

تاریخ: ۱۹۱۷۵

الف) $2x^2 - 5x - 6 = 0 \rightarrow x^2 - 5x - 3 = 0 = (x-9)(x+4) \rightarrow x \begin{cases} 9 \\ -4 \end{cases} \rightarrow \frac{9}{6} = \frac{1}{2}, \frac{-4}{6} = -\frac{2}{3}$ ✓

ب) $3x^2 - 11x - 3 = 0 \rightarrow x^2 - 11x - 9 = 0 = (x-9)(x+1) \rightarrow x \begin{cases} 9 \\ -1 \end{cases} \rightarrow \frac{9}{3} = 3, \frac{-1}{3} = -\frac{1}{3}$ ✓

ج) $4x^2 - 12x - 3 = 0 \rightarrow x^2 - 3x - \frac{3}{4} = 0 = (x-4)(x+\frac{3}{4}) \rightarrow x \begin{cases} 4 \\ -\frac{3}{4} \end{cases} \rightarrow \frac{4}{4} = 1, \frac{-\frac{3}{4}}{4} = -\frac{3}{16}$ ✓

د) $2x^2 - 5x - 12 = 0 \rightarrow x^2 - 5x - 6 = 0 = (x-6)(x+1) \rightarrow x \begin{cases} 6 \\ -1 \end{cases} \rightarrow \frac{6}{2} = 3, \frac{-1}{2} = -\frac{1}{2}$ ✓

الف) $x^2 - 5x - 14 = 0 = (x-7)(x+2) \rightarrow x = 7, -2$ ✓

ب) $2x^2 + 5x + 3 = 0 \rightarrow x^2 + 5x + 4 = (x+2)(x+3) = 0 \rightarrow x = \begin{cases} -2 \\ -3 \end{cases} \rightarrow \frac{-2}{2} = -1, \frac{-3}{2} = -\frac{3}{2}$ ✓

ج) $x^2 + 2x + 3 = 0 \rightarrow x^2 + 2x + 1 = -2 \rightarrow (x+1)^2 = -2$ ✗ (ریشه ندارد)

د) $3x^2 + 3x - 2 = 0 \rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \rightarrow \frac{-3 \pm \sqrt{9 + 24}}{6} \rightarrow \frac{-3 \pm \sqrt{33}}{6}$ ✓

$A = \{1, 2, 3\} \quad B = \{2, 3\}$

$A \times B = \{(1, 2), (1, 3), (2, 2), (2, 3), (3, 2), (3, 3)\}$

$B^2 = \{(2, 2), (2, 3), (3, 2), (3, 3)\} \quad A \times B - B^2 = \{(1, 2), (1, 3)\}$ ✓

الف) $f(x) = \{(3, m^2), (2, 1), (-3, m), (-2, m), (3, m+2), (m, 4)\}$
 $m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0 \Rightarrow m = \begin{cases} 2 \\ -1 \end{cases}$ ✓

این جواب غیر قابل قبول است چون بار زوجی ۶ در فرجه می‌داریم ✗

ب) $g(x) = \{(3, m^2), (2, 1), (m, 4), (3, m+2), (-2, m), (-1, 3)\}$
 $m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \Rightarrow m = \begin{cases} 2 \\ -1 \end{cases}$ ✗

به انشای هیچ m این رابطه تابع نمی‌شود

$f(x) = \{(1, a^2), (1, 3a-2), (a^2, 3a+2)\}$

$a^2 = 3a-2 \rightarrow a^2 - 3a + 2 = (a-1)(a-2) = 0 \Rightarrow a = \begin{cases} 1 \\ 2 \end{cases}$ ✓

تایید مقدار

$f(x) = \{(1, 1), (1, 1), (1, 5)\}$

$$f(x) = \begin{cases} x^2 - 1 & x \leq 1 \\ ax + b & 1 \leq x \leq r \\ x^r & x \geq r \end{cases}$$

$$\left. \begin{aligned} f(1) = x^2 - 1 = ax + b \rightarrow a + b = 0 \\ f(r) = x^r = ax + b \rightarrow 1 = ra + b \end{aligned} \right\} \Rightarrow \begin{aligned} a &= 1 \\ b &= -1 \end{aligned}$$

$$a \times b = -1^r$$

$$f(x) = \begin{cases} rx - r & x \geq k \\ k - rx & x \leq k \end{cases}$$

$$f(k) = rx - r = k - rx \rightarrow rk - r = k - rk \Rightarrow k = r \Rightarrow k = \frac{r}{0} = 1/r$$

$$\text{الف) } y^3 - 4y = x^2 - 4x + 3$$

$$\text{If } x=1 \Rightarrow y^3 - 4y = 1 - 4 + 3 = 0 \rightarrow y^2(y-4) = 0 \Rightarrow y=0 \text{ یا } y=4$$

$$\text{ب) } |x| + |y| = 3 \quad \text{If } x=0 \Rightarrow |y| = 3 \Rightarrow y = \pm 3$$

$$\text{ج) } |y| = \sqrt{1 - \cos x} \quad \text{If } \cos x = \frac{1}{4} \Rightarrow |y| = \sqrt{\frac{3}{4}} \Rightarrow y = \pm \sqrt{\frac{3}{4}}$$

$$\text{د) } y^4 + 2x^2 + 2x + 1 = 0 \Rightarrow y^4 + (x+1)^2 = 0 \Rightarrow \left. \begin{aligned} \text{جمع دوینتر ناممکن} &\Rightarrow y=0 \\ \text{صفر شمره 0 در دو صفر اند} &\Rightarrow x=-1 \end{aligned} \right\} \Rightarrow \text{نقطه} = (-1, 0)$$

$$\text{الف) } \sqrt[3]{y + x^2} = 2x - 2 \rightarrow \sqrt[3]{y} = -x^2 + 2x - 2 = -(x-1)^2 - 1$$

$$\begin{cases} \sqrt[3]{y_1} = -(x-1)^2 - 1 \\ \sqrt[3]{y_2} = -(x-1)^2 - 1 \end{cases} \rightarrow \sqrt[3]{y_1} = \sqrt[3]{y_2} \rightarrow y_1 = y_2 \Rightarrow \text{تابع است}$$

$$\text{ب) } y^3 + 2y = \omega x$$

$$\begin{cases} y_1^3 + 2y_1 = \omega x \\ y_2^3 + 2y_2 = \omega x \end{cases} \Rightarrow y_1^3 + 2y_1 = y_2^3 + 2y_2 \rightarrow y_1^3 - y_2^3 = 2y_2 - 2y_1 \Rightarrow (y_1 - y_2)(y_1^2 + y_1y_2 + y_2^2 + 2) = 2(y_2 - y_1) \Rightarrow (y_1 - y_2)(y_1^2 + y_1y_2 + y_2^2 + 2) = 0 \Rightarrow y_1 - y_2 = 0 \Rightarrow y_1 = y_2 \Rightarrow \text{تابع است}$$

$$\text{الف) } x \sin y = y \sin x \rightarrow \text{If } x=0 \Rightarrow \sin x = 0 \Rightarrow y = 1R$$

$$\frac{y}{x} = 1 \Rightarrow y = x$$

$$\text{ب) } \sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \xrightarrow{\frac{x}{y} = t} \sqrt{t} + \sqrt{\frac{1}{t}} = 2 \rightarrow t + \frac{1}{t} + 2\sqrt{t} = 4 \Rightarrow t + \frac{1}{t} = 2$$

$$\Rightarrow t = 1, \frac{1}{t} = 1 \Rightarrow \frac{x}{y} = 1, \frac{y}{x} = 1 \Rightarrow x = 1, y = 1 \rightarrow \text{نقطه} = (1, 1) \Rightarrow \text{تابع است}$$

تأیید نقطه نیست من نقدی (۲) ! ۵۰ یا ... در آن ها، مرکنه!

(۱۰-ب) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2$

مین عبارت تنها زمانی به قدر است که $\sqrt{\frac{x}{y}} = 1$ باشد پس

$\sqrt{\frac{x}{y}} = 1 \Rightarrow \frac{x}{y} = 1 \Rightarrow x = y$ و $(x, y \neq 0)$

