

14

کلیف ۲ لیکن جعفری

1, 75

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) $y = x^2 - 2x - 1 = 0 \Rightarrow \Delta \geq 0 \Rightarrow 4y^2 + 4y \geq 0$
 $\Rightarrow \frac{-1}{+} \frac{0}{-} \frac{0}{+} \Rightarrow R_y = (-\infty, -1] \cup [0, +\infty)$

②
الف) $x = \frac{2y \pm \sqrt{\Delta}}{2a} = \frac{y}{1} = y \neq 0$
 $\Rightarrow \frac{-b}{2a} = \frac{y}{1} = y \rightarrow y - 1 + 1 = 0$
 $R_y = [y, +\infty)$ ✓

ب) $y = -x^2 + 2x + 2 \Rightarrow \frac{-b}{2a} = \frac{-2}{-2} = 1 \rightarrow -9 + 18 + 2 = 11$
 $R_y = (-\infty, 11]$ ✓

ج) $\sqrt{x^2 - 4x - 3} \Rightarrow \frac{-b}{2a} = \frac{2}{1} = 2 \rightarrow 4 - 8 - 3 = -7$
 $\Rightarrow R_y = [0, +\infty)$ ✓

د) $y = \sqrt{-x^2 + 2x} \Rightarrow \frac{-b}{2a} = \frac{-1}{-2} = \frac{1}{2} \rightarrow -9 + 18 = 9$
 $R_y = [0, 3]$ ✓

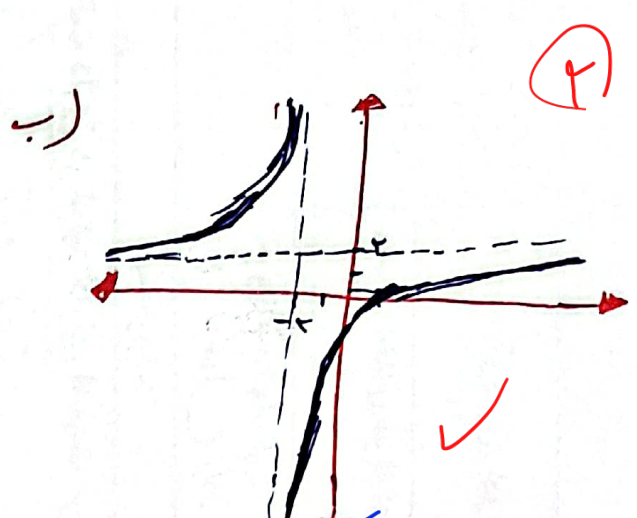
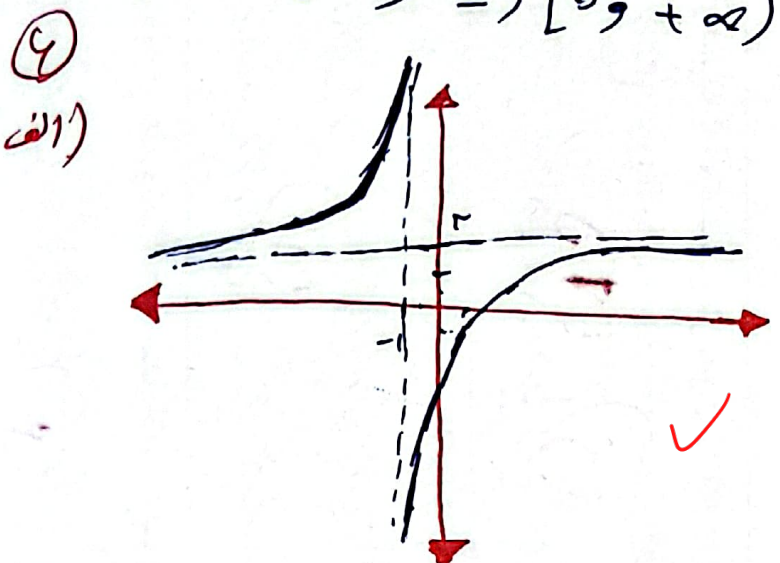
③
الف) $\mathbb{R}$ ✓ ب) $\mathbb{R}$ ✓ ج) $[0, +\infty)$ ✓ د) $\mathbb{R}$ ✓

1, 5

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

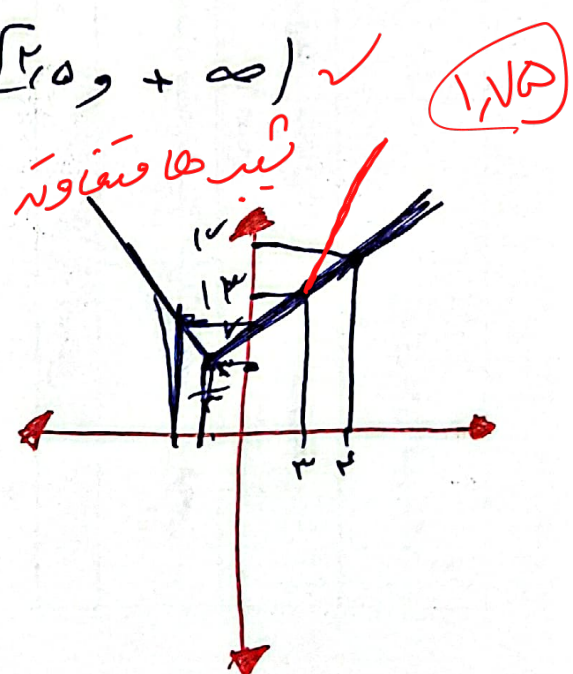
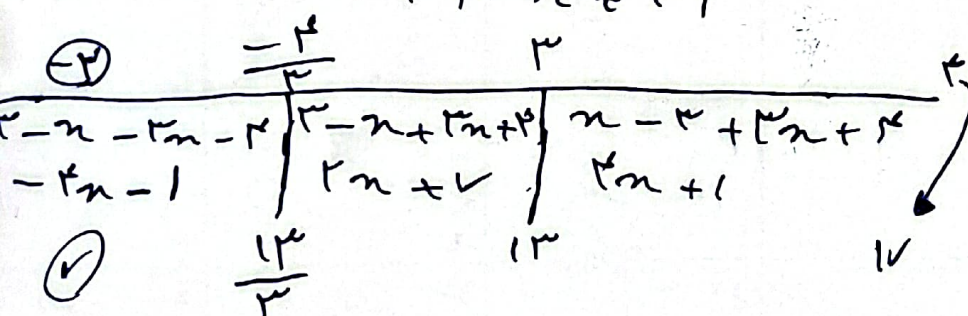
2

۵) الف) $\sqrt{1R - \{2\}} \Rightarrow [0, +\infty) - \{2\}$ ✓
 ب) $\sqrt{1R - \{2\}} \Rightarrow [0, +\infty)$ ✓



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 ۷) الف) $(-\infty, -2] \cup [2, +\infty)$ ✓
 ب) $(-\infty, -2] \cup [2, +\infty)$ ✓
 ج) $(-\infty, -2] \cup [2, +\infty)$ ✓
 د) $[2, +\infty)$ ✓

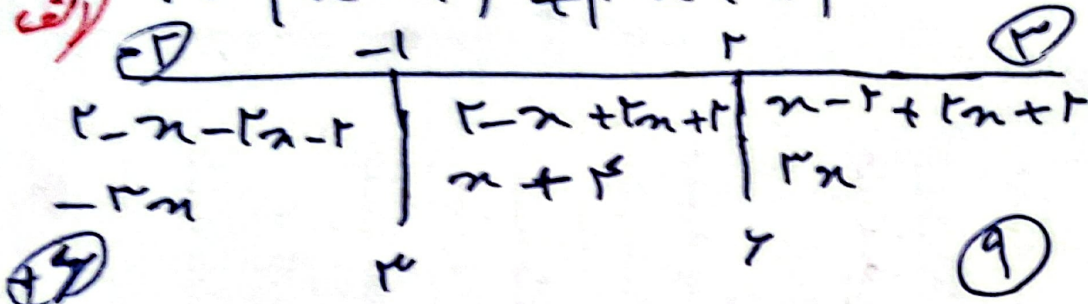
۸) الف) $y = x^2 + 2 + \frac{1}{x^2 + 2} - 2 \Rightarrow [\frac{1}{2}, +\infty) - 2$ ✓
 ب) $y = \sqrt{x^2 + 4} + \frac{1}{\sqrt{x^2 + 4}} \Rightarrow R_y = [2.5, +\infty)$ ✓
 ج) $y = |x - 2| + |3x + 4|$



۱۰) $R_y = [\frac{13}{3}, +\infty)$

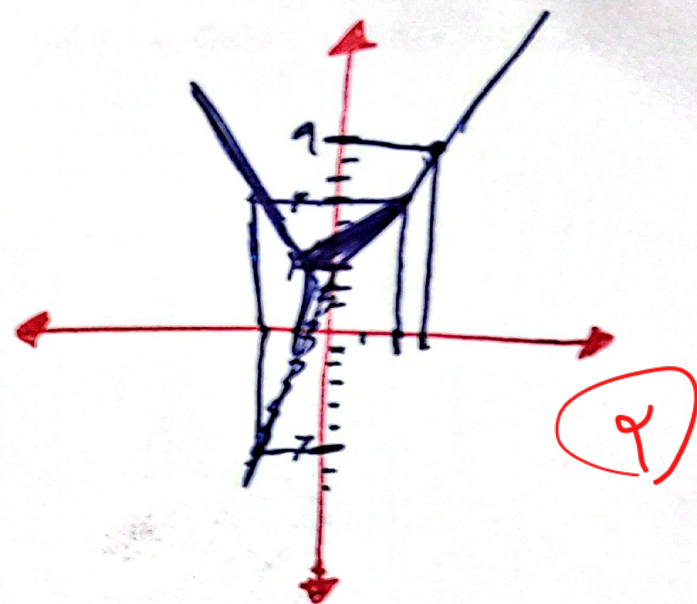
⑥

الف) $y = |x - r| + |rx + r|$

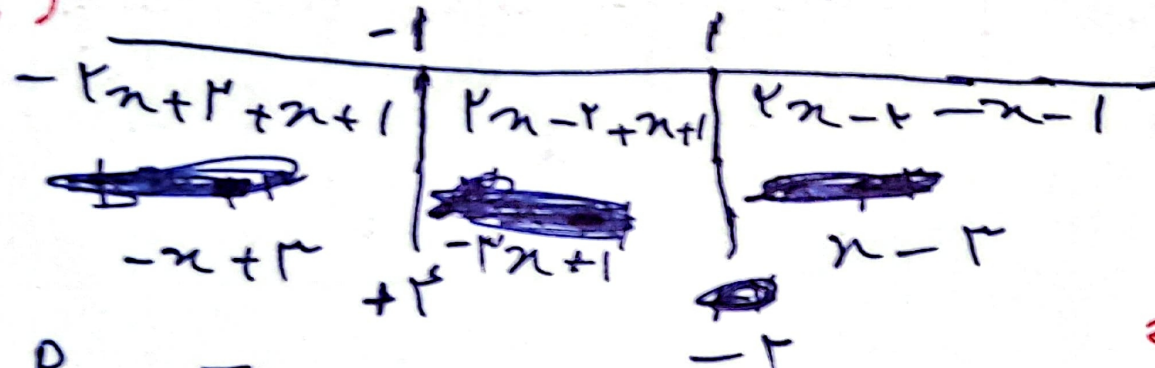


⑧

$R_y = [r, +\infty)$ ✓



د) $y = |rx - r| - |x + r|$



$R_y = [-r, +\infty)$ ✓

