

① الف) $f(x) = \sqrt{x} \ln\left(x + \frac{\pi}{x}\right) - 1$

$\max_{x \in \mathbb{R}} f(x) = 1 \Rightarrow R_f = [-1, 1]$

$\min_{x \in \mathbb{R}} f(x) = -1$

ب) $f(x) = \sqrt{x} \ln\left(x + \frac{\pi}{x}\right) - 1$

$\max_{x \in \mathbb{R}} f(x) = -1 \Rightarrow R_f = [-1, -1]$

$\min_{x \in \mathbb{R}} f(x) = -1$

② $-1 \leq x < 1 \rightarrow \frac{x}{|x|} = -1, [x] = -1 \Rightarrow y = -1$

$-1 \leq x < -1 \rightarrow \frac{x}{|x|} = -1, [x] = -1 \rightarrow y = -1$

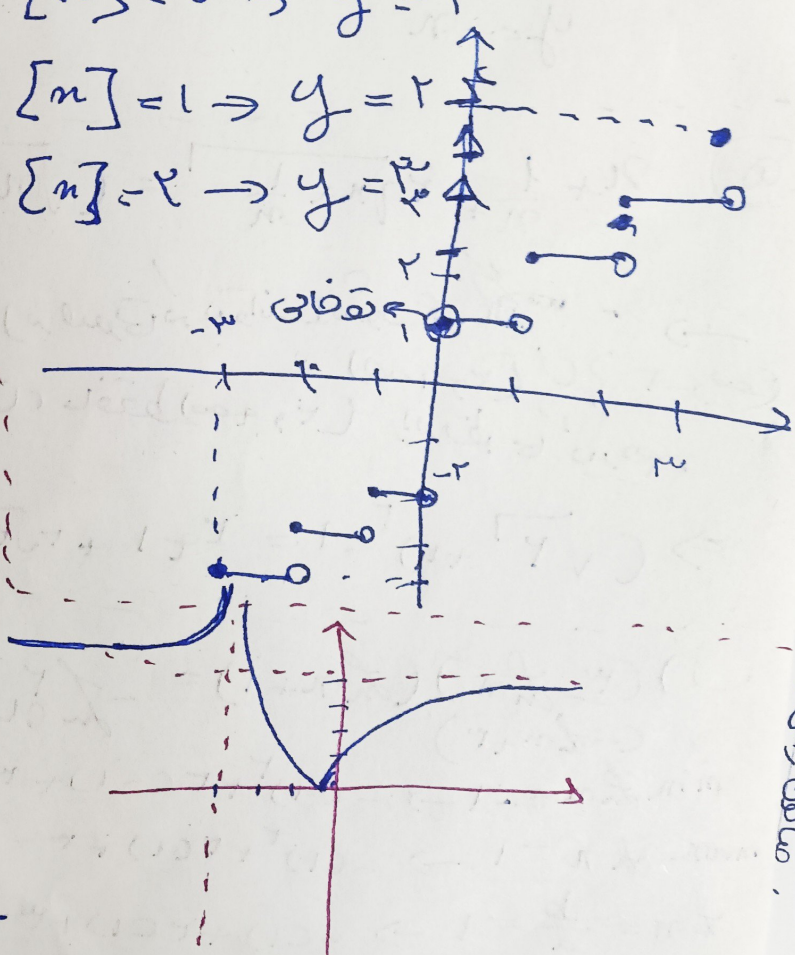
$-1 \leq x < 0 \rightarrow \frac{x}{|x|} = -1, [x] = -1 \rightarrow y = -1$

$0 \leq x < 1 \rightarrow \frac{x}{|x|} = 1, [x] = 0 \rightarrow y = 1$

$1 \leq x < 2 \rightarrow \frac{x}{|x|} = 1, [x] = 1 \rightarrow y = 2$

$2 \leq x < 3 \rightarrow \frac{x}{|x|} = 1, [x] = 2 \rightarrow y = 3$

$x = 3 \rightarrow y = 3$



$y = \frac{f(x+1)}{x+3}$

Month: Year: Day: 1

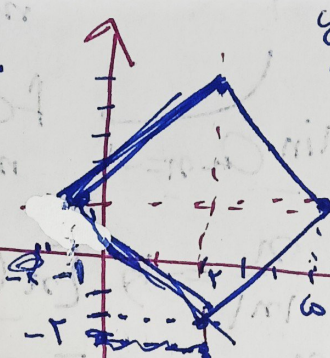
$\lim_{n \rightarrow \infty} \frac{(n-r)(n+r)}{n(n+r)} = \lim_{n \rightarrow \infty} \frac{n-r}{n} = 1$

$\lim_{n \rightarrow \infty} \frac{(n-r)(n+r)}{n(n+r)} = \lim_{n \rightarrow \infty} \frac{n-r}{n} = 1$

$\lim_{n \rightarrow \infty} \frac{(n-r)(n+r)}{n(n+r)} = \lim_{n \rightarrow \infty} \frac{n-r}{n} = 1$

$(5) |y-1| + |n-r| - r = 0$

$y > 1, n < r$
 $y-1+n-r-r=0$
 $y=n+r$



$y > 1, n > r$
 $y-1+n-r-r=0$
 $y=-n+r$

$y < 1, n < r$
 $-y+1+n+r-r=0$
 $y=-n$

$n > r, y < 1$
 $-y+1+n-r-r=0$
 $y=n-r$

$(6) n + \frac{1}{n} + r\sqrt{n + \frac{1}{n}} = (\sqrt{n + \frac{1}{n}} + 1)^2 - 1$

این تابع را می‌توانیم به صورت زیر بنویسیم: $f(x) = (x + \frac{1}{x}) + r\sqrt{x + \frac{1}{x}}$

این تابع برای $x > 0$ تعریف شده است.

$\Rightarrow (\sqrt{r} + 1)^2 - 1 = r + 1 + r\sqrt{r} - 1 = r + r\sqrt{r} \Rightarrow R_p = [r + r\sqrt{r}, +\infty)$

$(7) \lim_{n \rightarrow \infty} \frac{(n-r)(n+r)}{n(n+r)} = \lim_{n \rightarrow \infty} \frac{n-r}{n} = 1$

$\min_{n \in \mathbb{Z}} \lim_{n \rightarrow \infty} \frac{(n-r)(n+r)}{n(n+r)} = \lim_{n \rightarrow \infty} \frac{n-r}{n} = 1$

$\max_{n \in \mathbb{Z}} \lim_{n \rightarrow \infty} \frac{(n-r)(n+r)}{n(n+r)} = \lim_{n \rightarrow \infty} \frac{n-r}{n} = 1 \Rightarrow R_p = [0, 1]$

$\lim_{n \rightarrow \infty} \frac{(n-r)(n+r)}{n(n+r)} = \lim_{n \rightarrow \infty} \frac{n-r}{n} = 1$

$$(9) D_f = \underbrace{\{1, 2, \dots, 9\}}_{\cup 9} \rightarrow (x) =$$

$$\Rightarrow 9 \times 10 + \left\{ -\frac{1}{x} \left(\underbrace{1 + \frac{1}{x} + \frac{1}{x^2}}_{\frac{9 \times 10}{x} = 90} \right) \right\} = 90 + \left(-\frac{90}{x} \right) = 40$$

$$(V) D_f = [r_9 + \infty) \rightarrow \text{مستقيم} \Rightarrow a=0, \text{ مستقيم} \\ r=$$

$$\begin{aligned} r b + 0 &= 0 \\ r b + C &= 1 \Rightarrow b=1, C=-1 \end{aligned}$$

$$g(x) = \sqrt{x^2 + 1} \Rightarrow R_g = [r_9 + \infty)$$

$$(A) \frac{a(x-r)(x+r)}{x+r} \Rightarrow f(x) = x^2 - rx$$

$$x^2 - rx = 1 \Rightarrow x^2 - rx - 1 = 0$$

$$R_f = [-1, +\infty) \rightarrow c = -1$$

$$n = \frac{(-r)}{a}, \frac{C}{b}$$

$$A\left(\frac{-r}{a}\right) = A(-1) = 1$$

$$(a) \sqrt[3]{(a-r)^3} = x-r$$

تابع زوجی از مرتبه 3 است

$$= x^3 - 9mx^2 + 13m - 1 \rightarrow a=9, b=1$$

$$D[-9, 1) \Rightarrow R_f = [-1, 9]$$

$$(10) y = \{n\} + \left\{ n < \frac{1}{x} \right\}$$

$$\frac{1}{x} \leq n < 1 \rightarrow y = 1$$

$$1 < n < \frac{1}{x} \rightarrow y = 2$$

$$\frac{1}{x} \leq n < 2 \rightarrow y = 3$$

دایره

