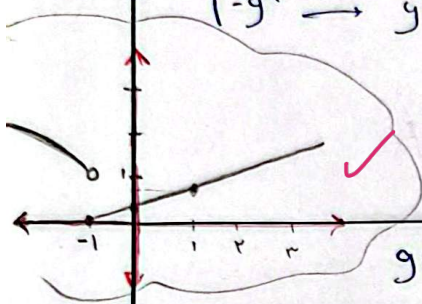


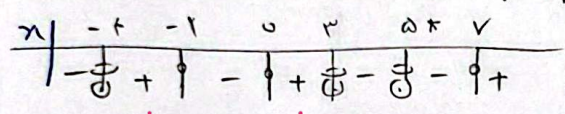
$$x = \begin{cases} y^2 - 1 \rightarrow y = \frac{x+1}{2} \geq 0 \rightarrow x \geq -1 \\ -y^2 \rightarrow y^2 = -x \rightarrow y = \pm \sqrt{-x} \rightarrow y > 1 \rightarrow \sqrt{-x} > 1 \rightarrow -x > 1 \rightarrow x < -1 \end{cases}$$



II: $(-x > 0 \rightarrow x < 0) \rightarrow I \cap II: x < -1$

→ تابع مستقیم → تصادف

$$g(x) = \sqrt{\frac{x f(x-2)}{f(x)}} \geq 0 \rightarrow \begin{cases} x \geq 0 \\ f(x-2) \geq 0 \\ f(x) > 0 \end{cases}$$



$$D_f: (-\infty, -2] \cup [0, 2] \cup [4, +\infty)$$

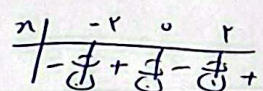
فقط خواست باشد که $x=4$ در دامنه است و $x=2$ در دامنه نیست که به بازه است آفده نیست

$$x^2 - 4x \neq 0 \rightarrow x(x-4) \neq 0$$

$$D_f: \mathbb{R} - \{0, 4\}$$

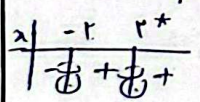
$$\Delta = 9 - 4(2)(2) < 0 \rightarrow \begin{cases} \Delta < 0 \\ a > 0 \end{cases} \rightarrow \text{عبارت همواره مثبت}$$

$$\frac{x^2 - 4x}{x^2 - 4x} \geq 0 \rightarrow 0, \pm 2$$



$$D_f: (-2, 0) \cup (2, +\infty)$$

$$g(x) = \sqrt{\frac{x-2}{x^2 - 4x - 4}} \geq 0 \rightarrow \begin{cases} x-2 \geq 0 \\ x^2 - 4x - 4 > 0 \end{cases}$$



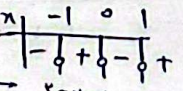
$$D_f: (-2, +\infty) - \{2\}$$

$$t^2 - 4t - 4 = 0 \rightarrow (t-2)(t+2) \rightarrow \begin{cases} t = 2 \rightarrow x = 2 \\ t = -2 \rightarrow x = -2 \end{cases}$$

$$x - 2[-x] \neq 0 \rightarrow x \neq -x[-x] \rightarrow [x] \geq 2 \rightarrow 2 \leq -x \leq 3 \xrightarrow{x-1} -2 \geq x \geq -3$$

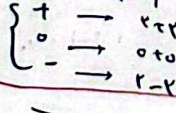
$$D_f: \mathbb{R} - (-3, 2)$$

$$f(x) = \sqrt{x(x^2-1)} \geq 0 \rightarrow \begin{cases} x \geq 0 \\ x^2-1 \geq 0 \end{cases}$$



$$I: [-1, 0] \cup [1, +\infty)$$

$$f(x) = \sqrt{|x-1| - x^2} \geq 0 \rightarrow \begin{cases} |x-1| \geq x^2 \\ |x-1| \geq 0 \end{cases}$$



$$II: \mathbb{R} - \{1\}$$

$$D_f: I \cap II: [1, +\infty)$$

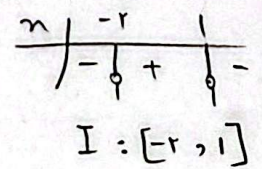
$$x \geq \pm 1 \rightarrow |x-1| \geq 0$$

$$-x^2 + x - 1 \geq 0 \rightarrow x^2 - x + 1 \leq 0$$

$$\Delta = 1 - 4(1)(1) < 0 \rightarrow \begin{cases} \Delta < 0 \\ a > 0 \end{cases} \rightarrow \text{عبارت همواره مثبت}$$

$$II: \mathbb{R} - \{1\}$$

$$D_f: I \cap II: [-2, 1) - \{1\}$$



$$a) y = \sqrt{(n-r)([n-r])} \geq 0 \quad \begin{matrix} n \\ + \quad 0 \quad + \end{matrix} \quad D_f: \mathbb{R} \checkmark$$

$$b) y = \sqrt{(n-1)([n-r])} \geq 0 \quad \begin{matrix} n \\ - \quad 0 \quad + \end{matrix} \quad D_f: [r, +\infty) \cup \{1\} \checkmark$$

$$|n-r| - 1 - k = 0 \rightarrow \begin{cases} n-r-1-k=0 \rightarrow n=r+k \\ -n+r-1-k=0 \rightarrow n=1-k \end{cases}$$

$$II: n = 0, r, \varepsilon \rightarrow \cancel{k=1} \rightarrow k+r=1 \rightarrow k=1-r \quad I: n = 0, r, \varepsilon$$

$$-|n-r| + 1 - k = 0 \rightarrow \begin{cases} n-r+1-k=0 \rightarrow n=r-k \\ -n+r+1-k=0 \rightarrow n=1+k \end{cases} \quad IO II: \cancel{k=1}$$

$$f(n) = \frac{n^r + rn + r}{n^r + rn + r + 1}$$

$$D_f: \mathbb{R} - \{-r, -1, 1\} \rightarrow n=r \checkmark$$

$$\frac{n^r + rn + r}{n^r + rn + r + 1} \neq 0 \rightarrow (-1), \frac{-c}{a} = -r$$

$$\frac{n+1}{n-1} \neq 0 \rightarrow (-1)$$

$$n^r - r(r)n + r(r) = 0$$

$$n^r - 4n + 4 = 0$$

$$(n-r)^2 = 0 \rightarrow n=r$$

$$\Delta = 0 \rightarrow \text{ریشه داری!} \quad \text{ریشه مضاعف}$$

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

$$D_f: (0, 1) \checkmark$$

$$\begin{cases} n+1 > 0 & n+1 \neq 1 \rightarrow n > -1, n \neq 0 \\ n > 0 & n \neq 1 \end{cases}$$

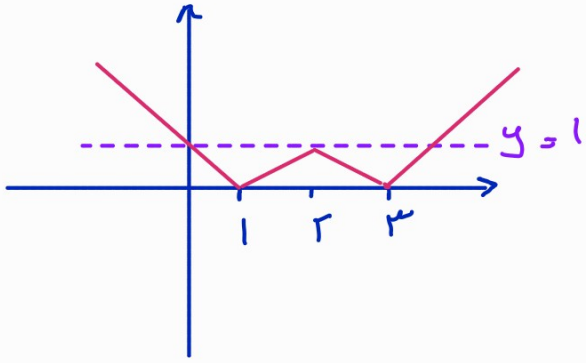
$$\log_n \frac{1}{r} > 0 \rightarrow \frac{1}{r} > n^0 \rightarrow \frac{1}{r} > 1 \rightarrow 0 < n < 1$$

$$-2 \leq n \leq 2 \xrightarrow{f(n^r-1)} -2 \leq r n^r - 1 \leq 2 \xrightarrow{+1} -1 \leq r n^r \leq 3 \rightarrow n^r \leq \frac{3}{r}$$

$$\pm \sqrt{\frac{-r}{r}} \leq n \leq \sqrt{\frac{r}{r}} \rightarrow \frac{-r\sqrt{r}}{r} \leq n \leq \frac{r\sqrt{r}}{r}$$

$$D_f: \left[\frac{-r\sqrt{r}}{r}, \frac{r\sqrt{r}}{r} \right] \checkmark$$

$$||x-2|-1| = K \rightarrow \text{۳ ریشه دارد}$$



شکل تابع را با خط قطع مردهیم :

چون ۳ نقطه برخورد دارند پس $K = 1$ بوره!