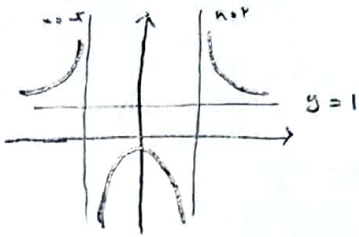


داریم رشتۀ B

ساده مدارک " ۲۰ افترین: انشا و تکلیف "

$$\text{مثال ۱)} \quad y = \frac{|x|+1}{|x|-2}$$

$$Ry = (-\infty, -\frac{1}{2}] \cup (\frac{1}{2}, +\infty) \quad \rightarrow y = \frac{x^2+1}{|x|} = \frac{|x|^2+1}{|x|}$$



$$|x| + \frac{1}{|x|} \Rightarrow Ry = [\frac{1}{2}, +\infty)$$

(۲) 1

$$y = \frac{x^2+2x-2}{x+2}$$

$$yx + 2y = x^2 + 2x - 2$$

$$x^2 + (2-y)x + (-2-2y) = 0$$

$$(2-y)^2 - 4(-2-2y) \geq 0$$

$$4 + 4y^2 - 4y + 8 + 8y \geq 0 \rightarrow y^2 + 2y + 12 \geq 0$$

$$y^2 + 2y + 12 = 0 \rightarrow y = -1 \pm \sqrt{11}$$

$$Ry = (-\infty, -1-\sqrt{11}] \cup [-1+\sqrt{11}, +\infty)$$

(۲) 2

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

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

$$\rightarrow x - \frac{1}{2} = t \Rightarrow \frac{t}{t^2+1}$$

$$D_f = \mathbb{R} \checkmark$$

(۲)

3

$$yt + \frac{t}{y} = \frac{1}{2} \rightarrow yt - t = -\frac{t}{y} \rightarrow (y-1)t = -\frac{t}{y} \rightarrow t = \frac{-\frac{t}{y}}{y-1}$$

$$+ \text{و} t \geq 0 \quad \frac{-\frac{t}{y}}{y-1} \geq 0 \rightarrow \frac{0+1}{-\frac{1}{2}+\frac{1}{2}} \quad R_f = [0, \frac{1}{2}]$$

$$\text{مثال ۲)} \quad y = \sqrt{-x^2+4x+1} \quad \text{Max} \quad \left| \begin{matrix} 2 \\ 1 \end{matrix} \right|$$

$$Ry = \sqrt{(-\infty, 1]}$$

$$Ry = [-1, \sqrt{2}] \checkmark$$

$$\rightarrow y = \sqrt{2x^2-4x+1} \quad \text{Min} \quad \left| \begin{matrix} 2 \\ -1 \end{matrix} \right|$$

$$Ry = \sqrt{[1, +\infty)} \Rightarrow Ry = [-1, +\infty)$$

(۲)

4

$$\text{مثال ۳)} \quad y = \log(x^2-1)+1$$

$$Ry = \mathbb{R} \checkmark$$

$$\rightarrow y = \log_r \frac{x^2+1}{x}$$

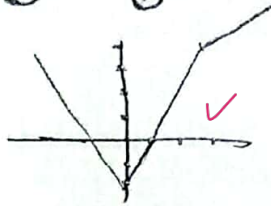
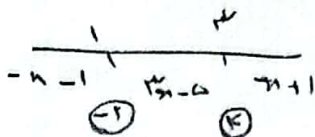
(۲)

$$\frac{x^2+1}{x} = x + \frac{1}{x} \Rightarrow [1, +\infty)$$

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

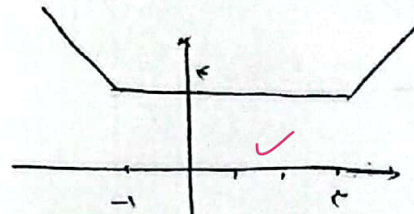
5

$$u) y = |x-1| - |x-2|$$



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

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



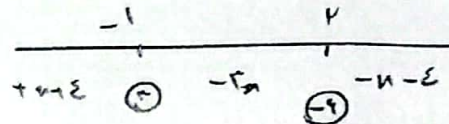
$$Ry = [-2, +\infty)$$

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

(2)

6

$$|x-1| - |x+2| \leq 1$$



$$-x-2 \leq 1 \rightarrow x \geq -3 \rightarrow [-3, +\infty) \quad (1)$$

$$-x \leq 1 \rightarrow x \geq -1 \rightarrow [-1, +\infty) \quad (2)$$

$$x+2 \leq 1 \rightarrow x \leq -1 \rightarrow (-\infty, -1) \quad (3)$$

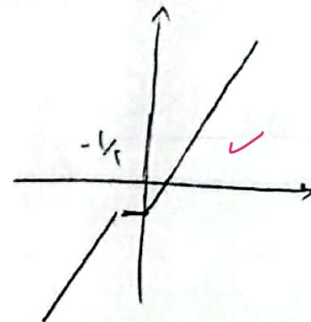
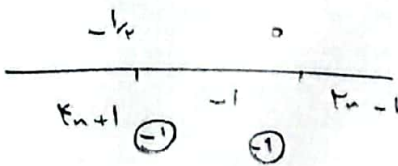
$$1 \cap 2 \cap 3 \Rightarrow$$

$$(-\infty, -1) \cup [-1, +\infty)$$

(2)

7

$$y = |x-1| - |x+1| + |x| \quad Ry = \mathbb{R}$$



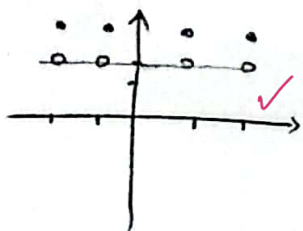
(2)

8

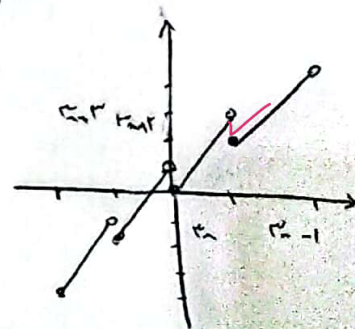
$$y = [-1] + [x-1] = [-1] + [-x] + x$$

$$v) y = |x-1| - [-x]$$

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



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



(2)

9

$$u) y = \sin^2 x - \sin x + 1$$

$$v) y = \sin^2 x + \sin^2 x + 1$$

$$1 \rightarrow 1$$

$$-1 \rightarrow x$$

$$-\frac{1}{2} \rightarrow \frac{1}{2} \rightarrow \frac{3}{2}$$

$$Ry = [-\frac{1}{4}, 2]$$

$$q \rightarrow 1$$

$$1 \rightarrow x$$

$$-\frac{1}{2} \rightarrow x$$

$$Ry = [1, 2]$$

(2)

10