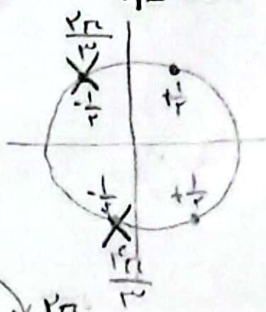
درس ریاضی «به نام خداوند رنگین کمان» تکلیف شماره پنجم

سوال یکم)

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

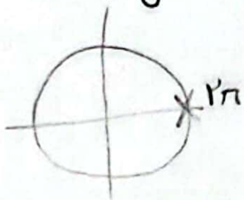
$2\cos x \neq -1 \qquad \cos x \neq \dfrac{-1}{2}$

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



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

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



سوال دوم)

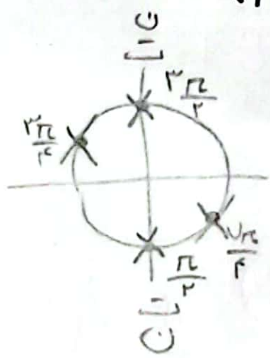
الف) $y = \dfrac{2\sin x + 1}{\tan x + 1}$

$\tan x + 1 \rightarrow \tan x + 1 \neq 0 \qquad \tan x \neq -1$

باید $\tan$ تعریف شود

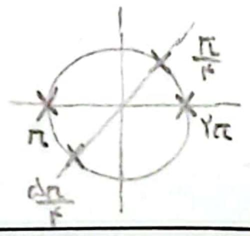
$\dfrac{\sin}{\cos}$

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



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

باید $\cot$ تعریف شود $\dfrac{\cos}{\sin}$



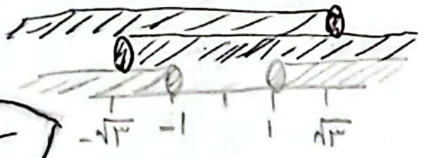
$D_f = \mathbb{R} - \left\{ k\pi , k\pi + \dfrac{\pi}{4} \right\}$

سوال سوم)

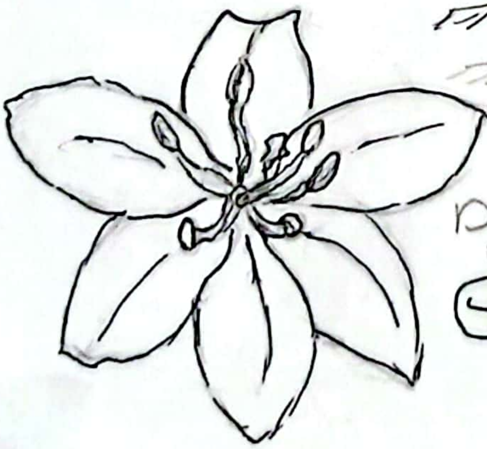
الف) $\sin y = x^2 - 2$

$-1 \leq x^2 - 2 \leq 1 \quad \xrightarrow{+2}$

$1 \leq x^2 \leq 3 \quad \xrightarrow{\sqrt{\ }} \begin{cases} 1 \leq x \leq -1 \\ -\sqrt{3} \leq x \leq \sqrt{3} \end{cases}$



ببخشید من تو بازه نوشتن خوب نیستم باید حتما شکل بکشم :)



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

ب) $y = \arccos(\sqrt{x} - 3)$

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

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

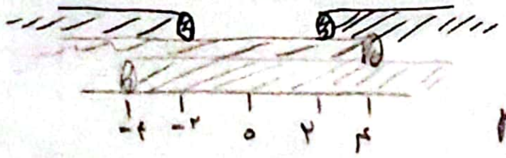
$4 \leq x \leq 16$

$D_f = [4 , 16]$

سوال چهارم)

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

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



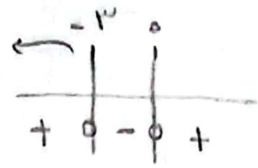
$D_f = [-4, -2] \cup [2, 4]$

ب) $y = \arcsin(x^2 + 3x + 1)$

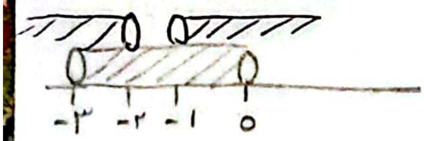
$-1 \leq x^2 + 3x + 1 \leq 1$

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

منفی $[-3, 0]$



1×2



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

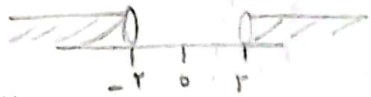
$D_f : [-3, -2] \cup [-1, 0]$

سوال پنجم)

الف) $y = \log_3 (x^2 - 4) \rightsquigarrow$

$x^2 - 4 > 0$

$x^2 > 4$



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

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

ب) $\log_2 (2 - |x|)$ $\quad 2 - |x| > 0 \quad |x| < 2$

$-2 < x < +2$

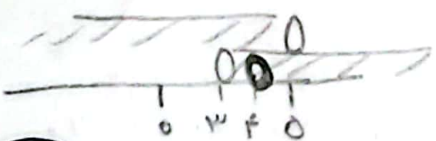
$D_f : (-2, +2)$

سوال ششم)

الف) $\log_{x-3} (5 - x) \longrightarrow 5 - x > 0 \quad 5 > x \quad x < 5$

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

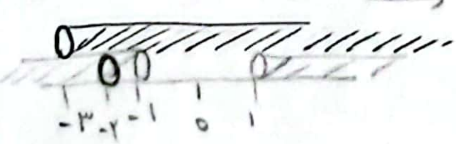
$x - 3 \neq 1 \quad x \neq 4$



$D_f : (3, 5) - \{4\}$

ب) $\log_{x+3} (x^2 - 1) \rightarrow x^2 - 1 > 0 \quad x^2 > 1 \quad \begin{cases} x > 1 \\ x < -1 \end{cases}$

$\longrightarrow x + 3 > 0 \quad x > -3 \quad x + 3 \neq 1 \quad x \neq -2$



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

سوال هفتم)

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

$x-3 \ne 0 \Rightarrow x=3$

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

ب) $y=\log_{x+5}\left(\frac{x+3}{x-2}\right)$

$x+5>0$

$x>-5$

$x+5\neq +1 \quad x\neq -4$

$D_f:(-5,-3)-\{-4\}\cup(2,+\infty)$

سوال هشتم)

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

$\boxed{x>2}$

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

$x-2\leq 2^3 \quad x-2\leq 8$

$x\leq 10$

$D_f:(2,10]$

ب) $y=\log(2\log_3 x-1) \longrightarrow x>0$

$2\log_3 x-1>0 \Rightarrow 2\log_3 x>1 \quad \log_3 x>\frac{1}{2}$

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

$\sqrt[2]{3}$

$D_f:(\sqrt{3},+\infty)$

سوال نهم)

الف) $\frac{3}{4^x+1} \longrightarrow 4^x+1\neq 0 \quad 4^x\neq -1$ همواره برقرار $D_f:\mathbb{R}$

ب) $\frac{3}{4^x-1} \longrightarrow 4^x-1\neq \quad 4^x\neq 1 \quad x\neq 0 \quad D_f=\mathbb{R}-\{0\}$

ج) $y=\dfrac{۳}{۴^x-۲} \longrightarrow ۴^x\neq ۲ \Rightarrow x\neq \log_۴^۲ \quad D_f=\mathbb{R}-\{\log_۴^۲\}$

د) $y=\dfrac{۳}{۴^x-۳} \longrightarrow ۴^x-۳\neq ۰ \quad ۴^x\neq ۳ \quad x\neq \log_۴^۳$

$D_f=\mathbb{R}-\{\log_۴^۳\}$

سوال دهم)

الف) $y=(۴x+۱)!$

$۴x+۱\in W \quad ۴x\in W-۱ \quad x\in \dfrac{W-۱}{۴}$

$D_f=\left\{x \mid x=\dfrac{k+۱}{۴},\ k\in W\right\}$

ب) $y=\left(\dfrac{۳x-۲}{۲x-۵}\right)!$ $\quad \dfrac{۳x-۲}{۲x-۵}=\dfrac{k}{۱} \rightarrow ۳x-۲=k(۲x-۵)$

$۳x-۲=۲kx-۵k$

$۳x-۲kx=-۵k+۲ \longrightarrow x(۳-۲k)=-۵k+۲$

$D_f=\left\{x \mid x=\dfrac{۲-۵k}{۳-۲k},\ k\in W\right\}$ $\quad x=\dfrac{-۵k+۲}{۳-۲k}$ یا $x=\dfrac{۲-۵k}{۳-۲k}$