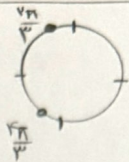
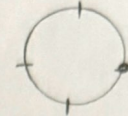
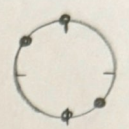
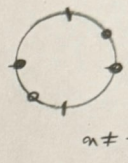


الف) $y = \frac{\sin n - 2}{2 \cos n + 1}$ $2 \cos n + 1 \neq 0 \Rightarrow \cos n \neq -\frac{1}{2}$  $D_f = \mathbb{R} - \left\{ 2K\pi + \frac{2\pi}{3}, 2K\pi + \frac{4\pi}{3} \right\}$

ب) $y = \frac{\sin n + 2}{\cos n - 1}$ $\cos n - 1 \neq 0 \Rightarrow \cos n \neq 1$  $D_f = \mathbb{R} - \{2K\pi\}$

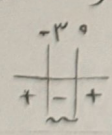
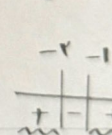
الف) $y = \frac{2 \sin n + 1}{\tan n + 1}$ $\tan n + 1 \neq 0 \Rightarrow \tan n \neq -1$ $\tan n = \frac{\sin n}{\cos n} \Rightarrow \cos n \neq 0$  $D_f = \mathbb{R} - \left\{ K\pi + \frac{3\pi}{4}, K\pi + \frac{7\pi}{4} \right\}$

ب) $y = \frac{\cos n + 1}{\cot n - 1}$ $\cot n = \frac{\cos n}{\sin n} \Rightarrow \sin n \neq 0$ $\cot n - 1 \neq 0 \Rightarrow \cot n \neq 1$  $D_f = \mathbb{R} - \left\{ K\pi + \frac{\pi}{2}, K\pi \right\}$

الف) $\sin y = n^2 - 2 \Rightarrow -1 \leq n^2 - 2 \leq 1 \Rightarrow 1 \leq n^2 \leq 3 \Rightarrow \begin{cases} 1 \leq n \leq \sqrt{3} \\ -1 \geq n \geq -\sqrt{3} \end{cases}$
 $D_f = [1, \sqrt{3}] \cup [-\sqrt{3}, -1]$

ب) $\arccos(\sqrt{n} - 3) =$ $-1 \leq \sqrt{n} - 3 \leq 1$ $D_f = [9, 16]$
 $2 \leq \sqrt{n} \leq 4 \Rightarrow 4 \leq n \leq 16$

الف) $\cos y = |n| - 3 \Rightarrow -1 \leq |n| - 3 \leq 1 \Rightarrow 2 \leq |n| \leq 4 \Rightarrow \begin{cases} 2 \leq n \leq 4 \\ -4 \leq n \leq -2 \end{cases}$
 $D_f = [2, 4] \cup [-4, -2]$

ب) $y = \arcsin(n^2 + 3n + 1) \Rightarrow -1 \leq n^2 + 3n + 1 \leq 1$ $[-1, +\infty) \cup (-\infty, -2]$
 $n^2 + 3n + 1 \leq 1 \Rightarrow n^2 + 3n \leq 0 \Rightarrow n(n+3) \leq 0 \Rightarrow n \in [-3, 0]$  $n^2 + 3n + 1 \geq -1 \Rightarrow n^2 + 3n + 2 \geq 0 \Rightarrow (n+1)(n+2) \geq 0 \Rightarrow n \in (-\infty, -2] \cup [-1, +\infty)$  $D_f = [-3, -2] \cup [-1, 0]$

الف) $y = \log_2 \frac{n^2 - 4}{n}$ $n^2 - 4 > 0 \Rightarrow n^2 > 4 \Rightarrow \begin{cases} n > 2 \\ n < -2 \end{cases}$ $D_f = (-\infty, -2) \cup (2, +\infty)$

ب) $y = \log_2 \frac{2 - |n|}{n}$ $2 - |n| > 0 \Rightarrow |n| < 2 \Rightarrow -2 < n < 2 \Rightarrow D_f = (-2, 2)$

$$a) y = \log_{n-r} a-n$$

$$a-n > 0 \rightarrow n < a$$

$$n-r > 0 \rightarrow n > r$$

$$n-r \neq 1 \rightarrow n \neq r+1$$

$$D_f = (r, a) - \{r+1\}$$

$$b) y = \log_{n+r} a^{r-1}$$

$$a^{r-1} > 0 \rightarrow a^r > 1 \rightarrow n > 1$$

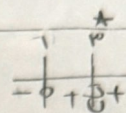
$$n < -1$$

$$n+r > 0 \rightarrow n > -r$$

$$n+r \neq 1 \rightarrow n \neq 1-r$$

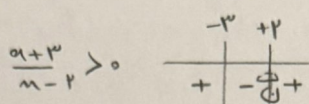
$$D_f = (-r-1) \cup (1, +\infty) - \{1-r\}$$

$$a) y = \log_{n-r} \frac{n^2 - rn + r^2}{n-r} > 0 \rightsquigarrow \frac{(n-1)(n-r)}{(n-r)}$$



$$D_f = (r, +\infty) \cup (1, r)$$

$$b) y = \log_{n+a} \frac{n+r}{n-r}$$



$$D_f = (-a, -r) \cup (r, +\infty) - \{r\}$$

$$n+a > 0 \rightarrow n > -a$$

$$n+a \neq 1 \rightarrow n \neq 1-a$$

$$a) y = \sqrt{r - \log_r^{(n-r)}}$$

$$n-r > 0 \rightarrow n > r$$

$$r - \log_r^{(n-r)} \geq 0 \rightarrow \log_r^{(n-r)} \leq r \rightsquigarrow n-r \leq 1 \rightsquigarrow n \leq r+1$$

$$D_f = (r, r+1]$$

$$b) y = \log(r \log_r^n - 1)$$

$$n > 0$$

$$r \log_r^n - 1 > 0 \rightarrow r \log_r^n > 1 \rightarrow \log_r^n > \frac{1}{r} \rightsquigarrow n > r^{\frac{1}{r}} \Rightarrow n > \sqrt[r]{r}$$

$$D_f = (\sqrt[r]{r}, +\infty)$$

$$a) r^n + 1 \neq 0 \rightsquigarrow r^n \neq -1 \rightsquigarrow D_f = \mathbb{R}$$

$$b) r^n - 1 \neq 0 \rightsquigarrow r^n \neq 1 \quad n \neq 0 \quad D_f = \mathbb{R} - \{0\}$$

$$c) r^n - r \neq 0 \rightsquigarrow r^n \neq r \quad n \neq \frac{1}{r} \quad D_f = \mathbb{R} - \{\frac{1}{r}\}$$

$$d) r^n - r \neq 0 \rightsquigarrow r^n \neq r \rightsquigarrow n \neq \log_r r \quad D_f = \mathbb{R} - \{1\}$$

$$a) y = (r_{n+1})! \rightsquigarrow r_{n+1} \in \mathbb{N} \rightsquigarrow r_n \in \mathbb{N} - 1 \rightsquigarrow n \in \frac{\mathbb{N}-1}{r}$$

$$D_f = \{n \mid n = \frac{k-1}{r}, k \in \mathbb{N}\}$$

$$b) \frac{r^n - r}{r^n - a} \in \mathbb{N} \rightsquigarrow r^n - r \in r^n n - a n \Rightarrow r^n - r n \in -a n + r$$

$$n(r - r n) \in -a n + r$$

$$n \in \frac{-a n + r}{r - r n}$$

$$D_f = \{n \mid n = \frac{-a n + r}{r - r n}, k \in \mathbb{N}\}$$