

$$n(P_{n+1}) - nP_n = r(n+1)$$

$$P_n = ?$$

$$P_n + nP_{n-1} = r(n+1)$$

$$nP_{n-1} - nP_n = r(n+1) - n$$

$$(1+n)P_n = r(n+1) - r(n+1) - n$$

$$n \geq 0 \quad P_n = P_{n+1} - P_n P_{n-1} = \frac{-P_n P_{n+1} + n + 1}{n+1}$$

$$n < 0 \quad P_n = -P_{n+1} + P_n P_{n-1} = \frac{P_n P_{n+1} - n - 1}{n+1}$$

$$P_n = ?$$

$$P_n + P_{n-1} = n^2 - P_n + r$$

$$r P_{n-1} = r \rightarrow P_{n-1} = r$$

$$P_n = n^2 - P_n + r \rightarrow P_n = n^2 - P_n + r$$

$$y = \frac{n^2 + n + r}{n-1}$$

$$ny - y = n^2 + n + r$$

$$0 = n^2 + n(1-y) + r + y$$

$$n = \frac{1-y \pm \sqrt{(1-y)^2 - 4(r+y)}}{2}$$

$$1+y^2 - 2y - 4 - 2y \geq 0 \quad y^2 - 4y - 4 \geq 0 \quad (y-4)(y+1) \geq 0$$

$$R_F = (-\infty, -1] \cup [4, +\infty)$$

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

$$n_{min} = \frac{a}{\varepsilon}$$

$$y_{min} = \frac{1}{n} - \frac{1}{n} + 1 = -\frac{1}{n} \quad R_F = \left[-\frac{1}{n}, +\infty\right)$$

$$y = \sqrt{-n^2 + 2n - 1}$$

$$n_{max} = \frac{-1}{-1} = 1$$

$$y_{max} = -1 + 1 - 1 = -1$$

$$\sqrt{(-\infty, 1]} = [0, 1]$$

$$y = \sqrt{n^2 - 2n + 1}$$

$$\sqrt{(-\infty, +\infty)} = [0, +\infty)$$

$$y = \log(n^2 - 2n + 1) \quad \text{برای } n \in \mathbb{R} \quad \text{در این بازه } \log \text{ تعریف می شود}$$

الف) $\frac{r_{n+1}}{r_n - 1}$
 $\{12 - \frac{1}{r}\}$

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

$(\frac{1}{r} + \infty)$

ب) $\sqrt{\frac{\Sigma n+1}{n-1}}$
 $\sqrt{12 - \frac{1}{r}} = [-1, +\infty) - \frac{1}{r}$

$\Rightarrow (\frac{1}{r} + \infty)$

ج) $y = \frac{r^2 + \frac{1}{r}}{\sqrt{r^2 + 1}}$

$y = \sqrt{r^2 + 1} + \frac{1}{\sqrt{r^2 + 1}} = \sqrt{r^2 + 1} + \frac{1}{\sqrt{r^2 + 1}} = \frac{r^2 + 1 + 1}{\sqrt{r^2 + 1}} = \frac{r^2 + 2}{\sqrt{r^2 + 1}}$

$(\frac{2}{\sqrt{r^2 + 1}} + \infty)$

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

$r^2 y - y = r^2 + 1$

$r^2 (y - 1) = y + 1$

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

$\frac{-1}{r} + \frac{1}{r} + \frac{1}{r} + \frac{1}{r}$

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

$\rightarrow 0 \rightarrow -1$
 $\rightarrow +\infty \rightarrow 1$

$R_f = (-\infty, -1] \cup (1, +\infty)$

$f(x) = \frac{r \sin x + \frac{1}{r}}{\sin x - 1}$

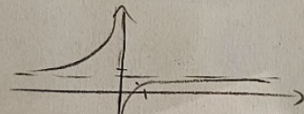
$\max = 1$

$\frac{1}{-1} = -1$

$\frac{1}{-1} = -1$

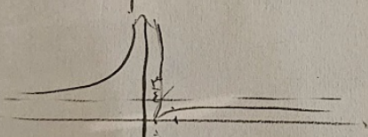
$[-1, -\frac{1}{r}] = R_f$

الف) $y = \left| \frac{r_{n+1} - 1}{\Sigma n} \right|$



ب) $\sqrt{\frac{9n-1}{\Sigma n-1} \frac{9(n-1)}{\Sigma(n-1)}} = \left| \frac{r}{r} \right|$

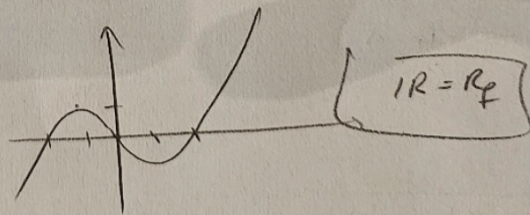
$R_f = [0, +\infty)$



$y = n|a| - r_n$

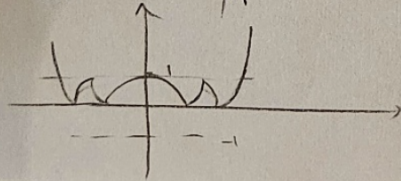
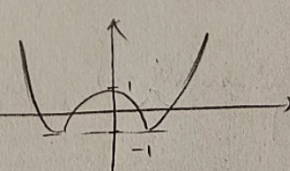
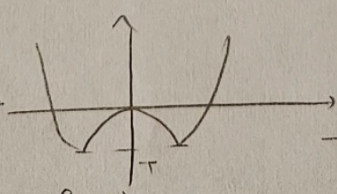
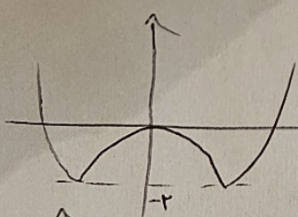
$n \rightarrow r_n - r_n$

$n \rightarrow -n - r_n$
 $n(-n - r)$



$R_f = R_f$

$f(n) =$



$y = |f(n) + 1|$