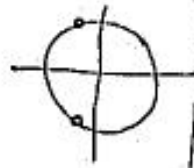


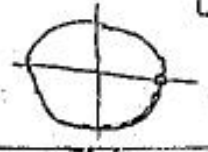
الف)  $\frac{\sin x - 1}{2 \cos x + 1}$   $2 \cos x + 1 \neq 0$   
 $\cos x \neq -\frac{1}{2}$

$D_f = \mathbb{R} - \left\{ 2k\pi + \frac{2\pi}{3}, 2k\pi + \frac{4\pi}{3} \right\}$



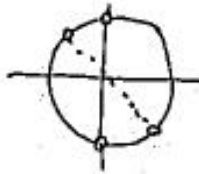
ب)  $\frac{\sin x + 1}{\cos x - 1}$   $\cos x - 1 \neq 0$   
 $\cos x \neq 1$

$D_f = \mathbb{R} - \{2k\pi\}$



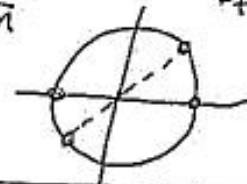
الف)  $\frac{2 \sin x + 1}{\tan x + 1}$   $\tan x + 1 \neq 0$   $\cos x \neq 0$   
 $\tan x \neq -1$

$D_f = \mathbb{R} - \left\{ k\pi + \frac{3\pi}{4}, k\pi + \frac{5\pi}{4} \right\}$



ب)  $\frac{\cos x + 1}{\cot x - 1}$   $\cot x \neq 1$   
 $\sin x \neq 0$

$D_f = \mathbb{R} - \left\{ k\pi, k\pi + \frac{\pi}{2} \right\}$



الف)  $\sin y = x^2 - 2$   $-1 \leq x^2 - 2 \leq 1$

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

$1 \leq x^2 \leq 3$   
 $1 \leq x \leq \sqrt{3}$

ب)  $y = \arccos(\sqrt{x} - 1)$

$-1 \leq \sqrt{x} - 1 \leq 1$   
 $0 \leq \sqrt{x} \leq 2$   
 $0 \leq x \leq 4$

$D_f = [0, 4]$

الف)  $\cos y = |x| - 2$   $-1 \leq |x| - 2 \leq 1$

$1 \leq |x| \leq 3$

$1 \leq x \leq 3 \Rightarrow D_f = [1, 3] \cup [-3, -1]$

$-3 \leq x \leq -1$

ب)  $y = \arcsin(x^2 + 3x + 1)$

$-1 \leq x^2 + 3x + 1 \leq 1$

$x^2 + 3x + 1 \leq 1 \Rightarrow x^2 + 3x \leq 0$   
 $x(x+3) \leq 0$   
 $0 \leq x \leq -3$

$-1 \leq x^2 + 3x + 1 \Rightarrow x^2 + 3x + 2 \geq 0$   
 $(x+1)(x+2) \geq 0$   
 $x \leq -2$  or  $x \geq -1$   
 $D_f = [-2, -1] \cup [0, 3]$

الف)  $y = \log_{10} \frac{x^2 - 2}{10}$

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

$x^2 - 2 > 0$

$x^2 > 2 \Rightarrow x > \sqrt{2}$  or  $x < -\sqrt{2}$

ب)  $y = \log_{10} \frac{2 - |x|}{10}$

$2 - |x| > 0$

$|x| < 2$

$-2 < x < 2$

$\Leftrightarrow$

$x < 2$   
 $x > -2$

$D_f = (-2, 2)$

الف)  $y = \log \frac{\omega - x}{x - 1}$   $\omega - x > 0$   $x - 1 > 0$   $x - 1 \neq 1$   $D_f = (\omega, \infty) - \{1\}$  (6)

ب)  $y = \log \frac{x^2 - 1}{x + 1}$   $x^2 - 1 > 0$   $x + 1 > 0$   $x + 1 \neq 1$   $D_f = (-1, -1) \cup (1, +\infty) - \{-1\}$

الف)  $\log \frac{x^2 - 1}{x - 1}$   $\frac{x^2 - 1}{x - 1} > 0$   $D_f = (1, +\infty) - \{1\}$  (7)

ب)  $y = \log \frac{x^2 - 1}{x + 1}$   $\frac{x^2 - 1}{x + 1} > 0$   $x + 1 > 0$   $x + 1 \neq 1$   $D_f = (-\infty, -1) \cup (1, \infty) - \{-1\}$

الف)  $\sqrt{1 - \log_2(x - 2)}$   $x - 2 > 0$   $1 - \log_2(x - 2) \geq 0$   $\log_2(x - 2) \leq 1$   $x - 2 \leq 2$   $D_f = [2, 4]$  (8)

ب)  $\log(2 \log_2 x - 1)$   $x > 0$   $2 \log_2 x - 1 > 0$   $\log_2 x > \frac{1}{2}$   $D_f = (\sqrt{2}, +\infty)$

الف)  $\frac{1}{e^x + 1}$   $e^x + 1 \neq 0$   $D_f = \mathbb{R}$  (9)

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

ج)  $y = \frac{1}{e^x - 2}$   $e^x - 2 \neq 0$   $D_f = \mathbb{R} - \log_2 \frac{1}{1/2}$

د)  $\frac{1}{e^x - 1}$   $e^x - 1 \neq 0$   $D_f = \mathbb{R} - \log_2 \frac{1}{1/2}$

الف)  $(x + 1)!$

$x + 1 \in \omega$

$x \in \omega - \frac{1}{\varepsilon}$

$D_f = \{x \mid x = k - \frac{1}{\varepsilon}, k \in \omega\}$

ب)  $(\frac{x - 1}{x - \omega})!$   $\frac{x - 1}{x - \omega} \in \omega$  (10)

$x - 1 = x \omega - \omega$

$x - x \omega = -\omega + 1$

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

$D_f = \{x \mid x = \frac{-\omega k + 1}{-x k + 1}, k \in \omega\}$