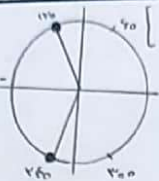
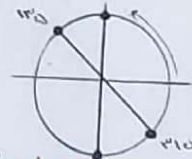


الف) $2\cos x + 1 \neq 0 \leadsto \cos x \neq -\frac{1}{2}$  $\rightarrow D_f = R - \left\{ 2k\pi + \frac{2\pi}{3}, 2k\pi + \frac{4\pi}{3} \right\}$
 $D_f = R - \left\{ 2k\pi \pm \frac{2\pi}{3} \right\}$ ۳

$\Rightarrow \cos x - 1 \neq 0 \leadsto \cos x \neq 1$  $\rightarrow D_f = R - \{ 2k\pi \}$

الف) $\tan x + 1 \neq 0 \rightarrow \tan x \neq -1$  $\rightarrow D_f = R - \left\{ k\pi + \frac{\pi}{4}, k\pi + \frac{5\pi}{4} \right\}$
 $\tan = \frac{\sin}{\cos} \Rightarrow \frac{\sin}{0}$ تعریف نشده است.
 این دو نقطه tan تعریف نشده اند.

$\Rightarrow \cot x - 1 \neq 0 \rightarrow \cot x \neq 1$  $\rightarrow D_f = R - \left\{ k\pi, k\pi + \frac{\pi}{4} \right\}$
 تعریف نشده است. $\cot$

الف) $\sin y = x^2 - 2 \leadsto -1 \leq x^2 - 2 \leq 1 \xrightarrow{+2} 1 \leq x^2 \leq 3 \xrightarrow{\sqrt{\quad}} 1 \leq x \leq \sqrt{3} \rightarrow D_f = [1, \sqrt{3}] \cup [-\sqrt{3}, -1]$
 $[-1, 1]$
 $\Rightarrow y = \arccos(\sqrt{x} - 3) \rightarrow -1 \leq \sqrt{x} - 3 \leq 1 \xrightarrow{+3} 2 \leq \sqrt{x} \leq 4 \leadsto 4 \leq x \leq 16 \rightarrow D_f = [4, 16]$ ۳

الف) $\cos y = |x| - 3 \leadsto -1 \leq |x| - 3 \leq 1 \xrightarrow{+3} 2 \leq |x| \leq 4 \rightarrow \begin{cases} 2 \leq x \leq 4 \\ -2 \geq x \geq -4 \end{cases} \rightarrow D_f = [-4, -2] \cup [2, 4]$
 $[-1, 1]$
 $\Rightarrow y = \arcsin(x^2 + 3x + 1) \leadsto -1 \leq x^2 + 3x + 1 \leq 1 \rightarrow \begin{cases} \textcircled{1} x^2 + 3x + 1 \leq 1 \xrightarrow{-1} x^2 + 3x \leq 0 \\ \textcircled{2} x^2 + 3x + 1 \geq -1 \xrightarrow{+1} x^2 + 3x + 2 \geq 0 \end{cases}$
 $\textcircled{1} \frac{x}{x} \frac{-3}{-3} \frac{0}{0} \frac{+}{+} \frac{-}{-} \frac{+}{+}$ $\textcircled{2} \frac{x}{x} \frac{-1}{-1} \frac{-2}{-2} \frac{+}{+} \frac{-}{-}$
 $\Rightarrow D_f = \textcircled{1} \cap \textcircled{2} \rightarrow D_f = [-3, -2] \cup [-1, 0]$ ۳

الف) $\log_{\frac{1}{3}}(x^2 - 4) \rightarrow x^2 - 4 > 0 \xrightarrow{+4} x^2 > 4 \xrightarrow{\sqrt{\quad}} x > 2 \text{ or } x < -2 \rightarrow D_f = (-\infty, -2) \cup (2, +\infty)$ ۳

$\Rightarrow \log_{\frac{1}{3}}(2 - |x|) \rightarrow 2 - |x| > 0 \rightarrow |x| < 2 \rightarrow -2 < x < 2 \rightarrow D_f = (-2, 2)$ ۵

$$\text{اذا) } y = \log_{x-r}^{a-x} \rightarrow \begin{cases} a-x > 0 \rightarrow a > x \\ x-r > 0 \rightarrow x > r \\ x-r \neq 1 \rightsquigarrow x \neq r+1 \end{cases} \Rightarrow D_f = (r, a) - \{r+1\}$$

$$\Rightarrow y = \log_{x+r}^{x^2-1} \rightarrow \begin{cases} x^2-1 > 0 \rightarrow x^2 > 1 \begin{cases} x > 1 \\ x < -1 \end{cases} \\ x+r > 0 \rightarrow x > -r \\ x+r \neq 1 \rightsquigarrow x \neq -r-1 \end{cases} \Rightarrow D_f = (-\infty, -1) \cup (1, +\infty) - \{-r-1\}$$

$$\text{اذا) } y = \log_{x-r} \frac{x^2-4x+r}{x-r} \rightsquigarrow \begin{cases} \frac{x^2-4x+r}{x-r} > 0 \rightsquigarrow \frac{(x-1)(x-3)}{x-r} > 0 \rightarrow \begin{array}{c|ccc} x & 1 & r & 3 \\ \hline & - & + & - \end{array} \\ x-r > 0 \rightarrow x > r \\ x-r \neq 1 \rightsquigarrow x \neq r+1 \end{cases}$$

$$\Rightarrow y = \log_{x+r} \frac{x+r}{x-r} \rightsquigarrow \begin{cases} \frac{x+r}{x-r} > 0 \rightarrow \begin{array}{c|ccc} x & -r & r & \\ \hline & + & - & + \end{array} \rightarrow (-\infty, -r) \cup (r, +\infty) \\ x+r > 0 \rightsquigarrow x > -r \\ x+r \neq 1 \rightsquigarrow x \neq -r-1 \end{cases} \Rightarrow D_f = (-\infty, -r) \cup (r, +\infty) - \{-r-1\}$$

$$\text{اذا) } y = \sqrt{r - \log_r(x-r)} \begin{cases} ① r - \log_r(x-r) \geq 0 \rightsquigarrow r \geq \log_r(x-r) \rightsquigarrow x-r \leq r \rightsquigarrow x \leq r+1 \\ ② x-r > 0 \rightarrow x > r \end{cases} \Rightarrow D_f = (r, r+1]$$

$$\Rightarrow y = \log(r \log_r^x - 1) \begin{cases} r \log_r^x - 1 \rightarrow x > 0 \\ r \log_r^x - 1 > 0 \rightarrow \log_r^x > \frac{1}{r} \rightsquigarrow x > \frac{r}{r-1} \rightsquigarrow D_f = \left(\frac{r}{r-1}, +\infty\right) \end{cases}$$

$$\text{اذا) } r^x + 1 \neq 0 \rightsquigarrow r^x \neq -1 \rightsquigarrow D_f = \mathbb{R}$$

$$\text{اذا) } r^x - 1 \neq 0 \rightsquigarrow r^x \neq 1 \rightsquigarrow D_f = \mathbb{R} - \{0\}$$

$$\text{ج) } r^x - r \neq 0 \rightsquigarrow r^x \neq r \rightsquigarrow D_f = \mathbb{R} - \{\log_r r\}$$

$$\text{د) } r^x - r^2 \neq 0 \rightsquigarrow r^x \neq r^2 \rightsquigarrow D_f = \mathbb{R} - \{\log_r r^2\}$$

$$\log_b^a c \rightarrow b^c = a$$

$$y = \square! \rightsquigarrow \square \in \mathbb{W}$$

$$\text{اذا) } y = (rx+1)! \rightsquigarrow rx+1 \in \mathbb{W} \rightsquigarrow x \in \frac{w-1}{r} \rightsquigarrow D_f = \left\{x \mid x = \frac{w-1}{r}, w \in \mathbb{W}\right\}$$

$$\Rightarrow y = \left(\frac{rx-r}{rx-r}\right)! \rightsquigarrow \frac{rx-r}{rx-r} \in \mathbb{W} \rightsquigarrow rx-r = rxw - w \rightarrow rx - rxw = -w + r$$

$$\Rightarrow x = \frac{-w+r}{r-rw} \rightarrow x = \frac{w-r}{rw-r} \rightsquigarrow D_f = \left\{x \mid x = \frac{w-r}{rw-r}, w \in \mathbb{W}\right\}$$