

$$\left. \begin{aligned} f(-2) &= 3a + 2(-2) = 3a - 4 \\ f(4) &= (a+1)(4+2) = 7a+7 \end{aligned} \right\} \rightarrow \begin{aligned} 14a+14 &= 4a-4 \Rightarrow \\ 10a &= -18 \Rightarrow \boxed{a = -1, 1} \end{aligned}$$

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$$\left(\sqrt{n} + \frac{1}{\sqrt{n}} \right)^2 = n + \frac{1}{n} + 2 \xrightarrow{n=1 \pm \sqrt{3}} \left\{ \begin{aligned} f(2+\sqrt{3}) &= 2+\sqrt{3} + \frac{1}{2+\sqrt{3}} + 2 = 2+\sqrt{3} + 2-\sqrt{3} + 2 = 6 \\ f(2-\sqrt{3}) &= 2-\sqrt{3} + \frac{1}{2-\sqrt{3}} + 2 = 2-\sqrt{3} + 2+\sqrt{3} + 2 = 6 \end{aligned} \right.$$

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$$6+6 = \boxed{12}$$

$$\left\{ \begin{aligned} 2f(n) - 3f(-n) &= 4n^2 - n \xrightarrow{\times 2} 4f(n) - 6f(-n) = 8n^2 - 2n \\ 2f(-n) - 3f(n) &= 4(-n)^2 + n \xrightarrow{\times 2} 4f(-n) - 6f(n) = 8n^2 + 2n \end{aligned} \right. \rightarrow \begin{aligned} 4f(n) - 6f(-n) &= 8n^2 - 2n \\ 4f(-n) - 6f(n) &= 8n^2 + 2n \\ \hline -2f(n) &= 10n^2 + 2n \Rightarrow \\ f(n) &= -5n^2 - \frac{1}{2}n \end{aligned}$$

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$$n=0 \rightarrow 2f(0) = 3m-1 \Rightarrow \boxed{f(0) = \frac{3}{2}m - \frac{1}{2}}$$

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$$n=-1 \Rightarrow f(-1) + f(-1) = \frac{3(-1)^2 - 12(-1) + 3}{-1} \Rightarrow 2f(-1) = -14 \Rightarrow \boxed{f(-1) = -7}$$

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$$Df = (-\infty, +1] \\ Dg = (-\infty, +1] \Rightarrow \text{دو تابع مساوی هستند.}$$

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$$\left. \begin{aligned} Df &= [0, +\infty) \\ Dg &= [0, +\infty) \end{aligned} \right\} \Rightarrow \text{دو تابع مساوی هستند.}$$

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$$n - |n| \geq 0 \Rightarrow n \geq |n| \Rightarrow n \geq 0 \rightarrow Dg = [0, +\infty) \\ f(n) \rightarrow n \geq 0 \Rightarrow Df = [0, +\infty) \rightarrow f(n) \text{ همیشه مثبت و اولی.}$$

پس دو تابع مساوی نیستند.

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$$\text{الف) } \frac{f(1) + g(1)}{f(1) - g(1)} = \frac{2+1}{2-1} = \underline{3}$$

$$\text{ب) } \frac{f(2) + g(2)}{f(2) - g(2)} = \frac{3+3}{3-3} = \underline{\text{تعریف نشده}}$$

$$\text{ج) } f(0) \times g(-1) = 0 \times 1 = \underline{0}$$

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$$\text{الف) } 3n - 1 = 2 \Rightarrow n = 1 \rightarrow (1, 1) \in g$$

$$\text{ب) } h(n) = f(|n|) \rightarrow n = -2 \rightarrow (-2, 2) \in h$$

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