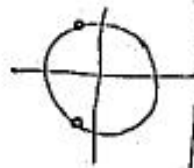


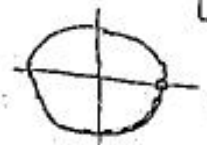
الف) $\frac{\sin x - 1}{2 \cos x + 1}$ $2 \cos x + 1 \neq 0$
 $\cos x \neq -\frac{1}{2}$

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



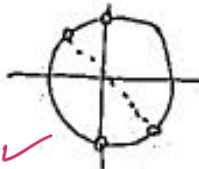
ب) $\frac{\sin x + 1}{\cos x - 1}$ $\cos x - 1 \neq 0$
 $\cos x \neq 1$

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



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

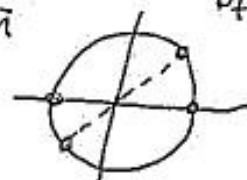
$D_f = \mathbb{R} - \left\{ k\pi + \frac{3\pi}{4}, k\pi + \frac{5\pi}{4} \right\}$



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

$\frac{\cos}{\sin}$

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



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

$D_f = [1, 3]$

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

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

$0 \leq |x| \leq 2$

$0 \leq x \leq 2 \Rightarrow D_f = [0, 2] \cup [-2, 0]$

$-2 \leq x \leq 2$

ب) $y = \arcsin(x^2 + 3x + 1)$

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

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

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

الف) $y = \log_{\frac{1}{2}}(x^2 - 4)$

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

$x^2 - 4 > 0$

$x^2 > 4 \Rightarrow x > 2$ or $x < -2$

ب) $y = \log_{\frac{1}{2}}(2 - |x|)$

$2 - |x| > 0$

$|x| < 2$

$-2 < x < 2$

$\Leftrightarrow$

$x < 2$

$x > -2$

$D_f = (-2, 2)$

الف) $y = \log \frac{\omega - x}{x - 2}$

$\omega - x > 0$
 $x < \omega$

$x - 2 > 0$
 $x > 2$

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

$D_f = (\omega, \infty) - \{3\}$

(6)

ب) $y = \log \frac{x^2 - 1}{x + 3}$

$x^2 - 1 > 0$
 $x^2 > 1$
 $x > 1$
 $x < -1$

$x + 3 > 0$
 $x > -3$

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

$D_f = (-3, -1) \cup (1, +\infty) - \{-2\}$

الف) $\log \frac{x^2 - 13x + 12}{x - 2}$

$\frac{(x-1)(x-12)}{(x-2)} > 0$

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

(7)

ب) $y = \log \frac{x+3}{x-2}$

$\frac{x+3}{x-2} > 0$

$x+3 > 0$
 $x > -3$

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

$D_f = (-3, -2) \cup (2, +\infty) - \{-2\}$

الف) $\sqrt{3 - \log_2(x-2)}$

$x-2 > 0$
 $x > 2$

$3 - \log_2(x-2) \geq 0$
 $\log_2(x-2) \leq 3$

$x-2 \leq 8$
 $x \leq 10$

$D_f = [2, 10]$

(8)

ب) $\log(2 \log_2 x - 1)$

$x > 0$

$2 \log_2 x - 1 > 0$

$\log_2 x > \frac{1}{2}$

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

$2 \log_2 x > 1 \Rightarrow$

$x > 2^{\frac{1}{2}} \Rightarrow x > \sqrt{2}$

الف) $\frac{3}{e^x + 1}$

$e^x + 1 \neq 0$
 $e^x \neq -1$

$D_f = \mathbb{R}$

(9)

ب) $\frac{3}{e^x - 1}$

$e^x - 1 \neq 0$
 $e^x \neq 1$
 $x \neq 0$

$D_f = \mathbb{R} - \{0\}$

ج) $y = \frac{3}{e^x - 2}$

$e^x - 2 \neq 0$

$e^x \neq 2 \Rightarrow x \neq \log_2 2$
 $x \neq 1$

$D_f = \mathbb{R} - \log_2 \frac{3}{\frac{1}{2}}$

د) $\frac{3}{e^x - 3}$

$e^x - 3 \neq 0$
 $e^x \neq 3$

$x \neq \log_2 3$

$D_f = \mathbb{R} - \log_2 3$

الف) $(\varepsilon x + 1)!$

$\varepsilon x + 1 \in \omega$

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

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

ب) $(\frac{\varepsilon x - 2}{2x - \omega})!$

$\frac{\varepsilon x - 2}{2x - \omega} \in \omega$

$\varepsilon x - 2 = 2x\omega - \omega\omega$

$\varepsilon x - 2x\omega = -\omega\omega + 2$

$x = \frac{-\omega\omega + 2}{-\varepsilon\omega + 2}$

$D_f = \{x \mid x = \frac{-\omega k + 2}{-\varepsilon k + 2}, k \in \omega\}$

(10)