

$$\checkmark \text{الف) } y^3 = 2n^2 - 1 \rightarrow \left. \begin{array}{l} \text{if } (n_1, y_1) \in f \\ \text{if } (n_2, y_2) \in f \end{array} \right\} \xrightarrow{\text{if } n_1 = n_2} y_1 = y_2 \quad (1)$$

$$y_1^3 = y_2^3 \rightarrow y_1 = y_2 \quad \checkmark \text{تابع مست} \quad (2)$$

$$\checkmark \text{ب) } y^3 + y = 2n^2 - 1 \rightarrow \left. \begin{array}{l} \text{if } (n_1, y_1) \in f \\ \text{if } (n_2, y_2) \in f \end{array} \right\} \xrightarrow{\text{if } n_1 = n_2} y_1 = y_2$$

$$y_1^3 + y_1 = y_2^3 + y_2 \rightarrow y_1^3 - y_2^3 + y_1 - y_2 = 0 \rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + y_1 + y_2 + 1) = 0$$

$$(y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + y_1 + y_2 + 1) = 0 \rightarrow y_1 - y_2 = 0 \rightarrow y_1 = y_2 \quad \checkmark$$

$$y_1^2 + y_1 y_2 + y_2^2 + y_1 + y_2 + 1 = 0$$

$$\text{a) } \frac{y_1^2}{n} + \frac{y_1 y_2}{n} + \frac{y_2^2}{n} + \frac{y_1}{n} + \frac{y_2}{n} + \frac{1}{n} = 0 \quad \text{بزنول: } \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{-y_2 \pm \sqrt{y_2^2 - 4y_2 y_1 - 4}}{2} \quad \text{دلتا منفی}$$

$n \notin \mathbb{R}$ به طبق تست اول رابطه تابع است

$$\checkmark \text{الف) } y = n^2 - 1 \rightarrow \left. \begin{array}{l} \text{if } (n_1, y_1) \in f \\ \text{if } (n_2, y_2) \in f \end{array} \right\} \xrightarrow{\text{if } n_1 = n_2} y_1 = y_2 \rightarrow y_1 = y_2 \quad \checkmark \text{تابع مست} \quad (1) \quad (2)$$

$$\checkmark \text{ب) } |y| + ny = n^2 \quad \underline{n=0} \quad |y| = 1 \rightarrow y = \pm 1 \quad \text{تابع نیست}$$

$$\checkmark \text{الف) } y^3 + n^3 = 2n - 1 \quad \underline{n=0} \quad y^3 = -1 \rightarrow y = -1 \quad \checkmark \text{تابع مست}$$

$$\checkmark \text{ب) } \sqrt[3]{y} + \sqrt[3]{n} = 2 \quad \underline{n=0} \quad \sqrt[3]{y} = 2 \rightarrow y = 8 \quad \checkmark \text{تابع مست} \quad \text{پسین صفت}$$

$$\frac{\sin}{\cos}$$

الف) $\tan \frac{\pi}{3} \rightarrow \frac{\pi}{3} = 4.71^\circ \rightarrow \left| \frac{1}{\sqrt{3}} \right| \rightarrow \frac{\sqrt{3}}{3} \times \frac{3}{1} = \sqrt{3}$ ✓

ب) $\cot \frac{\sqrt{3}\pi}{4} \rightarrow \frac{\sqrt{3}\pi}{4} = 11.78^\circ \rightarrow \left| \frac{-\sqrt{3}}{1} \right| \rightarrow \frac{-\sqrt{3}}{1} \times \frac{1}{1} = -\sqrt{3}$ ✓

ج) $\tan 3\pi \rightarrow \frac{11\pi}{4} = \left| \frac{\sqrt{3}}{-1} \right| \rightarrow \frac{-1}{1} \times \frac{3}{\sqrt{3}} = \frac{-1}{\sqrt{3}}$ ✓

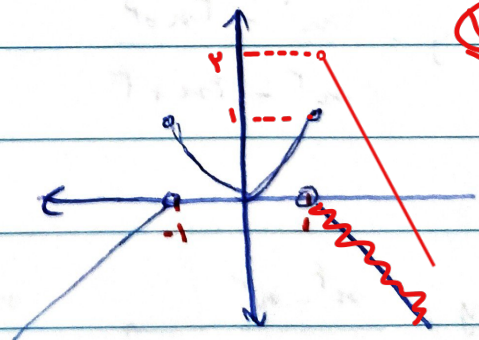
د) $\cot 11.78^\circ \rightarrow \pi = \left| \frac{-1}{0} \right| \rightarrow \frac{-1}{0} \rightarrow$ غلط است زیرا مخرج صفر است ✓

$0 \leq a \leq 2\pi \rightarrow 0 \leq a \leq 360^\circ$

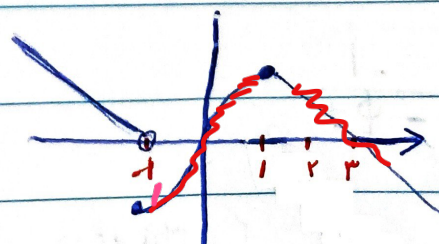
الف) $\sin a = \frac{1}{2} \rightarrow \frac{\pi}{6}, \frac{5\pi}{6}$ ✓
 ۳۰ و ۱۵۰

ب) $\cos a = \frac{\sqrt{3}}{2} \rightarrow \frac{\pi}{6}, \frac{11\pi}{6}$ ✓
 ۳۰ و ۳۳۰

$$f(n) = \begin{cases} -n+1 & n > 1 \\ n^2 & -1 < n < 1 \\ n+1 & n < -1 \end{cases}$$



$$f(n) = \begin{cases} -n+3 & n > 1 \\ n^2 & -1 \leq n \leq 1 \\ -n-1 & n < -1 \end{cases}$$



پایین صفتی

الف) $y = (n-2)(n-3)(n-4)$ $\frac{-2 \quad -3 \quad -4}{-\phi + \phi - \phi +}$ ✓ (7) (2)

ب) $y = (n-2)(n-3)^2(n-4)$ $\frac{-2 \quad -3 \quad -3 \quad -4}{+\phi - \phi - \phi +}$ ✓

الف) $\frac{(n-2)(n-4)}{n-3}$ $\frac{-2 \quad -4}{-\phi + \phi - \phi +}$ ✓ (8) (2)

ب) $\frac{(n-2)(n-4)}{(n-3)^2}$ $\frac{-2 \quad -4}{+\phi - \phi - \phi +}$ ✓

الف) $y = \frac{n^3 - 3n^2}{n-3}$ $\xrightarrow{\text{مجموع فرایب} = 0}$ $\frac{(n-1)^2(n+2)}{n-3}$ $\frac{-1 \quad -1 \quad 2}{+\phi - \phi - \phi +}$ ✓ (9) (2)

ب) $y = \frac{n^3 - 3n^2}{n^2 - 6n + 3}$ $\rightarrow \frac{(n-1)(n-2)}{(n-1)(n-3)}$ $\frac{-1 \quad -2}{+\phi + \phi - \phi +}$ ✓

الف) $y = \frac{n^4 - n^2}{n^2 + n + 1}$ $\xrightarrow{\Delta = -7 < 0}$ $\frac{n^2(n^2-1)}{n^2+n+1}$ $\frac{0 \quad 1 \quad -1}{+\phi + \phi + \phi +}$ ✓ (10) (1.5)

$\frac{-1 \quad 0 \quad 1}{+\phi - \phi - \phi +}$ ✓

صورت و مخرج هر دو مثبت هستند پس عبارت همواره مثبت است

ب) $y = \frac{n^4 + 3n^2}{n^2 + 2n + 3}$ $\xrightarrow{\Delta = -1 < 0}$ $\frac{n^2(n^2+3)}{n^2+2n+3}$ $\frac{0 \quad 3}{+\phi + \phi + \phi +}$ ✓ (R) ?

$$f(x) = \begin{cases} -x + 1 & x > 1 \\ x^2 & -1 \leq x \leq 1 \\ -x - 1 & x < -1 \end{cases}$$

