

تکامل داری. تکلیف نیست. ۱. مساله

الف) $y_1'' = 2xy_1' + 2x_1 - 1$ if $m_1 = m_2$ $y_1''' = y_2''' \rightarrow \sqrt[3]{y_1} = \sqrt[3]{y_2} \rightarrow y_1 = y_2 \checkmark$

ب) $\cos y = y \cos \frac{\pi}{2} \rightarrow \frac{\pi}{2} \cos y = y \cos \frac{\pi}{2} \rightarrow \frac{\pi}{2} \cos y = 0 \rightarrow \cos y = 0 \rightarrow y = \frac{\pi}{2} + k\pi$

ج) $\frac{x+y}{2} \geq \sqrt{xy}$ $\rightarrow$ میانگین حسابی بزرگتر از میانگین هندسی است $\rightarrow m = y$ $\rightarrow$ $\frac{x+y}{2} \geq \sqrt{xy}$

د) $xy^2 + 2m - y^3 - 2y = 0 \rightarrow x(y^2 + 2) - y(y^2 + 2) = 0 \rightarrow (y^2 + 2)(x - y) = 0 \rightarrow x - y = 0 \rightarrow x = y \checkmark$

الف) $|y| + m^2 = 2y$ $\xrightarrow{y \geq 0} y + m^2 = 2y \rightarrow y = m^2$ $\xrightarrow{y < 0} -y + m^2 = 2y \rightarrow m^2 = 3y \rightarrow y = \frac{m^2}{3}$

$[y] + [x] = 1$ $\rightarrow$ $[y] = 1 \rightarrow 1 \leq y < 2$

$|a-1| \geq 2 \rightarrow a-1 \geq 2 \rightarrow a \geq 3$
 $|a-1| \geq 2 \rightarrow a-1 \leq -2 \rightarrow a \leq -1$
 $\Rightarrow a \geq 3$ or $a \leq -1$

$-a^2 - b + a \geq 0$ $\xrightarrow{\frac{a}{b}}$ $-a^2 - ab + a \xrightarrow{x-1}$ $a^2 + ab - a = 0$
 $\xrightarrow{\frac{a}{b}}$ $-b^2 - b^2 + a \rightarrow -b^2 - b^2 + a = 0 \Rightarrow a^2 - 2b^2 + ab = 0 \rightarrow a^2 + ab - 2b^2 = 0$
 $(a+b)(a-b) = 0 \Rightarrow a = -b$ or $a = b$

$ax^2 + bx + c > 0$ $\xrightarrow{(-\infty, 2)}$ $a = 0$ $b < 0$
 $(2, 9) \rightarrow 2b + c = 0 \rightarrow c = -2b$ $3a + c - 3|b|$ $\xrightarrow{b < 0, a = 0}$ $-2b - 3(-b) = 0 \rightarrow -2b + 3b = 0 \rightarrow b = 0$

$\frac{3m+2}{a+b} + c > 0 \rightarrow \frac{3m+2 + a(m+b)}{a+b} > 0 \rightarrow \frac{(3+a)m + (2+ab)}{a+b} > 0$ $D = (2, -\infty)$
 $a = -3 \rightarrow 3a = 0$ $\rightarrow$ $b = -2$

(الف) $y = \sqrt{x^3 - x} \Rightarrow x^3 - x \geq 0$
 (ب) $y = \frac{1}{\sqrt{|x| - 1}} \Rightarrow |x| - 1 > 0 \Rightarrow |x| > 1 \Rightarrow x > 1 \text{ or } x < -1$

$x(x^2 - 1) \geq 0 \Rightarrow \frac{-1}{-1+1} \quad \frac{0}{0+0} \quad \frac{1}{1+1} \rightarrow [-1, 0] \cup [1, +\infty)$

(الف) $y = \sqrt[3]{\frac{1}{\ln(x) - [x]}}$ $|x| \neq [x] \rightarrow$ $D = \mathbb{R} - \{x \geq 0 \mid x \in \mathbb{Z}\}$
 (ب) $\sqrt{x} + \sqrt{y} = 9 \Rightarrow \sqrt{x} \leq 9 \Rightarrow x \leq 81 \text{ and } x \geq 0 \rightarrow [0, 81]$

$y = \frac{1}{\sqrt{(x+\frac{1}{p}) + (x+\frac{p}{p})}} \Rightarrow [x - \frac{1}{p}] + [x + \frac{p}{p}] > 0$
 $2[x - \frac{1}{p}] + 2 > 0 \Rightarrow 2[x - \frac{1}{p}] > -2 \Rightarrow [x - \frac{1}{p}] > -1$
 $x > \frac{1}{p} \leftarrow x - \frac{1}{p} \geq 0$

$y = \sqrt{1 - \log(x-a)}$
 1) $x - a > 0 \Rightarrow x > \frac{a}{p}$
 2) $1 - \log(x-a) \geq 0 \Rightarrow \log(x-a) \leq 1 \Rightarrow x - a \leq 10$
 $\frac{a}{p} < x \leq a + \frac{a}{p} \Rightarrow a + \frac{a}{p} - \frac{a}{p} = a$