

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

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

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

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

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

$$y^r - r y + r + 12 y + 12 \geq 0 \Rightarrow y^r + 12 y + 12 \geq 0 \quad (y + 4)(y + 3) \geq 0 \quad \frac{-y - 3}{-1 - 1} +$$

$$\left\{ (-\infty, -4] \cup [-3, +\infty) \right\}$$

$$f(x) = \frac{x^r - x + \frac{1}{r}}{x^r - x + 1} \quad (3)$$

$$x^r - x + 1 \neq 0 \Rightarrow \Delta = 1 - r < 0 \Rightarrow \boxed{Q = \mathbb{R}}$$

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

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

$$\Rightarrow -r y^r + 8 y \geq 0 \Rightarrow -y(y - 1) \geq 0$$

$$\frac{-\frac{1}{r}}{-\frac{1}{r} - \frac{1}{r}} \left\{ R_f = [0, 1) \right\}$$

$$\text{a)} y = \sqrt{-x^r + r x - 1} \quad \frac{-\Delta}{r a} = -\frac{14 - r}{-r} = \frac{1r}{r} = r \quad (4)$$

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

$$\Rightarrow y = \sqrt{x^r - 12 x} \quad \frac{-\Delta}{r a} = -\frac{4r}{1} = -1 \quad R_y = \sqrt{[-1, +\infty)} = \left\{ [-r, +\infty) \right\}$$

$$\text{a)} y = \log(x^r - x + 12) \rightarrow \log(-\infty, +\infty) \rightarrow \boxed{R_y = \mathbb{R}} \quad (5)$$

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

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

$$\frac{x^r + 1}{x} \geq 0$$

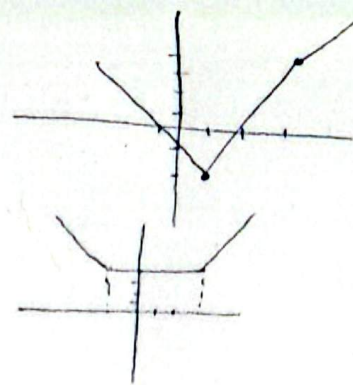
$$a) y = |2n-1| - (n-1)$$

$$\begin{array}{c|c|c} -n+1 & n-1 & n-1 \\ \hline -n-1 & n-1 & n-1 \\ \hline 1 & 1 & 1 \end{array}$$

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

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

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



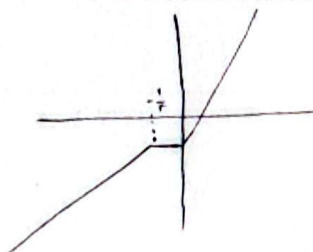
$$|x-1| - |x+1| \leq 1$$

$$\begin{array}{c|c|c} -1 & 1 & \\ \hline x+1 \leq 1 & -x+1 \leq 1 & x-1 \leq x+1 \\ \hline x \leq 0 & -x \leq 0 & -1 \leq 1 \\ \hline x \geq -\frac{1}{2} & & \end{array}$$

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

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

$$\begin{array}{c|c|c} -\frac{1}{2} & 0 & \\ \hline 2n+1 & 2n+1 & 2n+1 \\ \hline n & n & n \\ \hline -\frac{1}{2} & 0 & \end{array}$$

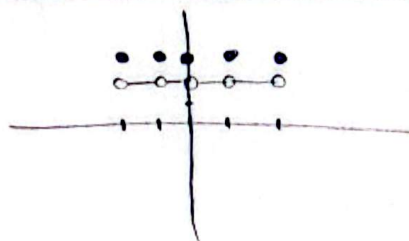


$$R_y = \mathbb{R}$$

$$[-1, 1]$$

$$a) y = [n] + [1-n] = [n] + [-n] + 1$$

$$R_y = \{1, 2\}$$



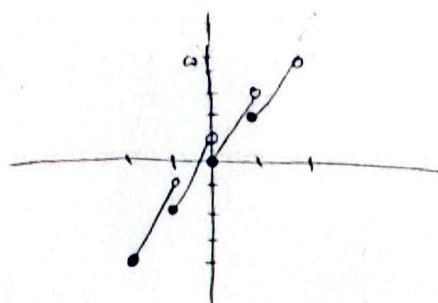
$$b) y = 2n - [n]$$

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

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

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

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



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

$$a) y = \sin^2 n - \sin^2 n + 1$$

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

$$b) y = \sin^2 n + \sin^2 n + 1$$

$$R_y = [1, 2]$$