

1) $q^2 - 9q - 4 = 0 \rightarrow q^2 - 9q - 4 = 0 \rightarrow (q-4)(q+4) = 0 \rightarrow \begin{cases} q=4 \\ q=-4 \end{cases} \rightarrow \begin{cases} q=4 \\ q=-\frac{4}{3} \end{cases}$

2) $3q^2 - 10q - 3 = 0 \rightarrow q^2 - 10q - 9 = 0 \rightarrow (q-9)(q+1) = 0 \rightarrow \begin{cases} q=9 \\ q=-1 \end{cases} \rightarrow \begin{cases} q=9 \\ q=-\frac{1}{3} \end{cases}$

3) $4q^2 - 5q - 3 = 0 \rightarrow q^2 - 5q - 12 = 0 \rightarrow (q-4)(q+3) = 0 \rightarrow \begin{cases} q=4 \\ q=-3 \end{cases} \rightarrow \begin{cases} q=4 \\ q=-\frac{3}{4} \end{cases}$

4) $2q^2 - 9q - 12 = 0 \rightarrow q^2 - 9q - 12 = 0 \rightarrow (q-1)(q+12) = 0 \rightarrow \begin{cases} q=1 \\ q=-12 \end{cases} \rightarrow \begin{cases} q=1 \\ q=-\frac{12}{5} \end{cases}$

1) $q^2 - 9q - 12 = 0 \rightarrow (q-9)(q+12) = 0 \rightarrow \begin{cases} q=9 \\ q=-12 \end{cases}$

2) $2q^2 + 9q + 3 = 0 \rightarrow q^2 + 9q + 6 = 0 \rightarrow (q+1)(q+6) = 0 \rightarrow \begin{cases} q=-1 \\ q=-6 \end{cases} \rightarrow \begin{cases} q=-1 \\ q=-\frac{1}{6} \end{cases}$

3) $q^2 + 2q + 3 = 0 \rightarrow \frac{-2 \pm \sqrt{4-12}}{2} \rightarrow \Delta < 0 \rightarrow \text{no real roots}$

4) $3q^2 + 3q - 2 = 0 \rightarrow \frac{-3 \pm \sqrt{9+24}}{6} = \frac{-3 \pm \sqrt{33}}{6} \rightarrow \begin{cases} q = \frac{-3 + \sqrt{33}}{6} \\ q = \frac{-3 - \sqrt{33}}{6} \end{cases}$

$A \times B = \left\{ \begin{pmatrix} 1 & 2 \\ 1 & 3 \end{pmatrix} \begin{pmatrix} 2 & 3 \\ 3 & 4 \end{pmatrix} \begin{pmatrix} 3 & 4 \\ 4 & 5 \end{pmatrix} \begin{pmatrix} 4 & 5 \\ 5 & 6 \end{pmatrix} \right\}$

$B^T = \left\{ \begin{pmatrix} 2 & 3 \\ 3 & 4 \end{pmatrix} \begin{pmatrix} 3 & 4 \\ 4 & 5 \end{pmatrix} \begin{pmatrix} 4 & 5 \\ 5 & 6 \end{pmatrix} \right\}$

$A \times B - B^T = \left\{ \begin{pmatrix} 1 & 2 \\ 1 & 3 \end{pmatrix} \begin{pmatrix} 2 & 3 \\ 3 & 4 \end{pmatrix} \begin{pmatrix} 3 & 4 \\ 4 & 5 \end{pmatrix} \begin{pmatrix} 4 & 5 \\ 5 & 6 \end{pmatrix} - \begin{pmatrix} 2 & 3 \\ 3 & 4 \end{pmatrix} \begin{pmatrix} 3 & 4 \\ 4 & 5 \end{pmatrix} \begin{pmatrix} 4 & 5 \\ 5 & 6 \end{pmatrix} \right\}$

1) $m^2 - m - 2 = 0 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0 \rightarrow \begin{cases} m=2 \\ m=-1 \end{cases}$

2) $m^2 - m - 2 = 0 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0 \rightarrow \begin{cases} m=2 \\ m=-1 \end{cases}$

همیشه تابع است

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

$a=1 \rightarrow \begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix} \rightarrow \text{no}$

$a=2 \rightarrow \begin{pmatrix} 1 & 2 \\ 2 & 1 \end{pmatrix} \rightarrow \text{yes}$

$f(a) = \left\{ \begin{pmatrix} 1 & 2 \\ 2 & 1 \end{pmatrix} \begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix} \begin{pmatrix} 1 & 2 \\ 2 & 1 \end{pmatrix} \right\}$

$$f(1) = (1)^2 - 1 = 0$$

$$f(1) = (a+b=0) \text{ or } \left. \begin{array}{l} f(1) = a+b=0 \\ f(2) = 2a+b=1 \end{array} \right\} \rightarrow \begin{array}{l} 2a+2b-2a-b = -1 \rightarrow b = -1 \\ a = 1 \end{array} \rightarrow a+b = 0$$

$$f(2) = 2a+b=1$$

$$f(2) = 1$$

$$f(x) = 2x - 3 = 5 - 3x \rightarrow \Delta x = 1 \rightarrow k = 1/2$$

1) X ✓ س. دو ی باتوان فرد علامت - آید پس تابع نیست.

2) X if $x=0 \rightarrow |0|+|y| = 3 \rightarrow |y| = 3 \rightarrow y = \pm 3 \rightarrow$ تابع نیست

3) X if $x=90^\circ \rightarrow \cos 90^\circ = 0 \rightarrow |y| = 1 \rightarrow |y| = 1 \rightarrow y = \pm 1$

4) X $x^2 + (x+1)^2 = 0 \rightarrow \left\{ \begin{array}{l} y = 0 \\ x = -1 \end{array} \right\}$ ✓ جمع 2 عدد نامشقی منفی پس دو عدد منفی است و تابع فک نقطه.

1) $\left. \begin{array}{l} x^2 - 2x + 2 = -\sqrt{y} \\ x^2 - 2x + 2 = -\sqrt{y} \end{array} \right\} \rightarrow \sqrt{y_1} = \sqrt{y_2} \rightarrow y_1 = y_2 \rightarrow$ تابع است ✓

2) $\left. \begin{array}{l} y_1 + y_2 = \Delta x \\ y_1 + y_2 = \Delta x \end{array} \right\} \rightarrow y_1 + y_2 = y_2 + 2y_2 \rightarrow y_1 + 2(y_1 - y_2) = 0$
 $\rightarrow (y_1 - y_2) / (y_1^2 + y_1 y_2 + y_2^2 + 2) = 0 \rightarrow y_1 - y_2 = 0$ ✓

1) if $x=\pi \rightarrow y \sin \pi = \pi \sin y = 0 \rightarrow$ تابع نیست مثال نقض

2) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \rightarrow \frac{x}{y} + \frac{y}{x} + 2 = 4 \rightarrow \frac{x^2 + y^2}{xy} = 2 \rightarrow x^2 + y^2 = 2xy$
 $x^2 + y^2 - 2xy = (x-y)^2 = 0 \rightarrow x = y$ ✓ تابع است

مربوط به $x, y \neq 0$
 ثابت نه 1

$$\text{ج-۲)} \quad 2x^2 + 2x + 3 = 0 \xrightarrow{a+c=b} \rightarrow x_1 = -1$$

$$\rightarrow x_2 = -\frac{c}{a} = -\frac{3}{2}$$

$$\text{ج-۱۰)} \quad \sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2$$

این عبارت تنها زمانی برقرار است که $1 = \sqrt{\frac{x}{y}}$ باشد پس

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

