

۲. آخرین معادله

$$\rightarrow \underbrace{2((a+1)(v))}_{14a+14} = 3a + 2(-2) + a = 4a - 4 \rightarrow 10a = -18 \rightarrow \boxed{a = -1.8} \quad 1$$

$$\underbrace{\frac{x_1}{2-\sqrt{3}}, \frac{x_2}{2+\sqrt{3}}}_{\text{مکملین یکدیگرند}} \Rightarrow \frac{1}{2-\sqrt{3}} = 2+\sqrt{3} \Rightarrow \frac{1}{\sqrt{x_1}} + \sqrt{x_1} + 2 + \sqrt{x_2} + \frac{1}{\sqrt{x_2}} + 2 + \sqrt{x_2} + \sqrt{x_1} + 4 + \sqrt{x_2} + \sqrt{x_1} = 2(\sqrt{x_1} + \sqrt{x_2}) + 8 \quad 2$$

$$\rightarrow \sqrt{x_1} + \sqrt{x_2} = ? \rightarrow (\sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}})^2 = 2-\sqrt{3} + 2+\sqrt{3} + 2(\sqrt{2-\sqrt{3}})(\sqrt{2+\sqrt{3}}) = 4 + 2(\sqrt{(2-\sqrt{3})(2+\sqrt{3})}) = 4 + 2(\sqrt{4-3}) = 4 + 2(1) = 6 \Rightarrow \sqrt{x_1} + \sqrt{x_2} = \sqrt{6} \quad 3$$

$$\begin{aligned} x=x &\Rightarrow \begin{cases} (2f(x) - 3f(-x)) = \sum x^2 - x \times 2 \Rightarrow \begin{cases} 5f(x) - 9f(-x) = 12x^2 - 4x \\ 9f(x) - 9f(x) = 12x^2 + 3x \end{cases} \\ x=-x \Rightarrow \begin{cases} (2f(-x) - 3f(x)) = x + \sum x^2 \times 3 \Rightarrow \begin{cases} 9f(x) - 9f(x) = 12x^2 + 3x \\ -5f(x) = 20x^2 + x \Rightarrow f(x) = -\frac{4}{5}x^2 - \frac{x}{5} \end{cases} \end{cases} \end{aligned} \quad 4$$

$$\rightarrow \begin{cases} (2f(0) = 3m - 1) \times (-5) \Rightarrow \begin{cases} -10f(0) = -15m + 5 \\ (9f(0) = 14 + 5m - 1) \times 3 \Rightarrow \begin{cases} 18f(0) = 42 + 15m \end{cases} \end{cases} \Rightarrow \frac{18f(0) = 42 + 15m}{-10f(0) = -15m + 5} \Rightarrow 18f(0) = 42 \Rightarrow f(0) = \frac{7}{3} \quad 5$$

$$\rightarrow ax + b + \frac{a}{x} + b = \frac{3x^2 - 12x + 3}{x} = 3x - 12 + \frac{3}{x} \Rightarrow a=3, b=-9 \Rightarrow f(-1) = -1(2) - 9 = -11 \quad 6$$

$$\left\{ \begin{aligned} f(x) &= (x-1)\sqrt{1-x} \rightarrow 1-x \geq 0 \rightarrow x \leq 1 \\ g(x) &= -\sqrt{(1-x)^3} \rightarrow (1-x)^3 \geq 0 \xrightarrow{\sqrt{}} 1-x \geq 0 \rightarrow x \leq 1 \end{aligned} \right\} \Rightarrow D_f = D_g \Rightarrow \text{مقادیر دو هم همواره نامثبت است} \quad 7$$

$$\left\{ \begin{aligned} f(x) &= x\sqrt{x} \rightarrow x \geq 0 \\ g(x) &= \sqrt{x^3} \rightarrow x^3 \geq 0 \rightarrow x \geq 0 \end{aligned} \right\} \Rightarrow D_f = D_g \Rightarrow \text{مقادیر دو هم همواره نامثبت است} \quad 8$$

$$\left\{ \begin{aligned} f(x) &= [\sqrt{x} - \lfloor \sqrt{x} \rfloor] \rightarrow x \geq 0 \\ g(x) &= \sqrt{x^3} \rightarrow x^3 \geq 0 \rightarrow x \geq 0 \end{aligned} \right\} \Rightarrow D_f = D_g \Rightarrow \text{مقادیر دو هم همواره منفی است} \quad 9$$

$$\begin{aligned} (f+g)(1) &= 1+2=3 \Rightarrow \left(\frac{f+g}{f-g}\right)(1) = \frac{3}{1} = 3 \\ f-g(1) &= 2-1=1 \end{aligned} \quad 10$$

$$\begin{aligned} f+g(2) &= 3+3=6 \Rightarrow \left(\frac{f+g}{f-g}\right)(2) = \frac{6}{0} = \infty \\ f-g(2) &= 0 \end{aligned} \quad 11$$

ج) $f(x) \times g(-1) = 0$ $x = 1$

باید هر یک از مولفه های اول را به علاوه ۱ و تقسیم بر ۳ کنیم ✓

→ $g(x) = f(3x-1)$ $\rightarrow (1, 1) (0, 0) (\frac{1}{3}, 0) (-\frac{1}{3}, 2) (\frac{2}{3}, -1) (-1, \frac{2}{3})$

ب) $h(x) = f(|x|)$ $\rightarrow$ باید هر یک از مولفه های اول را مساوی $|x|$ قرار دهیم ✓

→ $|x| = 2 \rightarrow x = \pm 2$
 $|x| = 1 \rightarrow x = \pm 1$
 $|x| = 0 \rightarrow x = 0$
 $|x| = -2 \rightarrow$ غلط
 $|x| = 3 \rightarrow x = \pm 3$

⇒ $(2, 1) (-2, 1) (0, 0) (3, -1) (-3, -1)$