

الف) $2x^3 + 3x^2 - 11x + 4 \neq 0 \Rightarrow x-1$ بخش پذیر ①

$(x-1)(2x^2 + 5x - 4) \neq 0 \Rightarrow (x-1)(x+4)(x - \frac{1}{2}) \neq 0$ $R = \{ \frac{1}{2}, -4, 1 \}$

ب) $2x^3 + 9x^2 + 10x + 4 \neq 0 \Rightarrow x+1$ بخش پذیر $R = \{ -1, -2, -\frac{1}{2} \}$

$(x+1)(2x^2 + 7x + 4) \rightarrow (x+1)(x^2 + \sqrt{7}x + 4) \Rightarrow (x+1)(x+4)(x + \frac{1}{4})$

الف) $x^3 - 2x^2 + 2x - 1 \neq 0 \xrightarrow{x-1} (x-1)(x^2 - x + 1)$ $R = \{ 1 \}$ ②

ب) $\frac{x+3}{(x-1)(x^2-x+1)} \geq 0$ $\frac{-3}{+ \quad - \quad +}$ $x \in (-\infty, -3] \cup (1, +\infty)$

$x^3 - 5|x-1| - 2x + 5 \neq 0 \begin{cases} x > 0 \Rightarrow x^3 - 5x + 5 - 2x + 5 \\ x = 0 \Rightarrow -5 + 5 = 0 \quad \times \\ x < 0 \Rightarrow x^3 - 5 + 5x - 2x + 5 \end{cases}$ ③

$\Rightarrow \begin{cases} x > 0 \quad x^3 - 7x + 10 = (x-5)(x-2) \\ x < 0 \quad x^3 + 3x = x(x+3) \end{cases} \quad R = \{ 0, 5, 2, -3 \}$

الف) $|2x+1| - |x+2| \neq 0 \xrightarrow{\text{مقدار}$ $|2x+1| \neq |x+2| \Rightarrow 4x^2 + 1 + 4x \neq x^2 + 4 - 4x$ ④

$3x^2 - 2x + 4x + 4x + 1 - 4 \neq 0 \quad 3x^2 + 10x - 3 \neq 0 \quad (3x^2 + 10x - 3) \neq 0$
 $(3x+12)(x-2) \neq 0 \quad \frac{1}{3}, \frac{1}{2} \quad R = \{ 2, \frac{1}{3}, \frac{1}{2} \}$ $x \in (-\infty, -\frac{1}{2}] \cup [2, +\infty)$

ب) $|2x+1| - |x+2| \geq 0$ $\frac{-\frac{1}{2}}{+ \quad - \quad +}$ $\frac{2}{+ \quad - \quad +}$ $x \in (-\infty, -\frac{1}{2}] \cup [2, +\infty)$

$(4x^2 + 1 + 4x) - (x^2 + 4 + 4x) \geq 0 \quad (3x^2 - 3) \geq 0 \quad (x-1)(x+1) \geq 0$
 $3x^2 - 2x - 1 \geq 0 \quad x^2 - 2x - 2 \geq 0 \quad (x-1)(x+2) \geq 0$

الف) $y = \log_r(1 - \log_r^n)$ $1 \Rightarrow n > 0$ ⑤

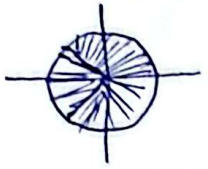
$r \Rightarrow 1 - \log_r^n > 0 \quad 1 > \log_r^n \quad n < r$

ب) $y = \log_r(1 - \log_{\frac{1}{r}}^n)$ $1 \Rightarrow n > 0$
 $r \Rightarrow 1 - \log_{\frac{1}{r}}^n > 0 \quad 1 > \log_{\frac{1}{r}}^n \quad n < \frac{1}{r}$

$f(n) = \sqrt{\log_{\log_{\log_r} r}^{(n-1)}}$ $1 \Rightarrow 2n-1 > 0 \quad n > \frac{1}{2}$ ⑥
 $r \Rightarrow \log_{\log_{\log_r} r}^{n-1} > 0 \quad 2n-1 > 1 \quad 2n > 2 \quad n > 1$
 $\log_{\log_{\log_r} r} \geq 0$

⑦

$$r \cos \alpha + 1 > 0 \quad r \cos \alpha > -1 \quad \cos \alpha > \frac{-1}{r}$$



$$\alpha \in \left(2k\pi - \frac{r\pi}{r}, 2k\pi + \frac{r\pi}{r} \right) \quad k \in \mathbb{Z}$$

$$\Rightarrow \frac{x-1}{x+1} > 0 \quad + \frac{-1}{-1} \quad \text{①} \quad \log \frac{x-1}{x+1} \geq b \Rightarrow$$

$$\frac{x-1}{x+1} \geq 1 \quad \text{①} \quad \text{①, ②} \quad [1, +\infty)$$

⑧

$$(a+r)x^2 + ax + b \geq 0 \Rightarrow \text{درجه دوم همواره مثبت}$$

$$r = 0 \quad a+r=0 \quad a = -r$$

$$a(a+r) + ra + b = 0 \quad a = -r$$

$$9a + 18 + ra + b = 0 \Rightarrow b - 2a \geq 0$$

$$x \geq \frac{b}{r}$$

$$\boxed{4 \leq b} \quad r = \frac{b}{r} \quad \text{میزان ۳}$$

⑨

$$f(n) = \sqrt{n^2 + 2n + 1 - n^2} = \sqrt{2n + 1} = \sqrt{2(n+1)} \quad \text{تکینگی} = -1$$

$$2(n+1) \geq 0 \quad \frac{-1}{+ \phi -} \quad (-\infty, -1] \quad \text{اضافه به مثبت}$$

$$r - n^2 \geq 0 \quad r \geq n^2 \quad \pm r \geq |n| \quad r \geq n$$

$$r = 0 \Rightarrow \text{برای اعداد غرضی} = 0, \text{ برای اعداد صحیح} = +1$$

⑩ به مثبت عدد صحیح از ۲ تا مثبت به مثبت
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