

ا) $\sin x + \frac{1}{\sin x} \rightarrow Ry = (-\infty, -1] \cup [1, +\infty)$ (سوال 1)

ب) $y = \frac{x^2+1}{x^2} \Rightarrow 1 + \frac{1}{x^2} \Rightarrow Ry = \mathbb{R} - (-1, 1)$

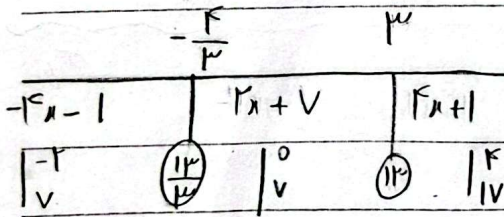
ج) $y = \frac{\sqrt{x^2+1}}{\sqrt{x}} \rightarrow \sqrt{x} + \frac{1}{\sqrt{x}} \Rightarrow Ry = \mathbb{R} - (-1, 1)$ 5

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

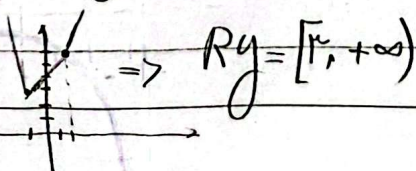
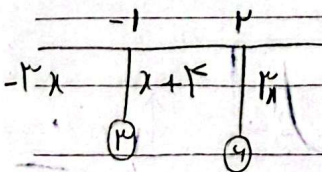
ه) $y = x^2 + \frac{1}{x^2+1} \rightarrow x^2 + \frac{1}{x^2+1} \xrightarrow{x=0} \frac{1}{1} = 1 \rightarrow Ry = [1, +\infty)$ (سوال 10) 10

و) $y = \frac{x^2+2}{\sqrt{x^2+1}} \rightarrow \sqrt{x^2+1} + \frac{1}{\sqrt{x^2+1}} \xrightarrow{x=0} \sqrt{1} + \frac{1}{\sqrt{1}} = 2 \rightarrow Ry = [2, +\infty)$

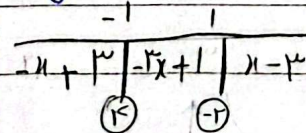
$y = |x-1| + |x+1|$



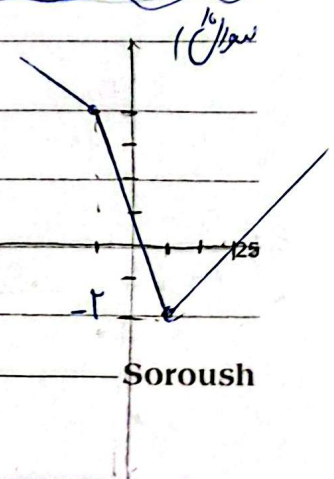
ا) $|x-1| + |x+1| = y$



ب) $y = |x-1| - |x+1|$



$Ry = [-1, +\infty)$



$$a) y = x^2 - 2x + 1 \rightarrow y = (x-1)^2 \rightarrow y-1 = (x-1)^2 \rightarrow x-1 = \sqrt{y-1} \rightarrow x = \sqrt{y-1} + 1 \quad (سوال)$$

$$R_y = \mathbb{R}$$

$$b) y = \frac{1}{x^2 - 2x} \rightarrow y(x^2 - 2x) - 1 = 0 \Rightarrow \frac{2y \pm \sqrt{4y^2 + 4y}}{2y} \Rightarrow \frac{-1 \pm \sqrt{1+4y}}{2y} \Rightarrow R_y = \mathbb{R} - \{-1, 0\}$$

$$a) y = x^2 - 4x + 10 \rightarrow \min \left| \frac{-b}{2a} = \frac{4}{2} = 2 \Rightarrow R_y = [4, +\infty) \quad (سوال)$$

$$b) y = -x^2 + 4x + 3 \rightarrow \max \left| \frac{-b}{2a} = -\frac{4}{-2} = 2 \Rightarrow R_y = (-\infty, 11] \quad (سوال)$$

$$1) y = \sqrt{-x^2 + 4x} \rightarrow \max \left| \frac{4}{2} = 2 \Rightarrow \sqrt{(-\infty, 4]} \Rightarrow R_y = [0, 2] \quad (سوال)$$

$$2) y = \sqrt{x^2 - 4x + 3} \rightarrow \min \left| \frac{4}{2} = 2 \Rightarrow \sqrt{[-4, +\infty)} \Rightarrow R_y = [0, +\infty) \quad (سوال)$$

$$a) x^2 - 2x + 1 \rightarrow R_y = \mathbb{R} \quad (سوال)$$

$$b) x^2 - 4x + 10 \rightarrow R_y = \mathbb{R} \quad (سوال)$$

$$2) y = \sqrt{x^2 - 4x + 10} \rightarrow \sqrt{(-\infty, +\infty)} \rightarrow R_y = [0, +\infty) \quad (سوال)$$

$$1) (x^2 - 4x + 10)^2 \rightarrow R_y = [0, +\infty) \quad (سوال)$$

$$a) y = \frac{x+1}{x-1} \rightarrow R = \mathbb{R} - \left\{ \frac{a}{c} \right\} \Rightarrow R_y = \mathbb{R} - \left\{ \frac{1}{-1} \right\} \quad (سوال)$$

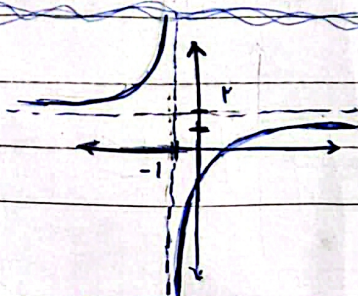
$$b) y = \frac{x+1}{x+1} \rightarrow R_y = \mathbb{R} - \left\{ \frac{1}{1} \right\} \quad (سوال)$$

$$a) y = \sqrt{\frac{x+5}{x+1}} \rightarrow \sqrt{\mathbb{R} - \left\{ \frac{1}{-1} \right\}} \rightarrow R_y = [0, +\infty) - \left\{ \sqrt{\frac{1}{-1}} \right\} \quad (سوال)$$

$$b) y = \sqrt{\frac{x+1}{x-1}} \rightarrow \sqrt{\mathbb{R} - \left\{ \frac{1}{-1} \right\}} \rightarrow R_y = [0, +\infty) \quad (سوال)$$

$$a) \frac{x-2}{x+1}$$

مسئله 25
 $\frac{a}{c} = \frac{2}{1} = 2$
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$$b) y = \frac{x-1}{x+1}$$

