

الف) $y = \frac{x+3}{x(x-1)(x+\frac{1}{x})}$ $D: \mathbb{R} - \{1, -3, \frac{1}{x}\}$ $(x^3 + 3x^2 - x(x+3)) \div (x-1) = x^2 + 4x - 3 \xrightarrow{\div x} x + \frac{4}{x} - \frac{3}{x} = (x+3)(x-\frac{1}{x})$ ب) $y = \frac{x+3}{x(x+1)(x+\frac{1}{x})}$ $D: \mathbb{R} - \{-1, -3, -\frac{1}{x}\}$ $(x^3 + 9x^2 + 6x + 3) \div (x+1) = x^2 + 8x + 3 \xrightarrow{\div x} x + \frac{8}{x} + \frac{3}{x} = (x+3)(x+\frac{1}{x})$	۱
الف) $y = \frac{x+3}{(x-1)(x^2-x+1)}$ $\rightarrow D: \mathbb{R} - \{1\}$ $b^2 + 4ac = 1 - 4 < 0 \rightarrow +$ و $a > 0$ ب) $y = \sqrt{\frac{x+3}{(x-1)(x^2-x+1)}}$ $\frac{-3}{+4-3} +$ $D = (-\infty, -3] \cup (1, +\infty)$	۲
$\begin{cases} x \geq 1 \\ x \leq 1 \end{cases} \rightarrow \begin{cases} x^2 - 5x + 5 - 2x + 5 = x^2 - 7x + 10 = (x-2)(x-5) \\ x^2 + 5x - 5 - 2x + 5 = x^2 + 3x = x(x+3) \end{cases}$ $D = \mathbb{R} - \{-3, 0, 2, 5\}$	۳
الف) $2n+1 - n+3 \neq 0 \rightarrow 2n+1 \neq n+3 \rightarrow (2n+1)^2 \neq (n+3)^2$ $4n^2 + 4 + 4n \neq n^2 + 9 + 6n \rightarrow 3n^2 - 2n - 5 \neq 0 \rightarrow n \neq \frac{2 \pm \sqrt{4 - 4(3)(-5)}}{6} = \frac{2 \pm \sqrt{64}}{6} = \frac{2 \pm 8}{6}$ $n \neq \frac{10}{6} \rightarrow n \neq \frac{5}{3}, -\frac{1}{3}$ $\rightarrow D: \mathbb{R} - \{\frac{5}{3}, -\frac{1}{3}\}$ ب) $2n+1 - n+3 \geq 0$ $\frac{-\frac{4}{3}}{+4-\frac{1}{3}} +$ $D = (-\infty, -\frac{1}{3}] \cup [\frac{5}{3}, +\infty)$	۴
الف) $\log_x^n \rightarrow n > 0$ ① $1 - \log_x^n > 0 \rightarrow \log_x^n < 1 \rightarrow n < 3$ ② $D = 1 \cap 2 = (0, 3)$ ب) $\log_{\frac{1}{x}}^n \rightarrow n > 0$ ① $1 - \log_{\frac{1}{x}}^n > 0 \rightarrow \log_{\frac{1}{x}}^n < 1 \rightarrow n > \frac{1}{x}$ $D = 1 \cap 2 = (\frac{1}{x}, +\infty)$ ⑤	۵

$\log_a(x_{n+1}) \rightarrow x_{n+1} > 0 \rightarrow x > \frac{1}{r} \quad (1)$ $\log_a(x_{n+1}) > 0 \rightarrow x_{n+1} > 1 \rightarrow x > 1 \rightarrow n > 1 \quad (2)$ $\log_a \log_a(x_{n+1}) > 0 \rightarrow \log_a(x_{n+1}) \leq 1 \rightarrow x_{n+1} \leq a \rightarrow x \leq 4 \rightarrow n \leq 3 \quad (3)$ $D = 1 \cap 2 \cap 3 = (1, 3]$	6
ا) $x \cos x + 1 > 0 \rightarrow x \cos x > -1 \rightarrow \cos x > -\frac{1}{x}$ $D = (2k\pi - \frac{2\pi}{r}, 2k\pi + \frac{2\pi}{r})$ ب) $\log \frac{x-1}{x+1} \rightarrow \frac{x-1}{x+1} > 1 \rightarrow$ لا يمكن $D = \emptyset$	7
$f(x) = \sqrt{-a'(x-r)} \rightarrow a'r = 0 \rightarrow a' = -r$ $-\frac{a'x}{r} + \frac{ra'}{r} = -rx + b \rightarrow a' = r \rightarrow \boxed{b=4}$	8
$b^2 - 4ac \leq 0 \rightarrow 4 - 4(1)(r-m^2) \leq 0 \xrightarrow{+4} 1 - (r-m^2) \leq 0 \rightarrow -1 + m^2 \leq 0$ $m^2 \leq 1 \rightarrow \boxed{-1 \leq m \leq 1} \rightarrow 1 - (-1) = \boxed{2}$	9
$x - x^2 \geq 0 \rightarrow x^2 \leq x \rightarrow -2 \leq x \leq 2 \rightarrow D = [-2, 2] \quad (1)$ $[x] + [-x] + 1 \neq 0 \rightarrow [x] + [-x] \neq -1 \rightarrow D = \mathbb{Z} \quad (2)$ $D = 1 \cap 2 = [-2, 2] \quad \text{تعداد اعداد صحیح: } 2 - (-2) + 1 = \boxed{5}$	10