ $\qquad [-7, +\infty)$

$R_f = [0, +\infty)$

د) $y = \sqrt{6x - x^2}$ $\qquad$ ext max $\left| \begin{matrix} \frac{-b}{2a} = 3 \\ 9 \end{matrix} \right.$ $\qquad [9, +\infty)$

$R_f = [3, +\infty)$

۳- الف) $R_f = \mathbb{R}$ $\qquad$ ب) $R_f = \mathbb{R}$ $\qquad$ ج) $y = \sqrt{\mathbb{R}} = [0, +\infty)$

(۱,۵)

د) $R_f = \mathbb{R}$ $[0, +\infty)$

۴- (۵) الف) $R_f = \mathbb{R} - \{\frac{3}{2}\}$ $\qquad$ ب) $\mathbb{R} - \{2\}$

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حل تمرینات

۵-

الف) $y=\sqrt{\frac{2x+4}{x+1}}$ $\xrightarrow{\text{به توان ۲}}$ $y^2=\frac{2x+4}{x+1}$ ②

$\mathbb{R}-\{2\} = [0,+\infty)-\{\sqrt{2}\}$

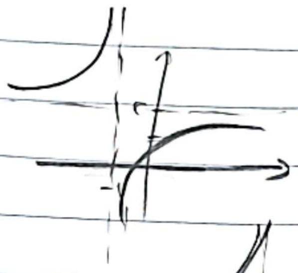
$y^2=\frac{2x+4}{x+1} \to x=\frac{-y^2+4}{y^2-2}$ $\xrightarrow{\text{ضرب}}$ $2x=\sqrt{\frac{4-y^2}{y^2-2}}$

$\frac{4-y^2}{y^2-2}\geq 0$ — -2, $-\sqrt{2}$, $\sqrt{2}$, 2 : $-\ +\ -\ +\ -$ $R_f=[-2,-\sqrt{2})\cup(\sqrt{2},2]$

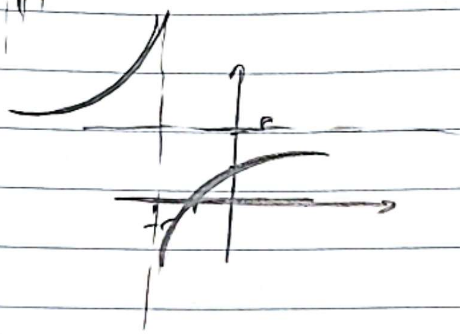
✓ ج) $y=\sqrt{\frac{2x+1}{2-x}}$ } $R_f=\mathbb{R}-\{-2\} \to R_y=[0,+\infty)$

۶-

الف) ②



ج) $y=\frac{2x-1}{x+2}$



۷)

الف) $a\sin x$ ... $a>0$ $R_y=[2,+\infty)\cup(-\infty,-2]$

ج) $y=x^2+\frac{1}{x^2}$ $R_y=(-\infty,-2]\cup[2,+\infty)$ ۱/۷۵

ه) $\sqrt[3]{x}+\frac{1}{\sqrt[3]{x}}$ $R_y=(-\infty,-2]\cup[2,+\infty)$

د) $\sqrt{x}+\frac{1}{\sqrt{x}}$ $R_y=[2,+\infty)$

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حسین عبدالعزیزی

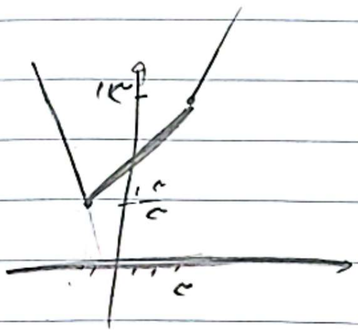
۸- الف) $y = x^2 + 2 + \frac{1}{x^2+2}$ ($t = x^2+2$) $= 2 + \frac{1}{2} = \frac{5}{2}$ $\frac{1}{3} - 3 = \frac{1}{2}$ (۱,۷۵)

$x = 0 \to \min_t = 2$, $t > 0$ $R_y = [\frac{5}{2}, +\infty)$ $\frac{1}{3}$

ب) $y = \frac{x^2+4+1}{\sqrt{x^2+4}} = \sqrt{x^2+4} + \frac{1}{\sqrt{x^2+4}}$ ($t = \sqrt{x^2+4}$) $= 2 + \frac{1}{2} = \frac{5}{2}$ ✓

$x = 0 \to \min_t = \sqrt{4} = 2$, $t > 0$ $R_f = [\frac{5}{2}, +\infty)$

۹- $y = |x-2| + |2x+4|$

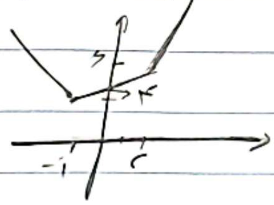


x	$-\frac{4}{2}$		2	
$2-x-2x-4 = -3x-2$		$2-x+2x+4 = x+6$		$x-2+2x+4 = 3x+2$

$|_{\frac{4}{2}}^{-\frac{4}{2}}$ $|_{12}^{2}$ $|_{\frac{12}{2}}$

(۲)

۱۰- الف) $y = |x-2| + |2x+2|$

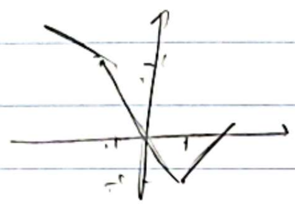


x	-1		2	
$-3x$		$x+4$		$3x$

$|_{3}^{-1}$ $|_{6}^{2}$

$R_f = [3, +\infty)$ (۲)

ب) $y = |2x-2| - |x+1|$



x	-1		1	
$3-x$		$-3x+1$		$x-3$

$|_{4}^{-1}$ $|_{-2}^{1}$

$R_y = [-2, +\infty)$