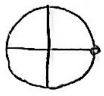
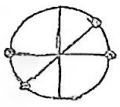
۱- الف) $y=\frac{\sin x-2}{2\cos x+1}$　　$2\cos x+1\neq 0 \longrightarrow \cos x\neq -\frac{1}{2}$　　  　　$D_f=\mathbb{R}-\left\{2k\pi+\frac{2\pi}{3}, 2k\pi+\frac{4\pi}{3}\right\}$

ب) $y=\frac{\sin x+2}{\cos x-1}$　　$\cos x\neq 1$　　  　　$D_f=\mathbb{R}-\{2k\pi\}$

۲- الف) $y=\frac{2\sin x+1}{\tan x+1} \longrightarrow \begin{cases}\tan x\neq -1\\ \cos x\neq 0\end{cases}$　　  　　$D_f=\mathbb{R}-\left\{k\pi+\frac{3\pi}{4}, k\pi+\frac{\pi}{2}\right\}$

ب) $y=\frac{\cos x+1}{\cot x-1} \longrightarrow \begin{cases}\cot x\neq 1\\ \sin x\neq 0\end{cases}$　　  　　$D_f=\mathbb{R}-\left\{k\pi, k\pi+\frac{\pi}{4}\right\}$

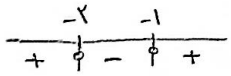
۳- الف) $\sin y=x^2-2 \longrightarrow -1\leq x^2-2\leq 1 \longrightarrow 1\leq x^2\leq 3$　　$\begin{cases}\sqrt{1}\leq x\leq\sqrt{3}\\ -\sqrt{1}\geq x\geq -\sqrt{3}\end{cases}$

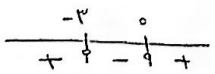
$D_f=[-\sqrt{3},-\sqrt{1}]\cup[\sqrt{1},\sqrt{3}]$

ب) $y=\arccos(\sqrt{x}-2) \longrightarrow \begin{cases}\sqrt{x}\longrightarrow x\geq 0\\ -1\leq\sqrt{x}-2\leq 1 \longrightarrow 2\leq\sqrt{x}\leq 3 \longrightarrow 3\leq x\leq 16\end{cases}$　　$D_f=[3,16]$

۴- الف) $\cos y=|x|-2 \longrightarrow -1\leq|x|-2\leq 1 \longrightarrow 2\leq|x|\leq 3$　　$\begin{cases}2<x<3\\ -2>x>-3\end{cases}$　　$D_f=[-3,-2]\cup[2,3]$

ب) $y=\arcsin(x^2+2x+1) \longrightarrow -1\leq x^2+2x+1\leq 1 \longrightarrow$　　$\begin{cases}x^2+2x+1\geq -1 \longrightarrow x^2+2x+2\geq 0 \longrightarrow (x+1)(x+2)\geq 0 & *\\ x^2+2x+1\leq 1 \longrightarrow x^2+2x\leq 0 \longrightarrow x(x+2)\leq 0 & **\end{cases}$





$D_f=[-2,-1]\cup[-1,0]$

۵- الف) $y=\log_2^{x^2-3}$　　$x^2-3>0 \longrightarrow x^2>3$　　$\begin{cases}x>2\\ x<-2\end{cases}$　　$D_f=(-\infty,-2)\cup(2,+\infty)$

ب) $y=\log_2^{2-|x|}$　　$2-|x|>0 \longrightarrow |x|<2 \longrightarrow -2<x<2$　　$D_f=(-2,2)$

۶- الف) $y=\log_{x-2}^{5-x}$

$5-x>0 \longrightarrow x<5$

$x-2>0 \longrightarrow x>2$　　$D_f=(2,5)-\{3\}$

$x-2\neq 1 \longrightarrow x\neq 3$

ب) $\log \frac{x^2-1}{x+2}$

$x^2-1>0 \rightarrow x^2>1 \begin{cases} x>1 \\ x<-1 \end{cases}$

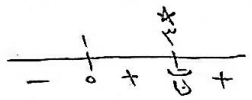
$x+2>0 \rightarrow x>-2$

$x+2 \neq 1 \rightarrow x \neq -1$

$D_f = (-2,-1) \cup (1,+\infty) - \{-1\}$

۷- الف) $y = \log \frac{x^2-5x+4}{x-2}$

$\frac{x^2-5x+4}{x-2} > 0 \rightarrow \frac{(x-1)(x-4)}{x-2} > 0$



$D_f = (1,+\infty) - \{2\}$

ب) $y = \log \frac{\frac{x+2}{x-2}}{x+5}$

$\frac{x+2}{x-2} > 0 \rightarrow$

$x+5>0 \rightarrow x>-5$

$x+5 \neq 1 \rightarrow x \neq -4$

$D_f = (-5,-2) \cup (2,+\infty) - \{-4\}$

۸- الف) $y = \sqrt{2 - \log_2^{(x-2)}} \rightarrow \begin{cases} x-2>0 \rightarrow x>2 \\ 2-\log_2^{(x-2)} \geq 0 \rightarrow \log_2^{(x-2)} \leq 2 \rightarrow x-2 \leq 4 \rightarrow x \leq 6 \end{cases}$

$D_f = (2,6]$

ب) $y = \log(2\log_2^x - 1) \rightarrow \begin{cases} x>0 \\ 2\log_2^x - 1 > 0 \rightarrow \log_2^x > \frac{1}{2} \rightarrow x > 2^{\frac{1}{2}} \rightarrow x > \sqrt{2} \end{cases}$

$D_f = (\sqrt{2},+\infty)$

۹- الف) $y = \frac{2}{e^x+1} \rightarrow e^x+1 \neq 0 \rightarrow e^x \neq -1$ (همواره برقرار است) $\quad D_f = \mathbb{R}$

ب) $y = \frac{2}{e^x-1} \rightarrow e^x-1 \neq 0 \rightarrow e^x \neq 1 \rightarrow x \neq 0 \quad D_f = \mathbb{R} - \{0\}$

ج) $y = \frac{2}{e^x-2} \rightarrow e^x-2 \neq 0 \rightarrow e^x \neq 2 \rightarrow x \neq \log_e^2 \quad D_f = \mathbb{R} - \{\log_e^2\}$

د) $y = \frac{2}{e^x-3} \rightarrow e^x-3 \neq 0 \rightarrow e^x \neq 3 \rightarrow x \neq \log_e^3 \quad D_f = \mathbb{R} - \{\log_e^3\}$

۱۰- الف) $y = (4x+1)! \rightarrow 4x+1 \in w \rightarrow x \in \frac{w-1}{4} \quad D_f = \{x \mid x = \frac{k-1}{4}, k \in w\}$

ب) $y = (\frac{2x-2}{2x-5})! \rightarrow \frac{2x-2}{2x-5} \in w \Rightarrow x = \frac{-2+5w}{2-2w}$

$D_f = \{x \mid x = \frac{-2+5k}{2-2k}; k \in w\}$