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

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

$2 \cos x \neq -1 \Rightarrow \cos x \neq -\frac{1}{2}$

$x \neq \left\{ 2k\pi + \frac{3\pi}{2}, 2k\pi + \frac{\pi}{2} \right\}$

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

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

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

$D_f = R - \left\{ 2k\pi + \frac{3\pi}{4}, 2k\pi + \frac{5\pi}{4}, 2k\pi + \frac{\pi}{4}, 2k\pi + \frac{7\pi}{4} \right\}$

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

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

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

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

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$(-\infty, -1] \cup [1, +\infty) \leftarrow \frac{1 \leq x^2 \leq 3}{-\sqrt{3} \leq x \leq +\sqrt{3}}$
 $D_f = [-\sqrt{3}, -1] \cup [1, +\sqrt{3}]$

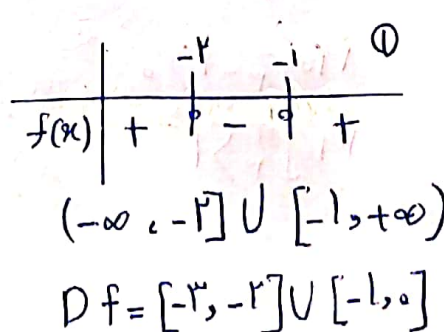
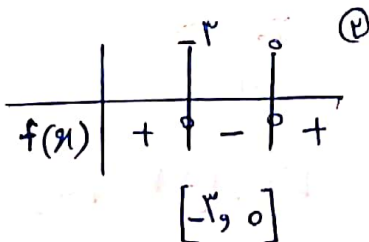
ب) $y = \arccos(\sqrt{x} - 2) \rightarrow -1 \leq \sqrt{x} - 2 \leq 1$
 $2 \leq \sqrt{x} \leq 3$
 $4 \leq x \leq 16$
 $D_f = [4, 16]$

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

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$(-\infty, -2] \cup [2, +\infty) \leftarrow \frac{2 \leq |x| \leq 4}{-4 \leq x \leq 4}$
 $D_f = [-4, -2] \cup [2, 4]$

ب) $\arcsin(x^2 + 3x + 1)$ $-1 \leq x^2 + 3x + 1 \leq 1 \rightarrow 0 \leq x^2 + 3x + 2$ ①



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

$$\text{الف) } y = \log_p x^{r-1}$$

$$x^{r-1} > 0$$

$$Df = (-\infty, -1], [1, +\infty)$$

-a

$$x^r > 1$$

$$x > 1$$

$$x < -1$$

$$\text{ب) } y = \log_p^{r-|x|}$$

$$r - |x| > 0$$

$$Df = (-1, 1)$$

$$r > |x| \rightarrow |x| < r$$

$$-r < x < r$$

$$\text{الف) } y = \log_{x-1} \omega - x$$

$$\omega - x > 0$$

$$\omega > x$$

$$Df = (1, \omega) - \{1\}$$

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$$x - 1 \neq 1 \quad x \neq 2$$

$$x - 1 > 0 \quad x > 1$$

$$\text{ب) } y = \log_{x+3} x^2 - 1$$

$$x^2 - 1 > 0$$

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

$$x^2 > 1$$

$$x + 3 \neq 1$$

$$x > 1$$

$$x \neq -3$$

$$x < -1$$

$$x + 3 > 0 \quad x > -3$$

$$\text{الف) } y = \log_{x-1} \frac{x^2 - 1}{x + 3}$$

$$\rightarrow \frac{x^2 - 1}{x - 1} > 0$$

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

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

$$x - 1 \neq 0$$

$$x \neq 1$$

$$(x-1) > 0$$

$$x > 1$$

$$\text{ب) } y = \log_{x+1} \frac{x+3}{x-1}$$

$$\frac{x+3}{x-1} > 0$$

$$\frac{x+3}{x-1} > 0$$

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

$$x + 1 > 0$$

$$x > -1$$

$$x \neq -1$$

$$\text{الف) } y = \sqrt{r - \log_p (x-1)}$$

$$r - \log_p (x-1) \geq 0$$

$$x - 1 > 0$$

$$Df = (1, 1.0]$$

-A

$$r \geq \log_p (x-1)$$

$$x > 1$$

$$1 \geq x - 1$$

$$1 < x$$

$$1.0 \geq x \rightarrow x \leq 1.0$$

$$1 < x \leq 1.0$$

$$\text{ب) } y = \log (r \log_p x - 1)$$

$$r \log_p x - 1 > 0$$

$$x > r^{\frac{1}{r}}$$

$$x > 0$$

$$r \log_p x > 1$$

$$x > \sqrt[r]{r}$$

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

$$\text{الف)} \frac{r}{r^x + 1} \Rightarrow r^x + 1 \neq 0, \quad Df = R$$

$$r^x \neq -1$$

$$\text{ب)} \frac{r}{r^x - 1} \Rightarrow r^x - 1 \neq 0, \quad Df = R - \{0\}$$

$$r^x \neq 0, \quad x \neq 0$$

$$\text{ج)} \frac{r}{r^x - r} \Rightarrow r^x - r \neq 0, \quad x \neq \frac{1}{r}, \quad Df = R - \left\{\frac{1}{r}\right\}$$

$$r^x \neq r$$

$$\text{د)} y = \frac{r}{r^x - r} \Rightarrow r^x - r \neq 0, \quad x \neq \log_r r, \quad Df = R - \{\log_r r\}$$

$$r^x \neq r$$

$$\text{الف)} y = (r^x + 1)! \quad r^x + 1 \in W, \quad Df = \left\{x \mid x = \frac{k-1}{r}, k \in W\right\}$$

$$r^x \in W-1$$

$$x \in \frac{W-1}{r}$$

$$\text{ب)} y = \left(\frac{r^x - r}{r^x - \omega}\right)! \quad \frac{r^x - r}{r^x - \omega} \in W, \quad Df = \left\{x \mid x = \frac{r - \omega k}{r - r k}, k \in W\right\}$$

$$r^x - r \in r^x W - \omega W$$

$$r^x - r \in W - \omega W$$

$$x(r - rW) \in r - \omega W$$

$$x \in \frac{r - \omega W}{r - rW}$$