

۱) $4x^2 - 5x - 4 = 0 \Rightarrow x^2 - 5x - 4 = 0 \Rightarrow (x-1)(x+4) = 0 \Rightarrow x = \frac{1}{4}, x = -\frac{4}{1}$
 ۲) $3x^2 - 8x - 4 = 0 \Rightarrow x^2 - 8x - 4 = 0 \Rightarrow (x-1)(x+1) = 0 \Rightarrow x = \frac{1}{2}, x = -\frac{1}{2}$
 ۳) $2x^2 - 5x - 12 = 0 \Rightarrow x^2 - 5x - 12 = 0 \Rightarrow (x-4)(x+3) = 0 \Rightarrow x = \frac{4}{2}, x = -\frac{3}{2}$
 ۴) $2x^2 - 5x - 12 = 0 \Rightarrow x^2 - 5x - 12 = 0 \Rightarrow (x-1)(x+4) = 0 \Rightarrow x = \frac{1}{2}, x = -\frac{4}{1}$

۱) $x^2 - 5x - 12 = 0 \Rightarrow (x-7)(x+4) \Rightarrow x = 7, x = -4$
 ۲) $2x^2 + 5x + 4 = 0 \Rightarrow x^2 + 5x + 4 = 0 \Rightarrow (x+1)(x+4) \Rightarrow x = -\frac{1}{2}, x = -\frac{4}{2}$
 ۳) $x^2 + 2x + 4 = 0 \Rightarrow \Delta = 4 - 4(1)(4) < 0 \Rightarrow$ ریشه ندارد!
 ۴) $2x^2 + 5x - 4 = 0 \Rightarrow x^2 + 5x - 4 = 0 \Rightarrow \Delta = 9 + 20 = 29 \Rightarrow x = \frac{-5 \pm \sqrt{29}}{2}$

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

۱) $f(x) = \{(x, m^2), (x, 1), (-x, m), (-x, m), (x, m+x), (m, x)\}$
 $m+x = m^2 \Rightarrow m^2 - m - x = 0 \Rightarrow m = -1 \checkmark$
 $m = 2 \checkmark$

۲) $g(x) = \{(x, m^2), (x, 1), (m, x), (x, m+x), (-x, m), (-1, x)\}$
 $m^2 = m+x \Rightarrow m^2 - m - x = 0 \Rightarrow m = -1 \checkmark$
 $m = 2 \checkmark$

$f(x) = \{(0, x^2), (1, x^2 - x), (x^2, x^2 + x)\}$
 $x^2 = x^2 - x \Rightarrow x^2 - x^2 + x = 0 \Rightarrow x = 0 \checkmark$
 $x = 2 \checkmark$

$f(x) = \begin{cases} x^x - 1 & x \leq 1 \Rightarrow x = 1 : 1 - 1 = 0 \\ ax + b & 1 \leq x \leq 2 \Rightarrow x = 1 : 2a + b \Rightarrow x = 2 : a + b \\ x^2 & x \geq 2 \Rightarrow x = 2 : 4 \end{cases}$ $\Rightarrow \begin{cases} a + b = 0 \\ 2a + b = 1 \end{cases} \Rightarrow \begin{cases} a = 1 \\ b = -1 \end{cases}$ $a \times b = -4$ سوال ۶ از اعداد صحیح	۶
$f(x) = \begin{cases} 2x - 2 & x \geq k \quad x = k : 2k - 2 \\ 2 - 4x & x \leq k \quad x = k : 2 - 4k \end{cases}$ $\Rightarrow 2 - 4k = 2k - 2 \Rightarrow 6k = 4 \Rightarrow k = \frac{2}{3}$	۷
الف) $y^x - 4y = x^x - 4x + 4 \quad x = 0 : y(y^x - 4) = 0 \Rightarrow y = 4, y = 0$ ب) $x + y = 3 \quad x = 0 : y = 3 \Rightarrow y = \pm 3$ ج) $y = \sqrt{1 - \cos x} \quad x = \frac{\pi}{2} \Rightarrow y = \sqrt{1 - 1} \Rightarrow y = 0 \Rightarrow y = 0$ د) $y^x + x^x + 2x + 1 = 0 \Rightarrow y^x + (x+1)^x = 0$	۸
الف) $\sqrt{y^x} + x^x = 2x - 2 \quad x_1, y_1 \in f \quad \text{if } x_1 = x_2 \Rightarrow y_1 = y_2$ $\Rightarrow \sqrt{y_1^x} = -x_1^x + 2x_1 - 2, \sqrt{y_2^x} = -x_2^x + 2x_2 - 2 \Rightarrow \sqrt{y_1^x} = \sqrt{y_2^x} \Rightarrow y_1 = y_2$ ب) $y^x + 2y = ax \quad x_1, y_1 \in f \quad \text{if } x_1 = x_2 \Rightarrow y_1 = y_2$ $y_1^x + 2y_1 = y_2^x + 2y_2 \Rightarrow (y_1 - y_2)(y_1^x + y_2^x + y_1 + y_2) = 0 \Rightarrow y_1 = y_2$	۹
الف) $x \sin y = y \sin x \Rightarrow x = 0 : 0 \times \sin y = y \times 0 \Rightarrow y = 0$ ب) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \Rightarrow \frac{x}{y} + \frac{y}{x} + 2 = 2 \Rightarrow \frac{x}{y} + \frac{y}{x} = 0$ $\frac{x^2 + y^2}{xy} = 2 \Rightarrow x^2 + y^2 = 2xy \Rightarrow x^2 + y^2 - 2xy = 0 \Rightarrow (x - y)^2 = 0 \Rightarrow y = x$ از اعداد صحیح (x و y ≠ 0)	۱۰

$$(10-ب) \sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2$$

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

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

