

۱۹ آذر

الف) $2x^3 - 3x^2 - 11x + 2 \neq 0 \Rightarrow (x-1)(2x^2 + 5x - 3) \neq 0 \Rightarrow (x-1)(x+3)(2x-1) \neq 0$ $x \in \mathbb{R} - \left\{1, -\frac{3}{2}, \frac{1}{2}\right\}$

ب) $2x^3 + 9x^2 + 10x + 2 \neq 0 \Rightarrow (x+1)(2x^2 + 7x + 2) \neq 0 \Rightarrow (x+1)(2x+1)(x+2) \neq 0$ $\Rightarrow x \in \mathbb{R} - \left\{-1, -\frac{1}{2}, -2\right\}$

الف) $x^3 - 2x^2 + 2x - 1 \neq 0 \Rightarrow (x^3 - x^2) + (-x^2 + x) + (x - 1) = x^2(x-1) - x(x-1) + (x-1) = (x-1)(x^2 - x + 1) \neq 0$

$(x-1)(x^2 - x + 1) \neq 0 \Rightarrow \Delta < 0 \Rightarrow x \neq 1$ $x \in \mathbb{R} - \{1\}$

ب) $x^3 - 2x^2 + 2x - 1 \neq 0 \Rightarrow \frac{(x+2) \rightarrow -2}{(x-1)(x^2 - x + 1)} \geq 0 \Rightarrow \frac{-2}{+} \frac{1}{-} \frac{1}{+}$ $\Rightarrow x \in \mathbb{R} - [-2, 1]$

$x^2 - 5|x-1| - 11x + 5 \neq 0$

- $x \leq 1 \Rightarrow x^2 + 4x \Rightarrow x(x+4) \Rightarrow x = 0 \checkmark$
- $x \geq 1 \Rightarrow x^2 - 7x + 10 \Rightarrow (x-5)(x-2) \Rightarrow x = 5 \checkmark$
- $x = 2 \checkmark$

$\Rightarrow x \in \mathbb{R} - \{0, 5, 2\}$

الف) $\sqrt{-x} - 2 \neq 0 \Rightarrow [-x] - 2 \geq 0 \Rightarrow [-x] \geq 2 \Rightarrow x \leq -2$

ب) $[x]^2 - 2[x] - 3 \neq 0 \Rightarrow ([x]-3)([x]+1) \neq 0 \Rightarrow [x] \neq 3 \text{ and } [x] \neq -1$

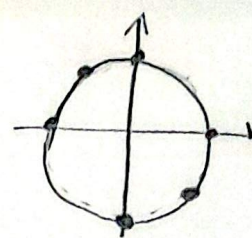
$[x] \neq -1 \Rightarrow x \in [-1, 0)$

الف) $\left[x - \frac{1}{x}\right] + \left[x + \frac{1}{x}\right] \geq 0 \Rightarrow \left[x - \frac{1}{x} + 1\right] + \left[x + \frac{1}{x} - 1\right] \geq 0 \Rightarrow 2\left[x + \frac{1}{x}\right] - 1 \geq 0$

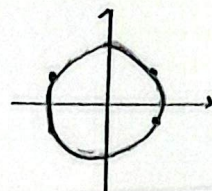
$\left[x + \frac{1}{x}\right] \geq \frac{1}{2} \Rightarrow x + \frac{1}{x} \geq 1 \Rightarrow x \geq \frac{1}{x}$

ب) $\left[x - \frac{1}{x}\right] + \left[\frac{1}{x} - x\right] \neq 0 \Rightarrow x - \frac{1}{x} \in \mathbb{R} \Rightarrow x \in \mathbb{Z} + \frac{1}{x}$ $x \in \left\{k + \frac{1}{k} \mid k \in \mathbb{Z}\right\}$

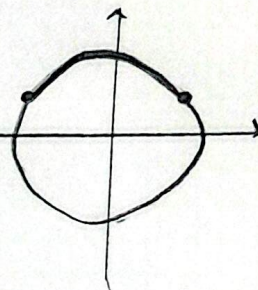
الف) $\frac{\cot x + 1}{\tan x + 1} = 0 \Rightarrow \tan x = 0 \Rightarrow x \neq \left\{ \frac{k\pi}{r}, k\pi - \frac{\pi}{r} \right\}$



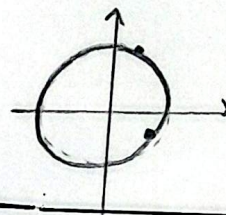
ب) $1 - \sin x \geq 0 \Rightarrow \sin x \leq 1 \Rightarrow x \in [k\pi - \frac{\pi}{r}, k\pi + \frac{\pi}{r}]$



الف) $2 \sin x - 1 \geq 0 \Rightarrow \sin x \geq \frac{1}{r} \Rightarrow x \in [2k\pi + \frac{\pi}{r}, 2k\pi + \frac{5\pi}{r}]$



ب) $1 - 2 \cos x \geq 0 \Rightarrow \frac{1}{r} \geq \cos x \Rightarrow x \in [2k\pi + \frac{\pi}{r}, 2k\pi + \frac{5\pi}{r}]$



الف) $-1 \leq x^2 + 3x + 1 \leq 1 \Rightarrow x^2 + 3x \leq 0 \Rightarrow x(x+3) \leq 0$



$0 \leq x^2 + 3x + 1 \Rightarrow 0 \leq (x+1)(x+1) \Rightarrow x \in [-1, 0]$

ب) $\cos y = \sqrt{5-2x} \Rightarrow -1 \leq \sqrt{5-2x} \leq 1 \Rightarrow 5-2x \geq 0 \Rightarrow x \leq \frac{5}{2}$
 $\sqrt{5-2x} \leq 1 \Rightarrow 5-2x \leq 1 \Rightarrow 4 \leq 2x \Rightarrow 2 \leq x$

الف) $y = \log_r (1 - \log_r x)$ $x > 0$
 $1 - \log_r x > 0 \Rightarrow 1 > \log_r x \Rightarrow \frac{1}{r} > x$

ب) $y = \log_r (1 - \log_r \frac{x}{r})$
 $1 - \log_r \frac{x}{r} > 0 \Rightarrow 1 > \log_r \frac{x}{r} \Rightarrow \frac{1}{r} > \frac{x}{r} \Rightarrow 0 < x < 1$
 متباينة ۰ و ۱ است پس معیت نامعادله تغییر کردند
 $\log_r \frac{1}{r} < 1 \Rightarrow \frac{1}{r} > \frac{1}{r} \Rightarrow 0 < x < 1$

الف) $\sqrt{r^2 x - x^2} - 1 \Rightarrow r^2 x - x^2 - 1 \geq 0 \Rightarrow x^2 - r^2 x + 1 \leq 0$
 $0 \leq (x - \frac{r}{2})^2 - \frac{r^2}{4} + 1$
 $\frac{1}{r^2} \leq x \leq \frac{r^2}{4} + 1$
 $x \in [1, r^2]$

ب) $y = \left(\frac{r^2 x + a}{r^2 x + r} \right)!$ $\frac{r^2 x + a}{r^2 x + r} \in W \Rightarrow x \in -\frac{r^2 \omega - a}{r^2 \omega - r}$

$\Rightarrow x \in \left\{ -\frac{r^2 k - a}{r^2 k - r} \mid k \in W \right\}$

۳- کمن عبارت مفرج را دستکاری میکنیم تا کی ساده تر شود...

$$(x^2 - x_{n+1}) - 5|x-1| + 4 \rightarrow (x-1)^2 - 5|x-1| + 4 \xrightarrow{|x-1|=t} t^2 - 5t + 4$$

$$(t-1)(t-4) = 0 \rightarrow t=1, t=4$$

$$\rightarrow Df = \mathbb{R} - \{-3, 0, 2, 5\}$$

$$|x-1|=1 \rightarrow x=2, 0 \quad |x-1|=4 \rightarrow x=5, -3$$

۲- ب) $\frac{x+3}{x^3 - x^2 + x - 1} \geq 0 \rightarrow \frac{x+3}{(x-1)(x^2 - x + 1)} \geq 0$
 (صفر ضرایب منفرات) (نقش‌پذیر برای $x-1$) ریشه ندارد! $\Delta < 0$

$\frac{-3}{+} \quad \frac{1}{-} \quad \frac{+}{+}$ $\rightarrow Df = (-\infty, -3] \cup (1, +\infty)$

۹- ب) $y = \log_2 \left(1 - \log_{\frac{1}{2}} n \right) \rightarrow \log_{\frac{1}{2}} n \rightarrow n > 0$

$\hookrightarrow 1 - \log_{\frac{1}{2}} n > 0 \rightarrow \log_{\frac{1}{2}} n < 1$ مناسب (در ۱) $\rightarrow n > \frac{1}{2}$

$Df = \left(\frac{1}{2}, +\infty \right)$