

① الف) $y, \frac{|x|+1}{|x|-2} \rightarrow y|x|-2y, |x|+1 \rightarrow (y-1)|x|+2y+1 \rightarrow |x|, \frac{2y+1}{y-1} \rightarrow \frac{2y+1}{y-1} \geq 0 \rightarrow \frac{-1}{+1-1} +$ (1)

19, 5

$Ry: (-\infty, -\frac{1}{2}] \cup (1, +\infty)$

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

طعنه قشبه!

$Ry: (-\infty, -1] \cup [2, +\infty)$ (2)

② $y, \frac{x^2+2x-2}{x+3} \rightarrow x^2+y^2, x^2+2x-2 \rightarrow x^2+(2-y)x-2-2y$

$x, \frac{y-2 \pm \sqrt{(2-y)^2-4(-2-2y)}}{2} \rightarrow y^2-4y+4+11+12y \geq 0 \rightarrow y^2+8y+15 \geq 0$

$(x+2)(x+4) \geq 0 \rightarrow \frac{-4}{+1-1} \rightarrow Ry: (-\infty, -4] \cup [-2, +\infty)$ (2)

③ $f(x) = \frac{x^2-x+\frac{1}{x}}{x^2-x+1} \rightarrow x^2y-x^2+y, x^2-x+\frac{1}{x} \rightarrow (y-1)x^2+(1-y)x+\frac{1}{x} \geq 0$

$P \in \mathbb{R} \rightarrow$ مخرجنا صفره

$x, \frac{y-1 \pm \sqrt{(1-y)^2-4(y-1)(\frac{1}{x})}}{2(1-y)} \rightarrow y^2-2y+1-4y^2+4y-1 \geq 0 \rightarrow -3y^2+2y \geq 0 \rightarrow -3y(y-\frac{2}{3}) \geq 0 \rightarrow Ry: [\frac{2}{3}, 1]$ (2)

④ الف) $y, \sqrt{-x^2+4x-1} \rightarrow \frac{-b}{2a} = 2 Ry: \sqrt{(-1, 3)} = [0, \sqrt{3}]$ (2)

ب) $y, \sqrt{2x^2-11x} \rightarrow \frac{-b}{2a} = \frac{11}{4} Ry: \sqrt{[-11, +\infty)} = [-\frac{11}{2}, +\infty)$

⑤ الف) $y, \log(x^2-x+11) \rightarrow Ry: (-\infty, +\infty)$

ب) $y, \log_p(\frac{x^2+1}{x}) \rightarrow Ry: \log_p(-\infty, -2] \cup [2, +\infty) = [1, +\infty)$ (2)

⑥ الف) $y, |2x-2|-|x-3|$

x	-1	2	5
y	-1	-2	4

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

ب) $y, |x-3|+|x+1|$

x	-2	-1	2	4
y	4	2	2	6

$Ry: [2, +\infty)$

(1, 15)

⑦

x	-4	-1	2
y	-1	-2	-1

$x+4=1 \rightarrow x=-3$

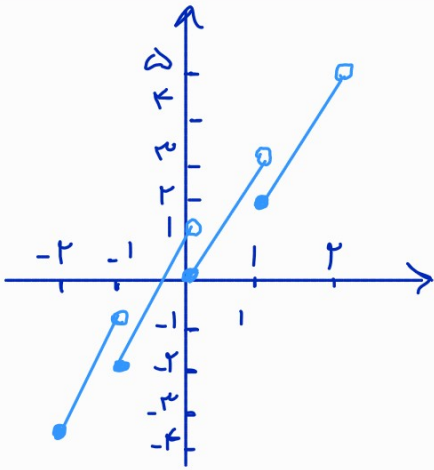
$x=3$

$-3x < 1 \rightarrow x < -\frac{1}{3}$

$\rightarrow (-\infty, -\frac{1}{3}) \cup [-\frac{1}{3}, +\infty)$ (2)

$$\text{ب) } y = |x| + \frac{1}{|x|} \xrightarrow[\alpha + \frac{1}{\alpha} \geq r]{\alpha > 0} |x| + \frac{1}{|x|} \geq r \rightarrow R_y = [r, +\infty)$$

-1



$$R_y = [-r, \infty)$$

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