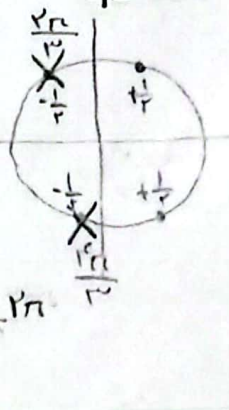


سوال یکم

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

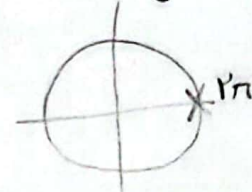
$2 \cos x \neq -1$ $\cos x \neq -\frac{1}{2}$

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



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

$D_f = \mathbb{R} - \{ 2k\pi \}$ (۲) ✓



سوال دوم

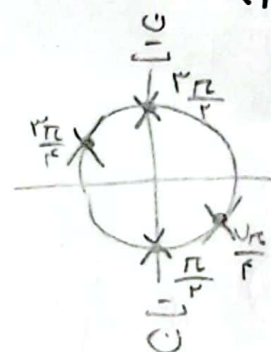
الف) $y = \frac{2 \sin x + 1}{\tan x + 1} \rightarrow \tan x + 1 \neq 0$ $\tan x \neq -1$

باید $\tan$ تعریف نباشد

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

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

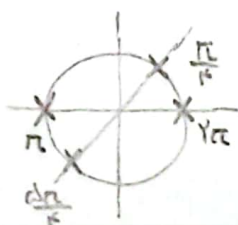
(۲) ✓



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

باید $\cot$ تعریف نباشد

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



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

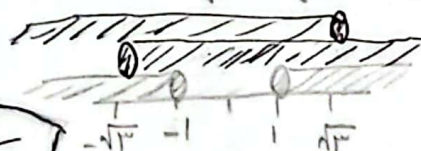
سوال سوم

الف) $\sin y = x^2 - 2$ $-1 \leq x^2 - 2 \leq 1$ $\xrightarrow{+2}$

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

$1 \leq x \leq -1$

$-\sqrt{3} \leq x \leq \sqrt{3}$



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

ب) $y = \arccos(\sqrt{x} - 3)$

ریختن در بازه نوشته خوب نیست باید حتماً گفته بشود:

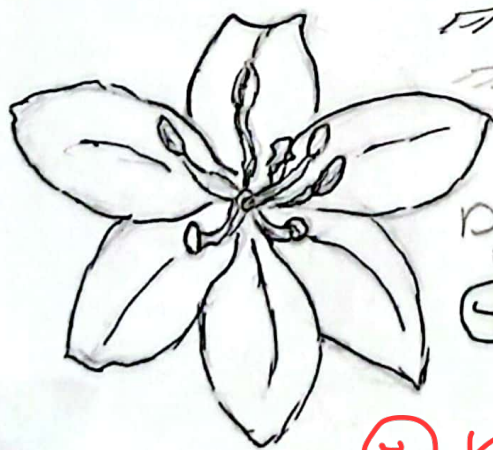
$-1 \leq \sqrt{x} - 3 \leq 1$ $\xrightarrow{+3}$

$2 \leq \sqrt{x} \leq 4$ $\xrightarrow{(\quad)^2}$

$4 \leq x \leq 16$

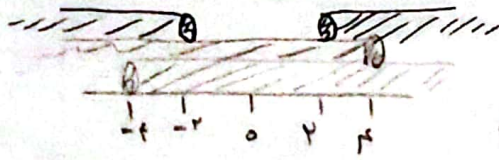
$D_f = [4, 16]$

(۲) ✓



سوال چهارم

الف) $\cos y = |x| - 3 \rightarrow -1 \leq |x| - 3 \leq 1 \xrightarrow{+3}$



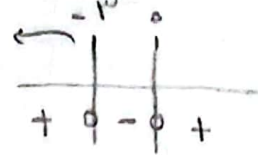
$$2 \leq |x| \leq 4 \rightarrow \begin{cases} -4 \leq x \leq -2 \\ 2 \leq x \leq 4 \end{cases}$$

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

ب) $y = \arcsin(x^2 + 3x + 1)$

نتیجه $[-3, 0]$

$$\begin{cases} x^2 + 3x + 1 \leq 1 \Rightarrow x^2 + 3x \leq 0 \checkmark x(x+3) \leq 0 \\ x^2 + 3x + 1 \geq -1 \Rightarrow x^2 + 3x + 2 \geq 0 \quad (x+1)(x+2) \geq 0 \end{cases}$$



نتیجه $(-\infty, -2] \cup [-1, +\infty)$

$$D_f = [-3, -2] \cup [-1, 0]$$

الف) $y = \lg(x^2 - 4)$

$x^2 - 4 > 0$

$x^2 > 4$



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

$\begin{cases} x > 2 \\ x < -2 \end{cases}$

ب) $\lg_2(2 - |x|)$

$2 - |x| > 0$

$|x| < 2$

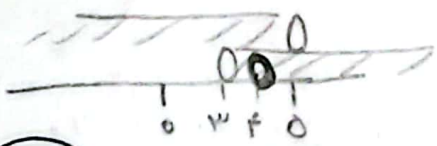
$D_f = (-2, +2)$

$-2 < x < +2$

سوال پنجم

الف) $\lg \frac{d-x}{x-3} \rightarrow \begin{cases} d-x > 0 \Rightarrow d > x \\ x-3 > 0 \Rightarrow x > 3 \end{cases}$

$x < d$



$D_f = (3, d) - \{1\}$

$x-3 \neq 1$

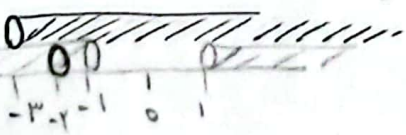
$x \neq 4$

ب) $\lg \frac{(x^2-1)}{x+3} \rightarrow \begin{cases} x^2-1 > 0 \Rightarrow x^2 > 1 \\ x+3 > 0 \Rightarrow x > -3 \end{cases}$

$x^2 > 1$

$x > 1$

$\begin{cases} x > 1 \\ x < -1 \end{cases}$



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

$x+3 \neq 1$

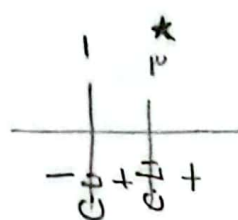
$x \neq -4$

سوال ششم

سوال هفتم

الف

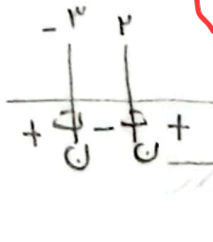
$$y = \log \left(\frac{x^2 - 4x + 3}{x - 1} \right) \rightarrow \frac{(x-3)(x-1)}{x-1}$$



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

ب

$$y = \log \left(\frac{x+1}{x-2} \right)$$



✓

$$\begin{aligned} x+1 &> 0 \\ x &> -1 \\ x+1 &\neq 0 \end{aligned}$$

$$D_f = (-1, -2) - \{-4\} \cup (2, +\infty)$$

الف

$$y = \sqrt{3 - \log_2(x-2)} \rightarrow x-2 > 0$$

$$x > 2$$

سوال هشتم

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

$$D_f = (2, 11]$$

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

$$x-2 \leq 11$$

$$x \leq 13$$

ب

$$y = \log(2 \log_2 x - 1) \rightarrow x > 0$$

$$2 \log_2 x - 1 > 0 \Rightarrow 2 \log_2 x > 1 \Rightarrow \log_2 x > \frac{1}{2}$$

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

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

الف

$$\frac{3}{x^2 + 1}$$

$$x^2 + 1 \neq 0 \quad x^2 \neq -1$$

همواره
برقرار

$$D_f = \mathbb{R}$$

سوال نهم

ب

$$\frac{3}{x^2 - 1}$$

$$x^2 - 1 \neq 0 \quad x^2 \neq 1 \quad x \neq 0$$

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

$$\textcircled{A} \quad y = \frac{r}{r^x - r} \rightarrow r^x \neq r \Rightarrow x \neq \log_r r \quad D_f = \mathbb{R} - \{\log_r r\}$$

$$\textcircled{B} \quad y = \frac{r}{r^x - r} \rightarrow r^x - r \neq 0 \quad r^x \neq r \quad x \neq \log_r r$$

$$D_f = \mathbb{R} - \{\log_r r\}$$

$$\textcircled{C} \quad y = (rx+1)!$$

(سوال دوم)

$$\rightarrow rx+1 \in \mathbb{N} \quad rx \in \mathbb{N}-1 \quad x \in \frac{\mathbb{N}-1}{r}$$

$$D_f = \left\{ x \mid x = \frac{k+1}{r}, k \in \mathbb{N} \right\}$$

$$\textcircled{D} \quad y = \left(\frac{rx-r}{rx-\Delta} \right)!$$

$$\frac{rx-r}{rx-\Delta} = \frac{k}{1} \rightarrow rx-r = k(rx-\Delta)$$

$$rx-r = r kx - \Delta k$$

$$rx - r kx = -\Delta k + r \rightarrow x(r - rk) = -\Delta k + r$$

$$D_f = \left\{ x \mid x = \frac{r - \Delta k}{r - rk}, k \in \mathbb{N} \right\} \quad x = \frac{-\Delta k + r}{r - rk} \leq x = \frac{r - \Delta k}{r - rk}$$