

①

$$-r \leq \frac{r_{n+1}}{r} \leq r \Rightarrow -1 \leq r_{n+1} \leq r$$

$$\Rightarrow -1 \leq r_n \leq 1 \Rightarrow -r \leq n \leq r$$

②

$$-r \leq n \leq r \Rightarrow -r \leq r_n \leq r \Rightarrow -1 \leq r_n - r \leq 1$$

③

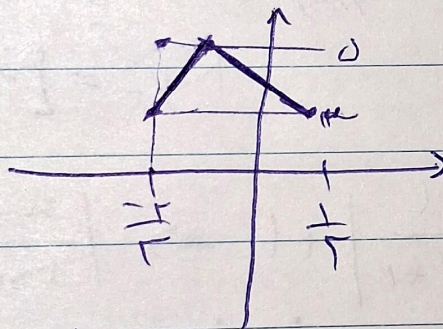
$$-1 \leq n \leq r$$

$$\frac{-r}{r} \leq \frac{r_{n+1}}{r} \leq \frac{r}{r} \Rightarrow -1 \leq r_{n+1} \leq r$$

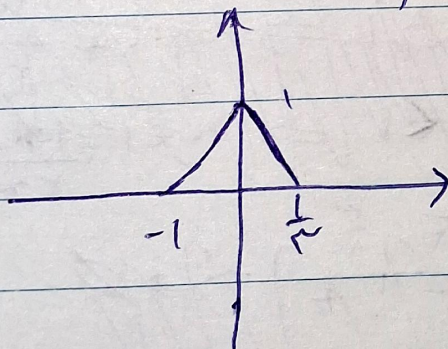
$$\Rightarrow -1 \leq r - \delta n \leq r \Rightarrow -r \leq -\delta n \leq r \Rightarrow \frac{-r}{\delta} \leq n \leq \frac{r}{\delta}$$

$$\Rightarrow n \in \left[\frac{-r}{\delta}, \frac{r}{\delta} \right]$$

④



⑤



⑥

$$-\frac{1}{r} (n-r)^r + r = 0 \quad (n-r)^r = r$$

$$\begin{cases} n-r = r \Rightarrow n = r \\ n-r = -r \Rightarrow n = 1 \end{cases}$$

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$$\textcircled{1} \quad r\alpha + r = 1 \Rightarrow \alpha = \frac{-1}{r}$$

$$1 - r(\frac{1}{r}) = \beta \Rightarrow \beta = \frac{1}{r}$$

$$\textcircled{1} \quad P_{f(n)} = (\alpha + 1, \Delta] \quad P_{g(n+1)} = [-r, b-1)$$

$$b-1 = \Delta \Rightarrow b = \Delta + 1 \quad -r - 1 = -a$$

$$a+1 = -r \Rightarrow a = -r-1$$

$$\textcircled{9} \quad -r \leq n < \Delta \Rightarrow \frac{-1}{r} \leq \frac{n}{r} < \frac{\Delta}{r} \Rightarrow \frac{-1}{r} \leq \frac{n}{r} + 1 \leq \frac{\Delta}{r}$$

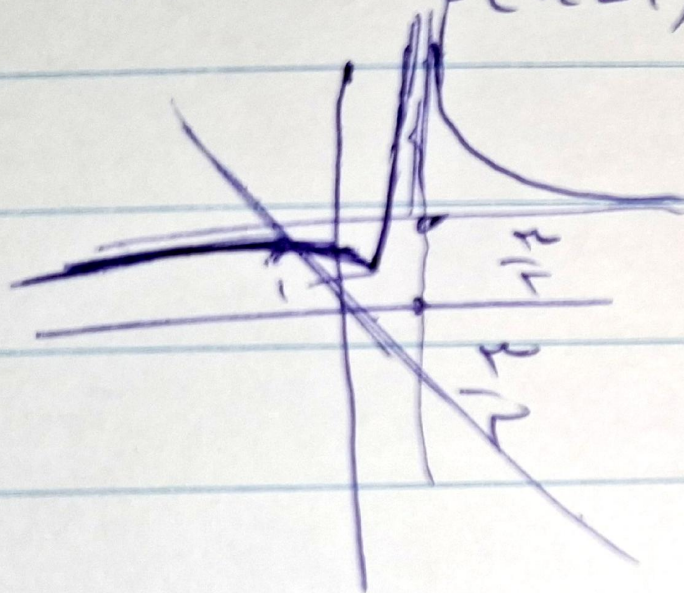
$$\Rightarrow P_{f(n)} = \left[\frac{-1}{r}, \frac{\Delta}{r} \right) \mid R_{f(n)} = [-1, r] \Rightarrow |r[-1, r] - r|$$

$$R_{y_r} = [0, \Delta] \quad \checkmark$$

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$$\textcircled{1} g(n) = \left| \frac{(n-r)+1}{r(n-r)+1} \right| + 1 = \left| \frac{n-1}{rn-r} \right| + 1$$



$$\Rightarrow \frac{n-1 + \cancel{r(n-r)} + \cancel{r(n-r)}}{rn-r} =$$

$$\frac{rn-r}{rn-r} = 1 \rightarrow n^r = r$$

$$n = \pm \sqrt[r]{r}$$

$$\underline{n < -\sqrt[r]{r}}$$