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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) $y = \frac{\sin x + 3}{\cos x - 1} \rightarrow \cos x - 1 \neq 0$
 $\cos x \neq 1$

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

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

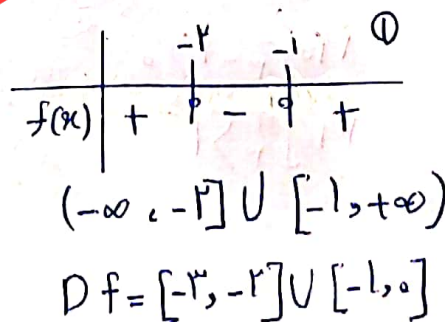
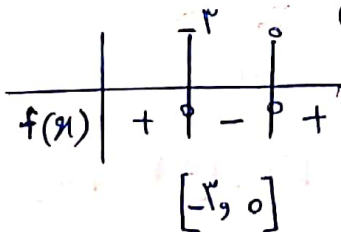
ب) $y = \arccos(\sqrt{x} - 3) \rightarrow -1 \leq \sqrt{x} - 3 \leq 1$
 $2 \leq \sqrt{x} \leq 4$
 $4 \leq x \leq 16$
 $D_f = [4, 16]$

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

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$(-\infty, -2] \cup [2, +\infty) \leftarrow \frac{2}{3} \leq |x| \leq \frac{4}{3} \rightarrow -\frac{4}{3} \leq x \leq \frac{4}{3}$
 $D_f = \left[-\frac{4}{3}, -\frac{2}{3}\right] \cup \left[\frac{2}{3}, \frac{4}{3}\right]$

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



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

$$الف) y = \log_p (x^2 - 2)$$

$$x^2 - 2 > 0$$

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

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$$x^2 > 2$$

$$x > \sqrt{2}$$

$$x < -\sqrt{2}$$

(1, 1.41)

✓

$$ب) y = \log_p (2 - |x|)$$

$$2 - |x| > 0$$

$$Df = (-2, 2)$$

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

$$-2 < x < 2$$

$$الف) y = \log_p (a - x)$$

$$a - x > 0$$

$$a > x$$

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

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$$x - r \neq 1 \quad x \neq r + 1$$

$$x - r > 0 \quad x > r$$

(r, a)

✓

$$ب) y = \log_p (x^2 - 1)$$

$$x^2 - 1 > 0$$

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

$$x^2 > 1$$

$$x + 1 \neq 1$$

$$x > 1$$

$$x \neq -1$$

$$x < -1$$

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

$$الف) y = \log_p \frac{x^2 - 2x + 3}{x - 2}$$

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

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

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

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$$x - 2 \neq 0$$

$$x \neq 2$$

$$(x - 1) > 0$$

$$x > 1$$

(1, 2)

✓

$$ب) y = \log_p \frac{x + 3}{x - 2}$$

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

$$x + 3 > 0$$

$$x > -3$$

$$x > -\infty$$

$$x \neq -2$$

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

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

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

$$الف) y = \sqrt{2 - \log_p (x - 2)}$$

$$2 - \log_p (x - 2) \geq 0$$

$$x - 2 > 0$$

$$2 \geq \log_p (x - 2)$$

$$x > 2$$

$$2 \geq x - 2$$

$$2 < x$$

$$2 \geq x \rightarrow x \leq 4$$

$$2 < x \leq 4$$

$$Df = (2, 4]$$

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(2, 4]

✓

$$ب) y = \log_p (2 \log_p x - 1)$$

$$2 \log_p x - 1 > 0$$

$$x > \sqrt[p]{\frac{1}{2}}$$

$$x > 0$$

$$2 \log_p x > 1$$

$$x > \sqrt[p]{2}$$

$$Df = (\sqrt[p]{2}, +\infty)$$

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

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

ج) $\frac{r}{r^x - r} \Rightarrow r^x - r \neq 0$ $x \neq \frac{1}{r}$ $Df = R - \{\frac{1}{r}\}$

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

الف) $y = (r^x + 1)!$ $r^x + 1 \in W$ $Df = \{x | x = \frac{k-1}{r}, k \in W\}$ -1.
 $r^x \in W-1$
 $x \in \frac{W-1}{r}$

ب) $y = \left(\frac{r^x - r}{r^x - \omega}\right)!$ $\frac{r^x - r}{r^x - \omega} \in W$ $r^x - r \in r^x W - \omega W$
 $r^x - r \in W$
 $x(r - rW) \in r - \omega W$
 $x \in \frac{r - \omega W}{r - rW}$ $Df = \{x | x = \frac{r - \omega K}{r - rK}, k \in W\}$