

مسئله های تکلیف 3 : سوال B : 2

سوال 1)

$$y = \frac{x+3}{2x^3+5x^2-1x+3}$$

$$2x^3+5x^2-1x+3 \neq 0$$

$$(x+4)(x-1) \rightarrow \Delta = -4, 1 \rightarrow x^2+5x-4$$

$$\Delta f = R - \left\{ -\frac{5}{2}, \frac{1}{2} \right\}$$

الف)

ب)

$$y = \frac{x+3}{2x^3+9x^2+10x+3}$$

$$2x^3+9x^2+10x+3 \neq 0$$

$$(x+1)(2x^2+7x+3) \rightarrow (x+1)(x^2+7x+9) \rightarrow (x+1)(x+4)(x+1)$$

$$\Delta f = R - \left\{ -\frac{5}{2}, -1, -\frac{1}{2} \right\}$$

سوال 2)

الف)

$$y = \frac{x+5}{x^3-2x^2+2x-1}$$

$$x^3-2x^2+2x-1 \neq 0$$

$$(x-1)(x^2+x+1)$$

$$\Delta = b^2-4ac = 1-4 = -3$$

$$\Delta f = R - \{1\}$$

ب)

$$y = \sqrt{\frac{x+3}{x^3-2x^2+2x-1}}$$

$$x^3-2x^2+2x-1 \neq 0 \rightarrow (x-1)(x^2-x+1)$$

$$+1, -3$$

$$\Delta f = R - \{-3, +1\}$$

سوال 3)

$$y = \frac{2}{x^2-\Delta|x-1|-2x+\Delta}$$

$$x^2-\Delta|x-1|-2x+\Delta$$

$$x^2+\Delta x-\Delta-2x+\Delta = x^2+3x$$

$$x^2+3x \neq 0 \quad \Delta = 9$$

$$\frac{-b \pm \sqrt{\Delta}}{2a}$$

$$\frac{-3+3}{2} = 0$$

$$\frac{-3-3}{2} = -3$$

$$x > 0 \rightarrow \frac{2}{x^2-\Delta x+\Delta-2x+\Delta} = \frac{2}{x^2-3x+10} = \frac{2}{(x-\Delta)(x-2)}$$

$$\Delta f = R - \{-3, 0, 2, \Delta\}$$

سوال 4)

الف)

$$y = \sqrt{[-x]-2}$$

$$[-x]-2 \geq 0 \quad [-x] \geq 2$$

$$\Delta f = (-\infty, -2]$$

ب)

$$y = \frac{\Delta x^2+4}{[x]^2-2[x]-3}$$

$$[x]^2-2[x]-3 \neq 0 \quad [x]=t \Rightarrow t^2-2t-3 \neq 0$$

$$(t-3)(t+1) \neq 0 \quad t \neq -1, 3 \quad \Delta f = R - [-1, 3) \cup [3, 4)$$

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الف) $\sqrt{x - \frac{1}{x}} + \sqrt{x + \frac{5}{x}} \rightarrow \left[x - \frac{1}{x}\right] + \left[x + \frac{5}{x}\right] \geq 0$
 $Def = \left[\frac{1}{5}, +\infty\right)$

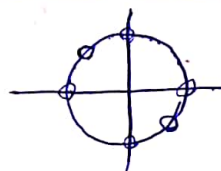
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$\rightarrow \sqrt{x - \frac{1}{x}} + \sqrt{\frac{1}{x} - x} \quad \left[x - \frac{1}{x}\right] + \left[\frac{1}{x} - x\right] \geq 0 \rightarrow Def = \left\{\frac{1}{x}\right\}$

$\frac{\cot x + 1}{\tan x + 1} = y \quad \tan x + 1 \neq 0 \rightarrow \tan x \neq -1$

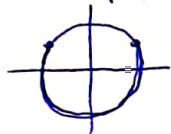
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$\rightarrow Def = \mathbb{R} - \left\{x \mid x = \frac{K\pi}{2}, K \in \mathbb{Z}\right\}$



$y = \sqrt{1 - f \sin^2 x} \rightarrow 1 - f \sin^2 x \geq 0 \quad 1 \geq f \sin^2 x \quad \frac{1}{f} \geq \sin^2 x$

$\frac{1}{x} \geq \sin^2 x \quad Def = \left[2K\pi + \frac{\pi}{2}, 2K\pi + \frac{3\pi}{2}\right]$



$y = \sqrt{x \sin x - 1} \rightarrow x \sin x - 1 \geq 0 \quad x \sin x \geq 1 \quad \sin x \geq \frac{1}{x}$

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$Def = \left[2K\pi + \frac{\pi}{2}, 2K\pi + \frac{3\pi}{2}\right]$

$y = \sqrt{1 - x \cos x} \rightarrow 1 - x \cos x \geq 0 \quad 1 \geq x \cos x$

$\frac{1}{x} \geq \cos x \rightarrow Def = \left[2K\pi + \frac{\pi}{2}, 2K\pi - \frac{\pi}{2}\right]$

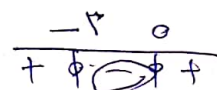
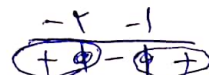
$y = \arcsin(x^2 + x + 1) \rightarrow |x^2 + x + 1| \leq 1 \quad 0 \leq x^2 + x + 1 \leq 1$

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$0 \leq (x+1)(x+1) \leq 1 \quad (x+1)(x+1) \geq 0$

$x^2 + x + 1 \leq 1 \rightarrow x^2 + x \leq 0$

$Def = [-1, 0] \cup [-1, 0]$



$$\therefore \cos y = \sqrt{d - 2r} \rightarrow -1 \leq \sqrt{d - 2r} \leq 1 \quad 0 \leq \sqrt{d - 2r} \leq 1 \quad \wedge \text{بال}$$

$$0 \leq d - 2r \leq 1 \quad 0 \leq d - 2r \quad + 2r \leq d \quad r \leq \frac{d}{2}$$

$$d - 2r \leq 1 \quad 1 - 2r \leq 0 \quad 1 \leq 2r \quad \frac{1}{2} \leq r$$

$$\text{Def } \left[\frac{1}{2}, \frac{d}{2} \right]$$

$$Pf = \left[\frac{1}{2}, \frac{d}{2} \right]$$

الف) $y = \log_r(1 - \log_r^x)$ $1 - \log_r^x > 0$ $1 > \log_r^x$ $Df = (0, r)$: 9 حل

$Df = (0, r)$

ب) $y = \log_r(1 - \log_{\frac{1}{r}}^x)$ $1 - \log_{\frac{1}{r}}^x > 0$ $1 > \log_{\frac{1}{r}}^x$

~~حل~~ $Df = (\frac{1}{r}, +\infty)$

الف) $y = \sqrt{r^{rx-r^r}} - 1$ $r^{rx-r^r} - 1 \geq 0$ $r^{rx-r^r} \geq 1$: 10 حل

$r^{rx-r^r} \geq r^r \rightarrow rx - r^r \geq r$ $rx - r^r - r \geq 0$ $rx - r^r + r \leq 0$

$(x-r)(x-1) \leq 0$ $\frac{1}{x-1} \geq \frac{r}{r-1}$ $Df = [1, r]$

ب) $y = \left(\frac{rx+d}{rx+f}\right)!$ $\frac{rx+d}{rx+f} \in W$ $rx+d \in rx+fW$

$rx - rxW \in fW - d$ $x(W - rW) \in fW - d$ $x \in \frac{fW-d}{fW-rW}$

$\Rightarrow$ ~~حل~~ $Df = \left\{x \mid x = \frac{fW-d}{fW-rW} \mid K \in W\right\}$