به نام خدا | تکلیف شماره ۶ | با عجب دار خواه

سوال ۱)

الف) $y = x^3 - 3x^2 + 3x - 1 + 1 \rightarrow y = (x-1)^3 + 1 \rightarrow R_y = R$

ب) $y = \frac{1}{x^2 - 2x} \rightarrow yx^2 - 2yx - 1 = 0 \rightarrow \Delta = 4y^2 - 4y(-1) = 4y^2 + 4y$

ریشه $\rightarrow \frac{2 \pm \sqrt{4y^2 + 4y}}{2y} \rightarrow y \neq 0$

$\rightarrow 4y^2 + 4y \geq 0 \rightarrow 4y(y+1) \geq 0$

$y \neq -1$

$\therefore R_y = R - (-1, 0]$

سوال ۲)

الف) $y = x^2 - 4x + 10 \rightarrow x_s = \frac{-(-4)}{2} = 2 \rightarrow y_s \Rightarrow 4 - 8 + 10 = 6$

$R_y = [6, +\infty)$

ب) $y = -x^2 + 6x + 3 \rightarrow x_s = 3 \rightarrow y_s = 12 \Rightarrow (-\infty, 12]$

ج) $y = \sqrt{x^2 - 4x - 3} \rightarrow \Delta = 16 - 4(1)(-3) = 28 \rightarrow \frac{-\Delta}{2a} = \frac{-28}{4} = -7$

$y_s = [-7, +\infty)$

د) $y = \sqrt{6x - x^2} \xrightarrow{a<0}$

$x_{max} = \frac{-6}{-2} = 3 \rightarrow y_{max} = 3 \rightarrow R_y = (-\infty, 3]$

سوال ۳)

الف) $R_y = \mathbb{R}$

ب) $R_y = \mathbb{R}$

ج- $R_y = [0, +\infty)$

سوال ۴)

الف) $y = \frac{3x+1}{x-2} = \mathbb{R} - \{3\} = R_y$

ب) $y = \frac{2x+1}{x+1} \Rightarrow R_y = \mathbb{R} - \{2\}$

سوال ۵)

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

$x(y^2-2)=4-y^2$

$x=\frac{4-y^2}{y^2-2} \rightarrow y\neq\sqrt{2}, -\sqrt{2} \rightarrow$

x	$-\sqrt{2}$		$+\sqrt{2}$	
	+	-		+

$R_y=R-[-\sqrt{2},\sqrt{2}]$

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

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

x	$-\frac{\sqrt{2}}{2}$		$+\frac{\sqrt{2}}{2}$	
	+	-		+

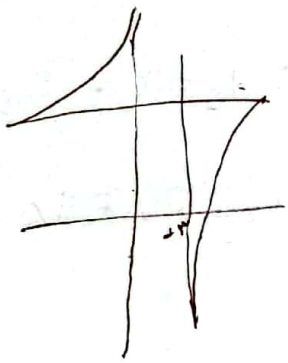
$R_y=R-[-\frac{\sqrt{2}}{2},\frac{\sqrt{2}}{2}]$

سوال ۶)

الف) $y=\frac{2x^3}{x+1}$

مجانب قائم $\rightarrow -1$

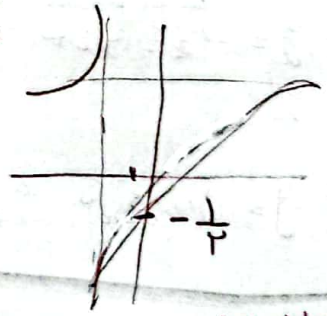
مجانب افقی $\rightarrow 2$



ب) $y=\frac{2x-1}{x+2}$

مجانب قائم: -2

مجانب افقی: 2



سوال ۷)

الف) $y=\sin x+\frac{1}{\sin x} \rightarrow R_y=(-\infty,-2]\cup[2,+\infty)$

ب) $y=\frac{x^6+1}{x^3}=x^3+\frac{1}{x^3} \rightarrow R_y=(-\infty,-2]\cup[2,+\infty)$

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

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

سوال ۸)

الف) $y = x^2 + \frac{1}{x^2+x^2} \rightarrow x^2 + \frac{1}{x^2} + \frac{1}{2} \rightarrow R_y = [\frac{1}{2}, +\infty)$

ب) $y = \frac{x^2+4+1}{\sqrt{x^2+4}} = \sqrt{x^2+4} + \frac{1}{\sqrt{x^2+4}} \rightarrow$

$\sqrt{4} + \frac{1}{\sqrt{4}} \in Sin = -kmin$

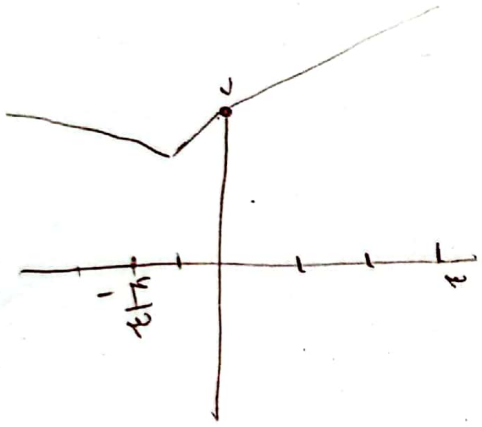
$= \frac{\sqrt{4}+1}{\sqrt{4}} = \frac{3}{\sqrt{4}} \times \frac{\sqrt{4}}{\sqrt{4}} = \frac{3\sqrt{4}}{4} = \frac{3 \times 2}{2} = 3$

$R_y = [3, +\infty)$

سوال ۹)

$y = |x-3| + |3x+4| \rightarrow$

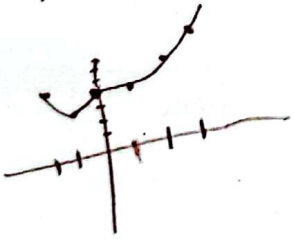
$\begin{cases} x-3+3x+4 & x \geq -\frac{4}{3} \\ -x+3-3x-4 & -\frac{4}{3} > x \geq 3 \\ -x-3+3x+4 & x < 3 \end{cases}$



سوال ۱۰)

الف) $y = |x-2| + |2x+2|$

11	6	3
-2	-1	0
6	3	4



$R_y = [3, +\infty)$

ب) $y = |2x+1| - |x+1|$

0	-1	-2
-2	-1	4