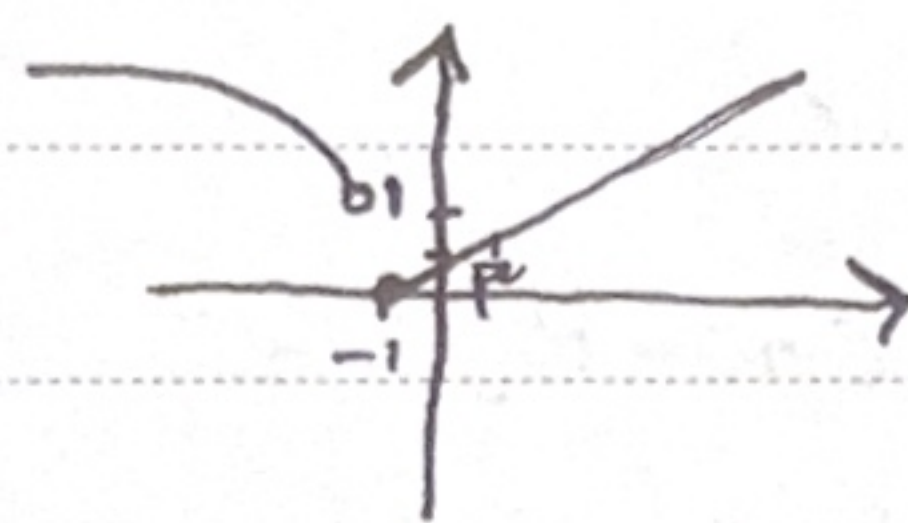


$$x = \begin{cases} y-1 & y \geq 0 \rightarrow y \geq 0 \Rightarrow y^2 \geq 0 \quad y-1 \geq -1 \quad x \geq -1 \\ -y^2 & y < 0 \rightarrow y < 0 \Rightarrow y^2 > 0 \rightarrow -y^2 < 0 \quad x < -1 \end{cases}$$



تابع

$$g(x) = \sqrt{\frac{x f(x-1)}{f(x)}} \Rightarrow \frac{x f(x-1)}{f(x)} \geq 0$$

فرض کنیم  $f(x) > 0$  در  $x = -1, 0, 1, 2, 3, 4, 5$  و  $f(x) < 0$  در  $x = -2, -3, -4, -5$

|                         | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
|-------------------------|----|----|----|----|----|---|---|---|---|---|---|
| $f(x-1)$                | -  | -  | 0  | +  | +  | + | + | 0 | - | 0 | + |
| $f(x)$                  | -  | 0  | +  | +  | +  | 0 | - | 0 | + | + | + |
| $x$                     | -  | -  | -  | 0  | +  | + | + | + | + | + | + |
| $\frac{x f(x-1)}{f(x)}$ | -  | +  | +  | 0  | +  | + | - | 0 | - | 0 | + |

$$D_g = (-5, -2] \cup [0, 3) \cup [5, +\infty)$$

$f(x-1)$  زوج،  $x=4$ ،  $f(x)$  فرد،  $x=4$

در  $x=4$ ،  $f(x-1) > 0$  و  $f(x) < 0$  پس  $\frac{x f(x-1)}{f(x)} < 0$

$$f(x) = \frac{x^2 - 2x + 1}{x^2 - 4x}$$

$\sqrt{f(x)}$  زوج،  $f(x)$  فرد (الف) (۳)

الف)  $x^2 - 4x \neq 0 \Rightarrow x(x-4) \neq 0 \Rightarrow x \neq 0, 4$   $D_f = \mathbb{R} - \{0, 4\}$

$\rightarrow \frac{x^2 - 2x + 1}{x^2 - 4x} \geq 0 \Rightarrow \Delta = 4 - 4 = 0 \Rightarrow \Delta < 0, a > 0 \Rightarrow$  همیشه مثبت

$\Rightarrow x^2 - 4x > 0 \Rightarrow x < 0 \text{ or } x > 4 \Rightarrow D_f = (-\infty, 0) \cup (4, +\infty)$

الف)  $y = \sqrt{\frac{x-1}{x^2 - 2x - 1}} \Rightarrow x = 1$   
 $\rightarrow \frac{x-1}{x^2 - 2x - 1} \geq 0 \Rightarrow x^2 - 2x - 1 = 0 \Rightarrow (x-1)(x+1) = 0 \Rightarrow x = 1, -1$   
 $\rightarrow D_f = (-\infty, -1) \cup (1, +\infty) - \{1\}$

$\rightarrow y = \frac{x^2 + 1}{x - 1 - x} \Rightarrow x - 1 - x \neq 0 \Rightarrow x \neq 1$

$x < -1 \text{ or } x > 1 \Rightarrow D_f = \mathbb{R} - [-1, 1]$

الف)  $f(x) = \frac{\sqrt{x(x-1)}}{\sqrt{|x|+x}} \Rightarrow x(x-1) \geq 0 \Rightarrow x \leq 0 \text{ or } x \geq 1$   $D_f = (-\infty, 0] \cup [1, +\infty)$  (ب) (۴)

$|x|+x > 0 \Rightarrow x > 0 \Rightarrow D_f = (0, +\infty)$  (پ) (۵)

$\rightarrow f(x) = \frac{\sqrt{|x-1|-x^2}}{|x|-1} \Rightarrow |x|-1 \neq 0 \Rightarrow |x| \neq 1 \Rightarrow x \neq \pm 1$  (۱)

$|x-1|-x^2 \geq 0 \Rightarrow x > 1 \Rightarrow x-1-x^2 \geq 0 \Rightarrow \Delta < 0$  همیشه مثبت

$\rightarrow -x + 1 - x^2 \geq 0 \Rightarrow x^2 - x + 1 \geq 0 \Rightarrow \Delta < 0$  همیشه مثبت

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

$D_f = [-1, 1] - \{-1, 1\}$

$$\text{الف) } y = \sqrt{(n-r)[n-r]} \Rightarrow (n-r)[n-r] \geq 0$$

(4)

$$\begin{array}{c} r \quad r \\ + | 0 | + \end{array}$$

$$\Rightarrow D_f = (-\infty, +\infty) = \mathbb{R}$$

$$\text{ب) } \sqrt{|n-1|[n-r]} \quad |n-1|[n-r] \geq 0 \rightarrow [n-r] \geq 0 \quad [n] = r$$

$$\begin{array}{c} 1 \quad r \\ - | - | 0 | + \end{array}$$

$$\Rightarrow [r, +\infty) \cup \{1\} = D_f$$

$$y = \frac{1}{|n-r|-1-k}$$

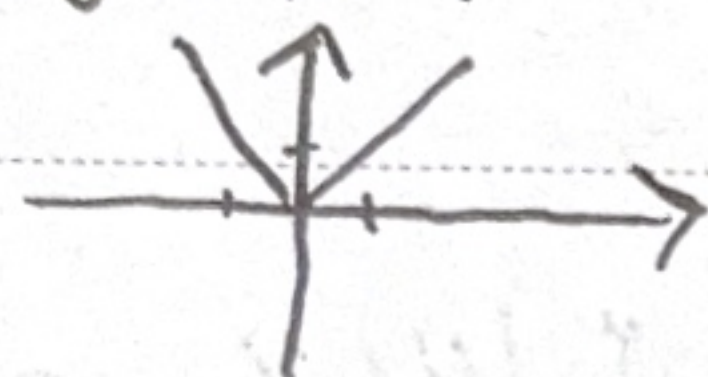
$$|n-r|-1-k \neq 0$$

$$|n-r|-1 \neq k$$

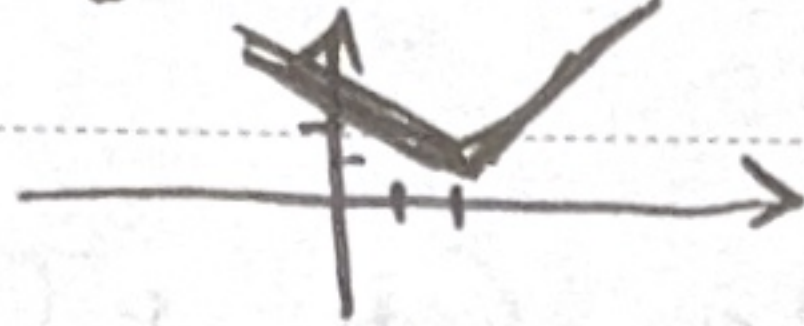
$$K=1$$

(5)

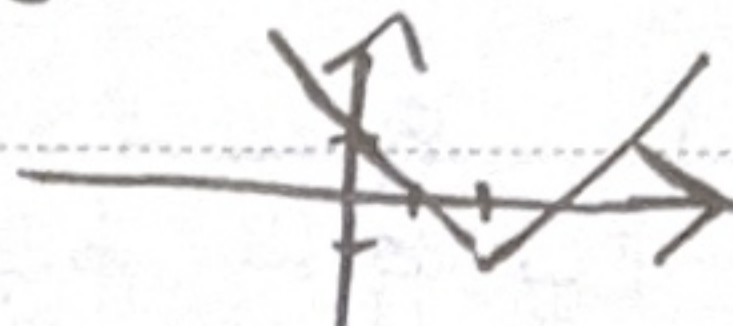
$$\text{① } y = |n|$$



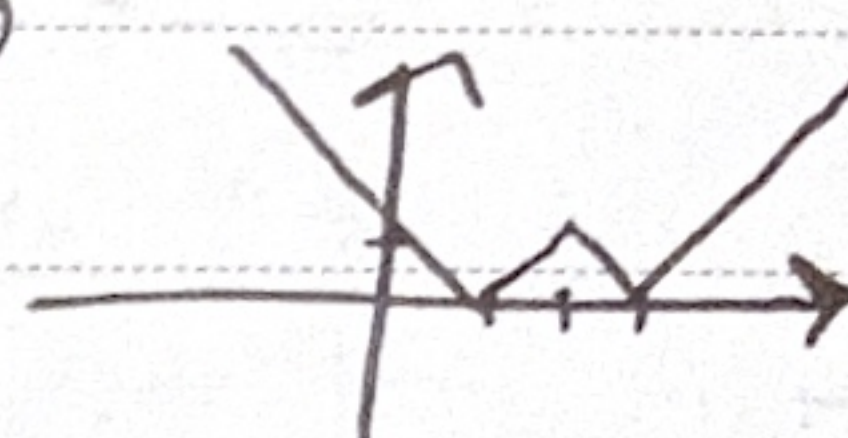
$$\text{② } y = |n-r|$$



$$\text{③ } y = |n-r|-1$$



$$\text{④ } y = |n-r|-1-k$$



$$K=1$$

$$f(n) = \frac{\frac{n^2+kn+r}{n^2+kn+r}}{\frac{n+1}{n-1}} \Rightarrow \frac{n+1}{n-1} \neq 0$$

$$\frac{n+1}{n-1} \neq 0$$

$$n-1 \neq 0 \quad n \neq 1$$

$$\text{①}$$

$$n+1 \neq 0 \quad n \neq -1$$

$$\text{②}$$

$$n^2+kn+r \neq 0 \quad (n+1)(n+r) \neq 0 \quad \frac{n \neq -1}{n \neq -r} \quad \text{③}$$

$$\text{①, ②, ③} \Rightarrow D_f = \mathbb{R} - \{-1, -r, 1\} \Rightarrow n=1 \quad n^2 - kn + r = 0$$

$$n^2 - 4n + 9 = 0 \Rightarrow (n-r)^2 = 0 \Rightarrow n=r \rightarrow \text{ليس حلاً}$$

$$y = \log_{n+1} \log_n \frac{1}{r}$$

$$n+1 \neq 1 \Rightarrow n \neq 0$$

$$n+1 > 0 \Rightarrow n > -1$$

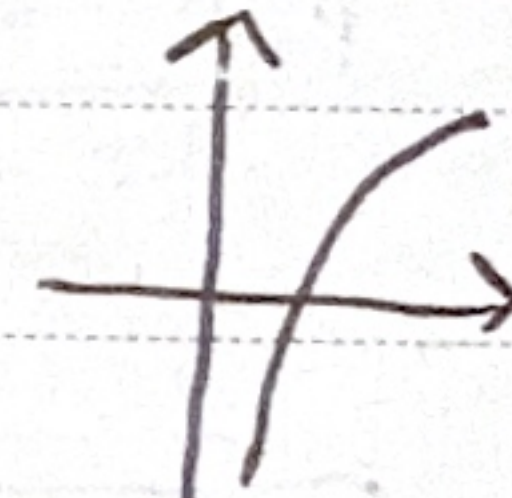
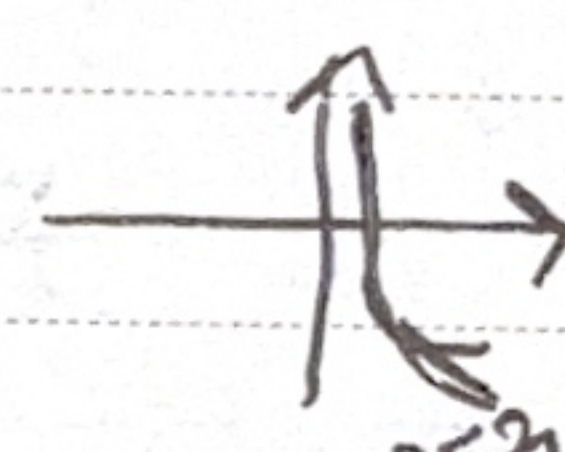
$$n > 0$$

$$n \neq 1$$

$$\log_n \frac{1}{r} > 0$$

$$\rightarrow$$

$$\text{نطاق تعريف الدالة}$$



$$0 < n < 1$$

(6)

$$f(n) \rightarrow D_f = [-\infty, r]$$

(7)

$$-\infty \leq \mu n^2 - 1 \leq r$$

$$-\frac{r}{\mu} \leq \mu n^2 \leq r$$

$$\mu n^2 \leq r$$

$$n^2 \leq \frac{r}{\mu}$$

$$-\frac{r}{\sqrt{\mu}} \leq n \leq \frac{r}{\sqrt{\mu}}$$

$$\Rightarrow -\frac{r\sqrt{\mu}}{\mu} \leq n \leq \frac{r\sqrt{\mu}}{\mu}$$

$$D_f(\mu n^2 - 1) = \left[ -\frac{r\sqrt{\mu}}{\mu}, \frac{r\sqrt{\mu}}{\mu} \right]$$