

(1)

$$\begin{array}{r} 2x^3 + 3x^2 - 1x + 3 \\ -2x^3 + 2x^2 \\ \hline 5x^2 - 1x + 3 \\ -5x^2 + 5x - 3 \\ \hline 6x - 6 \\ 6x - 6 \\ \hline 0 \end{array} \quad \begin{array}{l} x-1 \\ 2x^2 + 5x - 3 \end{array} \quad \text{جمع ضربیه = 0} \quad \text{بقیه بر } x-1$$

$$\begin{array}{r} 5x^2 - 1x + 3 \\ -5x^2 + 5x - 3 \\ \hline 6x - 6 \\ 6x - 6 \\ \hline 0 \end{array} \quad \begin{array}{l} (2x^2 + 5x - 3)(x-1) \\ (x+3)(x-1) \div 2 \end{array} \quad \begin{array}{l} 0 \neq \text{بقیه} \\ (x+5)(x-1) = x^2 + 5x - 5 = \text{دوم} \end{array}$$

$$P_f = R - \left\{1, -3, \frac{1}{2}\right\} \quad \leftarrow \quad \frac{x+3}{(x-1)(x+3)(x-\frac{1}{2})} \quad \text{عبارت 8}$$

$$\begin{array}{r} 2x^3 + 9x^2 + 6x + 3 \\ -2x^3 - 2x^2 \\ \hline 7x^2 + 6x + 3 \\ -7x^2 - 7x \\ \hline 13x + 3 \\ -13x - 13 \\ \hline 16 \end{array} \quad \begin{array}{l} x+1 \\ 2x^2 + 7x + 3 \end{array} \quad \text{جمع ضربیه = 0} \quad \text{بقیه بر } x+1$$

$$\begin{array}{r} 7x^2 + 6x + 3 \\ -7x^2 - 7x \\ \hline 13x + 3 \\ -13x - 13 \\ \hline 16 \end{array} \quad \begin{array}{l} (2x^2 + 7x + 3)(x+1) \\ (x+3)(x+\frac{1}{2}) \div 2 \end{array} \quad \begin{array}{l} 0 \neq \text{بقیه} \\ (x+5)(x+1) = x^2 + 7x + 5 = \text{دوم} \end{array}$$

$$P_f = R - \left\{1, -3, -\frac{1}{2}\right\} \quad \leftarrow \quad \frac{x+3}{(x+1)(x+3)(x+\frac{1}{2})} \quad \text{عبارت 8}$$

(2)

$$x^3 - 2x^2 + 2x - 1 = (x^2 - x + 1)(x-1) \quad \text{جمع ضربیه = 0} \quad \text{بقیه بر } x-1$$

$$P_f = R - \{1\} \quad \text{بقیه } 0 \neq$$

$$\frac{x+3}{(x^2 - x + 1)(x-1)} \geq 0 \quad \text{جمع ضربیه = 0} \quad \text{بقیه بر } x-1$$

$$P_f = (-\infty, -3] \cup (1, +\infty)$$

$$\frac{r}{x^r - \sqrt{x} + 1} \quad x \geq 1 \rightarrow D = \mathbb{R} - \{r, 0\} \quad \text{I} \quad (3)$$

$$\frac{r}{e^r + r^3 x} \quad x \leq 1 \rightarrow D = \mathbb{R} - \{0, -r\} \quad \text{II} \quad \Rightarrow I \cup \text{II}$$

$D = \mathbb{R} - \{0, -r, r, 0\}$

$$[-x] - r > 0 \rightarrow [-x] \geq r \rightarrow x < -1 \quad D = (-\infty, -1) \quad \text{(الف)}$$

$$\frac{\Delta x^r + r}{([x] - r)([x] + 1)} \quad (+) \text{ مخرج}$$

$$\begin{cases} [x] - r \neq 0 \rightarrow [x] \neq r \rightarrow [x] \neq [r, r) \quad \text{I} \\ [x] + 1 \neq 0 \rightarrow [x] \neq -1 \rightarrow [x] \neq [-1, 0) \quad \text{II} \end{cases}$$

$$D = \mathbb{R} - I \cup \text{II} = \mathbb{R} - [r, r) \cup [-1, 0)$$

$$\left[x - \frac{1}{r}\right] + \left[x + \frac{r}{r}\right] \geq 0 \rightarrow \left[x + \frac{r}{r} - 1\right] + \left[x + \frac{r}{r}\right] \geq 0 \rightarrow r\left[x + \frac{r}{r}\right] - 1 \geq 0 \quad \text{(الف)}$$

$$\left[x + \frac{r}{r}\right] \geq \frac{1}{r} \rightarrow x + \frac{r}{r} \geq 1 \rightarrow x \geq \frac{1}{r} \rightarrow D = \left[\frac{1}{r}, +\infty\right)$$

$$\left[x - \frac{1}{r}\right] + \left[-\left(x - \frac{1}{r}\right)\right] \geq 0 \rightarrow \begin{cases} a \in \mathbb{Z} \rightarrow [a] + [-a] = 0 \quad \checkmark \\ a \notin \mathbb{Z} \rightarrow [a] + [-a] = -1 \quad \alpha \end{cases}$$

$$x - \frac{1}{r} = \alpha$$

$$D = \{x \mid x = k + \frac{1}{r}, k \in \mathbb{Z}\} \quad x - \frac{1}{r} \in \mathbb{Z}$$

$$\begin{cases} \tan \theta + 1 \neq 0 \rightarrow \tan \theta \neq -1 \\ \cos \theta \neq 0 \end{cases}$$



$$\frac{\cos \theta + 1}{\frac{\sin \theta}{\cos \theta} + 1}$$

(الف)

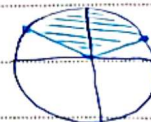
$$P = R - \left\{ k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{4} \right\}$$

$$1 - r \sin^2 \theta \geq 0 \rightarrow r \sin^2 \theta \leq 1 \rightarrow \sin^2 \theta \leq \frac{1}{r} \rightarrow -\frac{1}{\sqrt{r}} \leq \sin \theta \leq \frac{1}{\sqrt{r}}$$



$$P = \left[k\pi + \frac{\pi}{2}, k\pi - \frac{\pi}{2} \right]$$

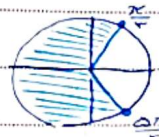
$$r \sin \theta - 1 \geq 0 \rightarrow r \sin \theta \geq 1 \rightarrow \sin \theta \geq \frac{1}{r}$$



(الف)

$$P = \left[r k\pi + \frac{\pi}{2}, r k\pi + \frac{\pi}{2} \right]$$

$$1 - r \cos^2 \theta \geq 0 \rightarrow r \cos^2 \theta \leq 1 \rightarrow \cos^2 \theta \leq \frac{1}{r} \rightarrow -\frac{1}{\sqrt{r}} \leq \cos \theta \leq \frac{1}{\sqrt{r}}$$



(ب)

$$P = \left[r k\pi + \frac{\pi}{4}, r k\pi + \frac{3\pi}{4} \right]$$

$$-1 \leq x^2 + rx + 1 \leq 1 \quad \begin{cases} x^2 + rx \leq 0 & \text{I} \\ x^2 + rx + r \geq 0 & \text{II} \end{cases}$$

$$\frac{-r}{2} \leq x \leq 0$$

$$I \cap II = P = [-r, r] \cup [-1, 0]$$

$$\frac{-r}{2} \leq x \leq 0$$

$$\omega - rx \geq 0 \rightarrow rx \leq \omega \rightarrow x \leq \frac{\omega}{r} \quad \text{I}$$

$$-1 \leq \sqrt{\omega - rx} \leq 1 \rightarrow \omega - rx \leq 1 \rightarrow rx \geq \omega - 1 \rightarrow x \geq \frac{\omega - 1}{r} \quad \text{II}$$

$$I \cap II = P = [r, r\omega]$$

Arman

$$\left\{ \begin{array}{l} 1 - \log_r x > 0 \rightarrow \log_r x < 1 \rightarrow x < r \quad I \\ x > 0 \quad II \end{array} \right. \Rightarrow I \cap II = Q = (0, r) \quad (9) \quad \text{الف}$$

$$\left\{ \begin{array}{l} 1 - \log_{\frac{1}{r}} x > 0 \rightarrow \log_{\frac{1}{r}} x < 1 \rightarrow x < \frac{1}{r} \quad I \\ x > 0 \quad II \end{array} \right. \Rightarrow I \cap II = Q = (0, \frac{1}{r}) \quad \text{ب}$$

$$\begin{aligned} \frac{r^x - r^y}{r^x - r^y - 1} > 0 &\rightarrow \frac{r^x - r^y}{r^x - r^y} \geq r^x \rightarrow r^x - r^y \geq r^x \\ r^y - r^x + r^x &\leq 0 \\ (x - y)(x - 1) &\leq 0 \end{aligned} \quad \text{الف} \quad (10)$$

$$Q = [1, r]$$

$$\begin{array}{c} + \quad - \quad - \quad + \\ 1 \quad \frac{1}{r} \quad 1 \quad r \end{array}$$

$$\frac{rk + \alpha}{rk + r} \in W \rightarrow x \in \frac{rk - \alpha}{rk - r} \rightarrow Q = \left\{ x \mid x = \frac{rk - \alpha}{rk - r}, k \in W \right\} \quad \text{ب}$$