تکلیف ۲ کیان جعفری

①

الف) $y = x^3 - 3x^2 + 3x - 1 + 1 \Rightarrow y = (x-1)^3 + 1 \Rightarrow \sqrt[3]{y-1} = x$

$\Rightarrow R_y = \mathbb{R}$

ب) $yx^2 - 2y - 1 = 0 \Rightarrow \Delta \geq 0 \Rightarrow 4y^2 + 4y \geq 0$

$\Rightarrow$ $\begin{array}{c|ccc} & -1 & & 0 \\ \hline & + & 0 & - & 0 & + \end{array}$ $\Rightarrow R_y = (-\infty, -1] \cup [0, +\infty)$

②

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

$R_y = [6, +\infty)$

ب) $y = -x^2 + 2x + 2 \Rightarrow \frac{-b}{2a} = \frac{-2}{-2} = 1 \rightarrow -1 + 2 + 2 = 3$

$R_y = (-\infty, 3]$

ج) $\sqrt{x^2 - 4x - 5} \Rightarrow \frac{-b}{2a} = \frac{4}{2} = 2 \rightarrow 4 - 8 - 5 = -9$

$\Rightarrow R_y = [0, +\infty)$

د) $y = \sqrt{-x^2 + 2x} \Rightarrow \frac{-b}{2a} = \frac{-2}{-2} = 1 \rightarrow -1 + 2 = 1$

$R_y = [0, 1]$

③ الف) $\mathbb{R}$ ب) $\mathbb{R}$ ج) $[0, +\infty) \Rightarrow \mathbb{R}$

④

الف) $\mathbb{R} - \{3\}$ ب) $\mathbb{R} - \{4\}$

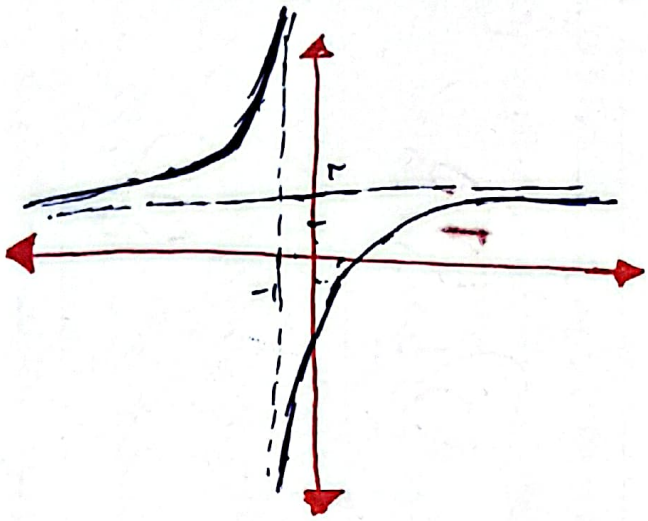
۵

الف) $\sqrt{\mathbb{R}-\{۲\}} \Rightarrow [۰, +\infty) - \{\sqrt{۲}\}$

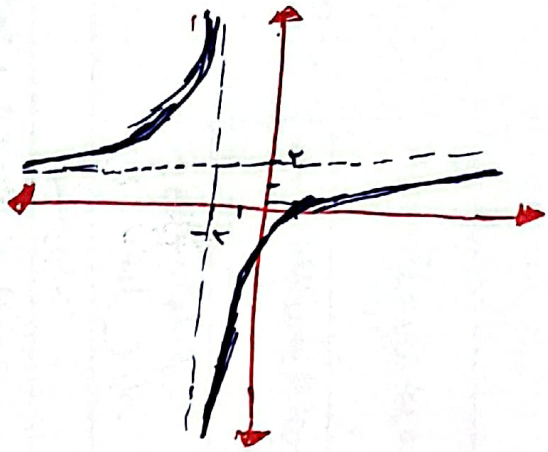
ب) $\sqrt{\mathbb{R}-\{-۳\}} \Rightarrow [۰, +\infty)$

۶

الف)



ب)



۷

الف) $(-\infty, -۲] \cup [۲, +\infty)$ ب) $(-\infty, -۲] \cup [۲, +\infty)$

ج) $(-\infty, -۲] \cup [۲, +\infty)$ د) $[۳, +\infty)$

۸

الف) $y = x^۲ + ۳ + \frac{۱}{x^۲+۳} - ۳ \Rightarrow \left[\frac{۱}{۳}, +\infty\right) - ۳$

$\Rightarrow \mathbb{R}_y = \left[\frac{۱}{۳}, +\infty\right)$

ب) $y = \sqrt{x^۲+۴} + \frac{۱}{\sqrt{x^۲+۴}} \Rightarrow \mathbb{R}_y = [۲, ۰, +\infty)$

۹

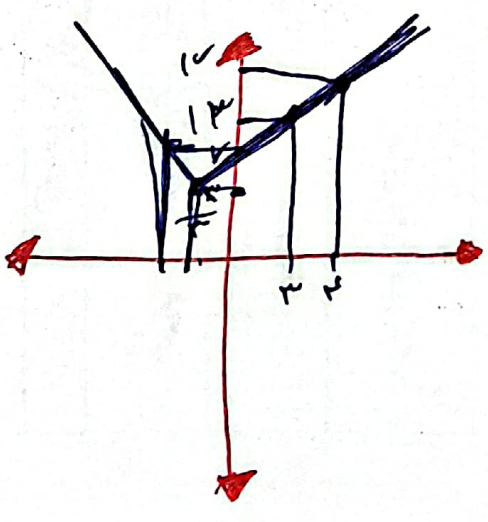
$y = |x-۲| + |۳x+۳|$

۴) $\frac{-۳}{۳}$ ۳ ۴

$۲-x-۲x-۲$ | $۲-x+۲x+۳$ | $x-۲+۳x+۳$

$-۳x-۱$ | $۲x+۷$ | $۴x+۱$

۷) $\frac{۱۳}{۳}$ ۱۳ ۱۷



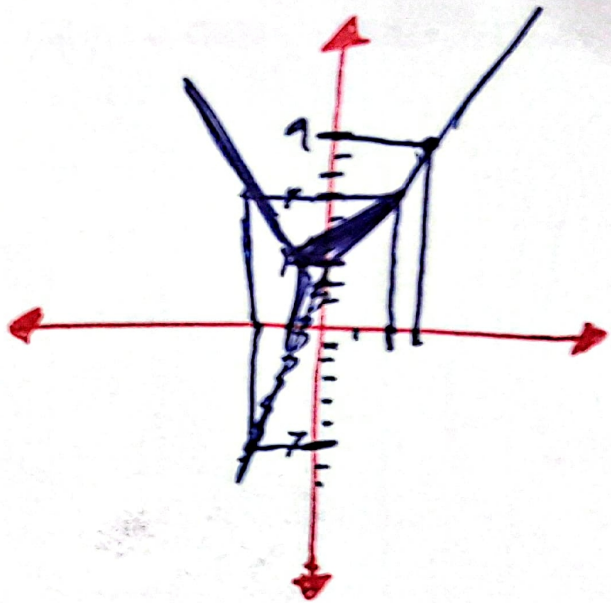
$R_y = \left[\frac{۱۳}{۳}, +\infty\right)$

⑥

ب) $y = |x-2| + |2x+2|$

①	$x < -1$	② $-1 \le x < 2$	③ $x \ge 2$
$\lvert x-2\rvert$	$2-x$	$2-x$	$x-2$
$\lvert 2x+2\rvert$	$-2x-2$	$2x+2$	$2x+2$
	$-2x$	$x+4$	$3x$

④ ⑤ ⑨

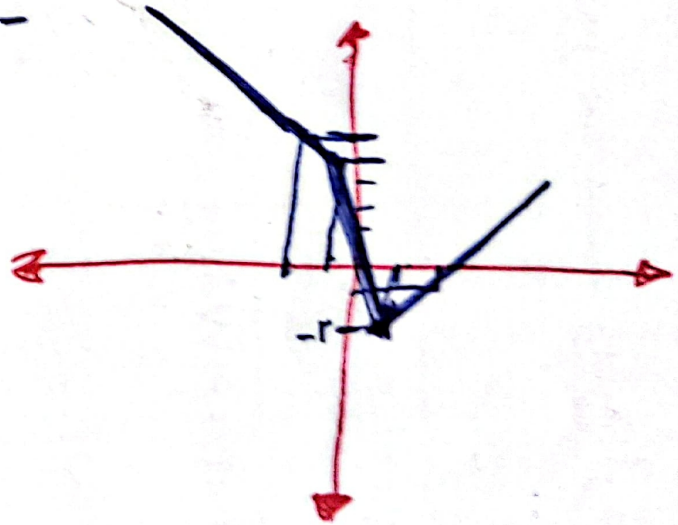


$R_y = [3, +\infty)$

ج) $y = |2x-1| - |x+1|$

	$x < -1$	$-1 \le x < 1$	$x \ge 1$
$\lvert 2x-1\rvert$	$-2x+1$	$1-2x$	$2x-1$
$\lvert x+1\rvert$	$-x-1$	$x+1$	$x+1$
	$-x+2$	$-3x$	$x-2$

$+2$ $\quad -2$



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