

تکالیف شماره ۵

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یا استفاده می تشریحی تکالیف نرگس افشاری کلاس دهم

الف) $y = \sqrt{\frac{u^2 - 4u}{u^3 - u}}$

$\frac{u^2 - 4u}{u^3 - u} \geq 0$

$\frac{u(u-4)}{u(u^2-1)} = \frac{u(u-4)}{u(u-1)(u+1)} \geq 0$

ب) $y = \sqrt{\frac{u^2 - u^3}{u^3 - u}}$

$\frac{u^2 - u^3}{u^3 - u} \geq 0$

$Df = (-\infty, -1) \cup (0, 1) \cup (1, +\infty)$

$\frac{u^3(u^2-1)}{u(u^3-1)} = \frac{u^3(u-1)(u+1)}{u(u-1)(u+1)} = u^2 \geq 0$

$Df = (-\infty, -1) \cup (-1, 0) \cup (0, 1) \cup (1, +\infty)$

الف) $y = \frac{u+1}{\sqrt{u+|u|}}$

$u+|u| \geq 0$

$u = \mathbb{R}^+ \Rightarrow Df = \mathbb{R}^+$

ب) $y = \frac{1}{\sqrt{u+|u|}}$

$u+|u| \geq 0$

$u = \mathbb{R}^+ \Rightarrow Df = \mathbb{R}^+$

الف) $y = \sqrt{2-[u]}$

$2-[u] \geq 0$

$-[u] \geq -2$

ب) $y = 1$

$\frac{1}{\sqrt{2-[u]}} = 1 \Rightarrow 2-[u] = 1 \Rightarrow [u] = 1$

$[u] \leq 2$

$Df = (-\infty, 3)$

الف) $y = \sqrt{[u-\frac{1}{u}] + [u+\frac{1}{u}]}$

$[u+\frac{1}{u}] = [u-\frac{1}{u} + 1] = [u-\frac{1}{u}] + 1$

$[u-\frac{1}{u}] + [u-\frac{1}{u}] + 1 = 2[u-\frac{1}{u}] + 1$

$[u] + [-u] \rightarrow \infty \rightarrow 0$

$\rightarrow \infty \rightarrow -1$

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$Df = [\frac{1}{u}, +\infty)$

ب) $y = \sqrt{[u-\frac{1}{u}] + [-u+\frac{1}{u}]}$

$[-u+\frac{1}{u}] = -[u-\frac{1}{u}] \Rightarrow [u-\frac{1}{u}] - [u-\frac{1}{u}] = 0$

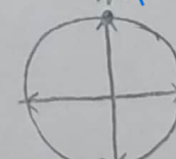
$Df = \mathbb{R}$

$u - \frac{1}{u} \in \mathbb{Z} \rightarrow u \in \mathbb{Z} + \frac{1}{u} \rightarrow Df = \{u \mid u = k + \frac{1}{u}, k \in \mathbb{Z}\}$

الف) $y = \frac{1}{\sin u - 1}$

$\sin u - 1 \neq 0 \Rightarrow \sin u \neq 1$

$Df = \mathbb{R} - \{2k\pi + \frac{\pi}{2}\}$



ب) $y = \frac{1}{\sin^2 u - 1}$

$\sin^2 u - 1 \neq 0 \Rightarrow \sin^2 u \neq 1$

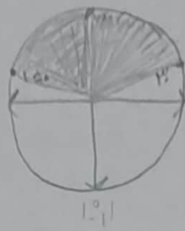
$Df = \mathbb{R} - \{2k\pi + \frac{\pi}{2}, 2k\pi + \frac{3\pi}{2}\}$



الف) $y = \sqrt{2 \sin u - 1}$

$2 \sin u - 1 \geq 0 \Rightarrow \sin u \geq \frac{1}{2}$

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$Df = [2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}]$

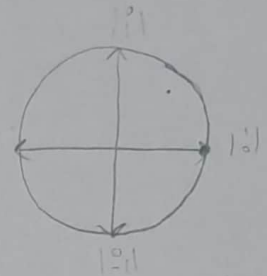
ب) $y = \sqrt{\cos u - 1}$

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$\cos u - 1 \geq 0 \Rightarrow \cos u \geq 1$

$Df = [2k\pi]$



الف) $\cos y = |u| - 3$

$-1 \leq |u| - 3 \leq 1 \Rightarrow 2 \leq |u| \leq 4 \Rightarrow Df = [-4, -2] \cup [2, 4]$

ب) $y = \arcsin(2u^2 + 3u + 1)$

① $2u^2 + 3u + 1 \leq 1 \Rightarrow 2u^2 + 3u \leq 0 \Rightarrow u(2u + 3) \leq 0$

② $2u^2 + 3u + 1 \geq -1 \Rightarrow 2u^2 + 3u + 2 \geq 0 \Rightarrow (u+1)(2u+2) \geq 0$

$[-\frac{\pi}{2}, 0] \cap [-1, +\infty) \cup (-\infty, -2]$

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$Df = [-\frac{\pi}{2}, 0] \cup [-1, 0]$

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

الف) $y = \sqrt{2 - \log_p(u-2)}$

$2 - \log_p(u-2) \geq 0 \Rightarrow -\log_p(u-2) \geq -2 \Rightarrow \log_p(u-2) \leq 2$

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ب) $y = \log(2^u - u)$

$u(2^u - 1) \geq 0$

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$u-2 \geq 0 \Rightarrow u \geq 2$ $u-2 \leq 9 \Rightarrow u \leq 11$

$[-1, +\infty) \cup (-1, +\infty)$

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

$Df = (2, 11]$

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الف) $y = \frac{3}{f^u + 1}$

$\Rightarrow f^u + 1 \neq 0 \Rightarrow f^u \neq -1 \Rightarrow Df = \mathbb{R}$

ب) $\frac{3}{f^u - 1} \neq 0 \Rightarrow f^u - 1 \neq 0 \Rightarrow f^u \neq 1 \Rightarrow u \neq 0$

ج) $y = \frac{3}{f^u - 2}$

$\Rightarrow f^u - 2 \neq 0 \Rightarrow f^u \neq 2 \Rightarrow Df = \mathbb{R} - \{\log_f 2\}$

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

د) $y = \frac{3}{f^u - 3}$

$\Rightarrow f^u - 3 \neq 0 \Rightarrow f^u \neq 3 \Rightarrow Df = \mathbb{R} - \{\log_f 3\}$

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الف) $y = (f^{u+1})!$

$f^{u+1} \in \mathbb{N} \Rightarrow f^u \in \mathbb{N} - 1 \Rightarrow u \in \frac{\mathbb{N}-1}{f}$

$Df = \{u/u = \frac{k-1}{f}, k \in \mathbb{N}\}$

ب) $y = \left(\frac{f^u - 2}{f^u - 5}\right)!$

$\frac{f^u - 2}{f^u - 5} \in \mathbb{N} \Rightarrow f^u - 2 \in f^u \mathbb{N} - 5\mathbb{N} = f^u \mathbb{N} - 5\mathbb{N} \Rightarrow (u(1-5)) \in f^u \mathbb{N} \Rightarrow u = \frac{f^u - 5k}{f^u - 5}$

$Df = \{u/u = \frac{f^u - 5k}{f^u - 5}, k \in \mathbb{N}\}$

$u = \frac{f^u - 5k}{f^u - 5}$