

فرض: y_0

$$\text{a)} y = \frac{\ln|+1|}{\ln|-2|} \Rightarrow y \ln|-2| - 2y = \ln|+1| \Rightarrow \ln|(y-1)| - 2y+1 \Rightarrow \ln| = \frac{2y+1}{y-1} \quad (2) \quad (1)$$

$$\frac{-\frac{1}{2}}{-\frac{1}{2} - \frac{1}{2}} \left\{ R_y = (-\infty, -\frac{1}{2}] \cup (1, +\infty) \right\}$$

$$\Rightarrow y = \frac{x^2+1}{\ln x} = \ln x + \frac{1}{\ln x} \quad \left\{ R_y = [2, +\infty) \right\}$$

$$y = \frac{x^2+2x-2}{x+2} \Rightarrow x^2+2x-2 = yx+2y \Rightarrow x^2+x(2-y)-2-2y=0 \quad (2) \quad (2)$$

$$\frac{-(2-y) \pm \sqrt{(2-y)^2 - 4(-2y-2)}}{2}$$

$$y^2 - 2y + 4 + 12y + 8 \geq 0 \Rightarrow y^2 + 10y + 12 \geq 0 \quad (y+4)(y+2) \geq 0 \quad \frac{-4-2}{1+1} +$$

$$\left\{ (-\infty, -4] \cup [-2, +\infty) \right\}$$

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

(2) (3)

$$x^2-x+1 \neq 0 \Rightarrow \Delta = 1-4 < 0 \Rightarrow \boxed{D = \mathbb{R}}$$

$$yx^2-yx+y = x^2-x+\frac{1}{x}$$

$$x^2(y-1) + x(-y+1) + y - \frac{1}{x} = 0 \Rightarrow (y-1) \pm \sqrt{(y-1)^2 - 4(y-1)(y-\frac{1}{2})} \Rightarrow y^2-2y+1-4y^2+8y-2 \geq 0$$

$$\Rightarrow -3y^2+6y \geq 0 \Rightarrow -3y(y-2) \geq 0$$

$$\frac{0}{-3} \pm \frac{2}{-3} \left\{ R_f = [0, 2] \right\}$$

$$\text{a)} y = \sqrt{-x^2+2x-1}$$

$$\frac{-\Delta}{2a} = -\frac{14-4}{-2} = \frac{10}{2} = 5$$

(2) (4)

$$\sqrt{(-\infty, 5]} = \left\{ [0, \sqrt{5}] \right\}$$

$$\Rightarrow y = \sqrt{x^2-2x-1}$$

$$\frac{-\Delta}{2a} = -\frac{4-4}{2} = -1$$

$$R_y = \sqrt{[-1, +\infty)} = \left\{ [-1, +\infty) \right\}$$

$$\text{a)} y = \lg(x^2-x+1) \rightarrow \lg(-\infty, +\infty) \rightarrow \left\{ R_y = \mathbb{R} \right\}$$

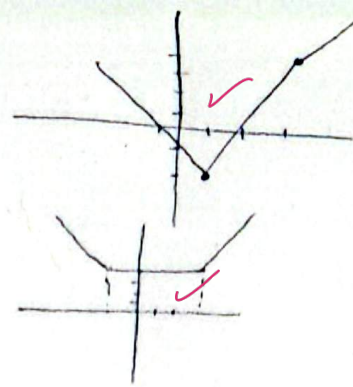
(2) (5)

$$\text{b)} y = \lg\left(\frac{x^2+1}{x}\right) \rightarrow \lg([2, +\infty)) = \left\{ [1, +\infty) \right\}$$

$$\frac{x^2+1}{x} \geq x+1 \rightarrow (-\infty, -2] \cup [2, +\infty) \rightarrow [2, +\infty)$$

$$a) y = |2n-2| - (n-2)$$

	$\frac{1}{2}$	2
$-2n+2n-2$	$2n-2+2$	$2n-2-n+2$
$-n-1$	$n-0$	$n+1$
$1/2$	2	



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

$$b) y = |n-2| + |n+1|$$

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

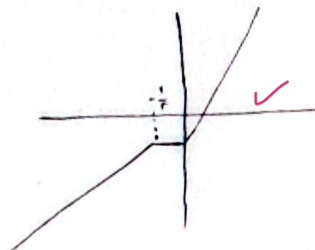
$$|x-2| - |2n+2| \leq 1$$

	-1	2
$x+1 \leq 1$	$-x+2 \leq 1$	$x-2 - 2n-2$
$x \leq 0$	$-x \leq -1$	$-x-4 \leq 1$
	$-x \leq -1$	$-0 \leq 1$
	$x \geq -1$	

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

$$y = 2n - |2n+1| + |n|$$

	$-\frac{1}{2}$	0
$2n+2n+1$	$2n-2n-1$	$2n-2n-1+n$
$4n+1$	-1	$n-1$
$1/2$	0	0
-1	-1	

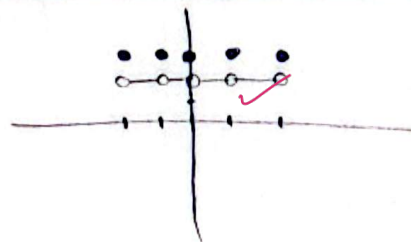


$$R_y = \mathbb{R}$$

$$[-2, 2]$$

$$a) y = [n] + [2-n] = [n] + [-n] + 2$$

$$R_y = \{2, 2\}$$



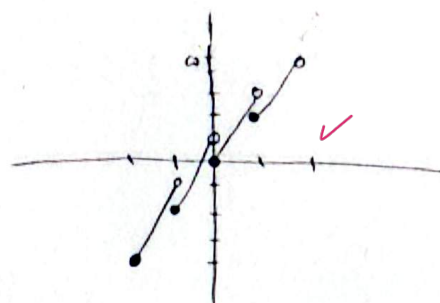
$$b) y = 2n - [n]$$

$$[-2, -1) \xrightarrow{[n]=-2} 2n+2$$

$$[-1, 0) \xrightarrow{[n]=-1} 2n+1$$

$$[0, 1) \xrightarrow{[n]=0} 2n$$

$$[1, 2) \xrightarrow{[n]=1} 2n-1$$



$$R_y = [-1, \infty)$$

	$\frac{1}{2}$	1
$1-1+1=1$	$1+1+1=3$	
$\frac{1}{2}$	$\frac{1}{2} - \frac{1}{2} + 1 = \frac{1}{2}$	

$$R_y = [\frac{1}{2}, 3]$$

	1
$1+1+1=3$	
$0+0+1=1$	
$0 \leq x < \frac{1}{2}$	

$$R_y = [1, 3]$$