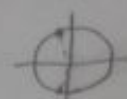


الف) $y = \frac{\sin x - 2}{2 \cos x + 1} \rightarrow 2 \cos x + 1 \neq 0 \rightarrow \cos x \neq -\frac{1}{2}$



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

ب) $y = \frac{\sin x + 2}{\cos x - 1} \rightarrow \cos x \neq 1$



$D_f, R = \{ 2k\pi \}$

الف) $y = \frac{2 \sin x + 1}{\tan x + 1} \rightarrow \tan x \neq -1$



$D_f, R = \left\{ k\pi - \frac{\pi}{4} \right\}$

ب) $y = \frac{\cos x + 1}{\cot x - 1} \rightarrow \cot x \neq 1$



$D_f, R = \left\{ k\pi + \frac{\pi}{4} \right\}$

الف) $\sin y = x^2 - 2 \rightarrow -1 \leq x^2 - 2 \leq 1 \rightarrow 1 \leq x^2 \leq 3 \rightarrow 1 \leq x \leq \sqrt{3} \text{ or } -\sqrt{3} \leq x \leq -1$

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

ب) $y = \arccos(\sqrt{x} - 3) \rightarrow -1 \leq \sqrt{x} - 3 \leq 1 \rightarrow 2 \leq \sqrt{x} \leq 4 \rightarrow 4 \leq x \leq 16$

$D_f = [4, 16]$

الف) $\cos y = |x| - 3 \rightarrow -1 \leq |x| - 3 \leq 1 \rightarrow 2 \leq |x| \leq 4$

$D_f = [-4, -2] \cup [2, 4]$

ب) $y = \arcsin(x^2 - 2x + 1)$

$D_f = (-\infty, -1] \cup [0, 0) \cup (0, 1] \rightarrow -2 \leq x^2 - 2x + 1 \leq 1$

$0 \leq x^2 - 2x + 1 \leq 2 \rightarrow (x-1)^2 \leq 2 \rightarrow x \in [1-\sqrt{2}, 1+\sqrt{2}]$

الف) $y = \log_r x^2 - 2$

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

$x > \sqrt{2} \text{ or } x < -\sqrt{2}$

$D_f = (-\infty, -\sqrt{2}] \cup [\sqrt{2}, \infty)$

ب) $\log_p \frac{2-|x|}{p}$

$2-|x| > 0 \rightarrow |x| < 2 \rightarrow -2 < x < 2$

$D_f = (-2, 2)$

مثال 1) $y = \log \frac{a-x}{x-r}$

$$\begin{cases} a-x > 0 \rightarrow x < a \\ a-r > 0 \rightarrow x > r \\ x-r \neq 1 \rightarrow x \neq r+1 \end{cases}$$

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

2) $y = \log \frac{x^{r-1}}{x+r}$

$$\begin{cases} x^{r-1} > 0 \rightarrow x^{r-1} > 0 \rightarrow \begin{cases} x > 1 \\ x < -1 \end{cases} \\ x+r > 0 \rightarrow x > -r \\ x+r \neq 1 \rightarrow x \neq 1-r \end{cases}$$

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

مثال 3) $y = \log \frac{x^r - 2x + r}{x-r}$

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

$$Df = (1, \infty) - \{r\}$$

4) $y = \log \frac{x+r}{x-r}$

$$\begin{cases} \frac{x+r}{x-r} > 0 \rightarrow \begin{cases} x > r \\ x < -r \end{cases} \\ x-r > 0 \rightarrow x > r \\ x-r \neq 1 \rightarrow x \neq r+1 \end{cases}$$

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

مثال 5) $y = \sqrt{r} \cdot \log(x-r)$

$$\log_r x \leq r \rightarrow x-r \leq r \rightarrow x \leq 2r$$

$$Df = (-\infty, 2r]$$

6) $y = \log(r \log_r x - 1)$ $r \log_r x > 1 \rightarrow \log_r x > \frac{1}{r} \rightarrow x > r^{\frac{1}{r}} \rightarrow x > \sqrt[r]{r}$

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

7) $y = \frac{r}{x^{r-1}}$ $x^{r-1} \neq 0 \rightarrow x \neq 0 \checkmark$

$$Df = \mathbb{R}$$

8) $y = \frac{r}{x^{r-1}}$ $x^{r-1} \neq 0 \rightarrow x \neq 0$

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

9) $y = \frac{r}{x^{r-1}}$ $x^{r-1} \neq 0 \rightarrow x \neq 0$

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

10) $y = \frac{r}{x^{r-1}}$ $x^{r-1} \neq 0 \rightarrow x \neq 0$

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

مثال 11) $y = (x+1)!$

$$x \in \mathbb{N} - 1 \rightarrow x \in \frac{\mathbb{N}-1}{\varepsilon} \rightarrow Df = \{x \mid x = \frac{k-1}{\varepsilon}, k \in \mathbb{N}\}$$

12) $y = \left(\frac{r(x-r)}{r(x-a)}\right)!$

$$r(x-r) \in \mathbb{N} - 1$$

$$\begin{aligned} r(x-r) &= r(x-a) \in \mathbb{N} - 1 \\ x(r-r) &= r-a \rightarrow x = \frac{r-a}{r-r} \end{aligned}$$

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