

$$2n-1 [x] > f \rightarrow x \rightarrow f(x) - x + 1 \geq 0 \rightarrow x \geq 0 \rightarrow 0 \leq x \leq \infty \quad (1)$$

$$2x+3 [x] \leq f \rightarrow x < 0 \rightarrow f(x) - x + 1 \geq 0 \rightarrow 2x+3 \geq 0 \rightarrow -\frac{3}{2} \leq x < 0 \quad (2)$$

$$(1) \cup (2) = [-\frac{3}{2}, +\infty)$$

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$$D_y = [-\frac{3}{2}, +\infty)$$

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$$= \frac{3(1x^3 + 1x^2 + x + 1)}{(2x+1)^3} = \frac{3(2x+1)^3}{(2x+1)^3} = \frac{3}{2x+1}$$

$$D_y = R - \{-\frac{1}{2}\}$$

$$\begin{array}{r} 1x^3 + 1x^2 + x + 1 \\ 1x^3 + 2x^2 \\ \hline 1x^2 + x + 1 \\ 1x^2 + 2x \\ \hline x + 1 \\ x + 1 \\ \hline 0 \end{array}$$

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$$= \frac{(x+1)(x-1)(x+2)}{(x+1)(x-1)} = x+2$$

$$\begin{array}{r} x^3 + 2x^2 - x - 2 \\ x^3 - x \\ \hline 2x^2 - 2 \\ 2x^2 - 2 \\ \hline 0 \end{array}$$

$$x+2 = \frac{ax^2}{x+b} \rightarrow x+2 = k + \frac{c}{x+b} \rightarrow x+2 = k + \frac{c}{x+b}$$

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$$\begin{cases} 2b+c=a \\ b-1=c-a \end{cases} \rightarrow \begin{cases} b=1 \\ a=2 \end{cases}$$

$$f_1 = \frac{a}{b+1} = 2 \quad f_{-1} = \frac{2-a}{b-1} = 1$$

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$$g(x) = (x-2)^2(x) + (-x-2)^2(-x) = x((x-2)^2 - (x+2)^2) = x((x)(-4)) = -4x^2$$

$$\rightarrow g(x) = -4x^2$$

(سوال ۴ و ۵ جواب جانوشتر)

$$(x-1)(x-c) = x^2 + ax + b \rightarrow c=b, \quad c+1=-a$$

$$\frac{(x+1)}{x-c} = \frac{(x+1)(x-1)}{x^2+ax+b} \rightarrow x-c=0 \rightarrow x=c$$

$$(x-1)(x-c) = x^2+ax+b \rightarrow x-1=x-c \rightarrow c=1$$

$$x^2-2x+1 = x^2+ax+b \rightarrow a=-2, b=1$$

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$$1-2n = -1 \rightarrow n=1 \rightarrow f_{(-1)} = 2 \checkmark$$

$$1-2n = 3 \rightarrow n = -1 \rightarrow f_{(3)} = 1 \checkmark$$

$$f_{(-1)} + f_{(3)} = \boxed{3} \checkmark$$

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$$n + \sqrt{n} = 4 \quad \sqrt{n} = t \rightarrow t^2 + t - 4 = 0 \rightarrow (t+3)(t-1) = 0 \rightarrow \begin{cases} \sqrt{n} = 1 \text{ قبول} \rightarrow n = 1 \\ \sqrt{n} = -3 \text{ قبول} \end{cases}$$

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$$f_{(4)} = (1)^2 + 3(1) = 1 + 3 = 4 \quad \boxed{4} \checkmark$$

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$$= (n-1)^3 + (n-1) + (1-n)^3 + (1-n) = \underline{n^3 - 1} + \underline{3n} - \underline{3n^3} + \underline{1 - n^3} + \underline{3n^3} - \underline{3n} = 0$$

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$$\rightarrow \boxed{F(x-1) + f_{(1-x)} = 0} \checkmark$$

$$f_{(1)} = \sqrt{5-3a} + k - 1 \quad g_{(1)} = \sqrt{b-4} + 3k$$

$$2f_{(1)} - g_{(1)} = 2\sqrt{5-3a} + 2k - 2 - \sqrt{b-4} - 3k = k$$

$$2k - 2 - 3k = k \rightarrow \boxed{k = -4} \checkmark$$

$$\rightarrow 3a - \frac{b}{4} - k = 5 - 2 + 4 = 7 \checkmark$$

$$b - 3a \geq 0 \rightarrow n \leq \frac{b}{3}$$

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$$3a - 3a \geq 0 \rightarrow n \geq \frac{3a}{3}$$

(مربعی که در دسترس داریم)

$$\frac{b}{3} = \frac{3a}{3} = 1 \rightarrow \boxed{b=3, a=\frac{1}{3}} \checkmark$$

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$$n + 1 \geq 0 \rightarrow n \geq -1, m - n \geq 0 \rightarrow n \leq m \rightarrow -1 \leq n \leq m, D_{f \circ g} = [-1, 1]$$

$$\rightarrow \boxed{m=1} \checkmark, f_{(n)} = \sqrt{1-3} + n = 2 + n \quad g_n = 2\sqrt{2}$$

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$$f - g_n = 2 + n - 2\sqrt{2} = 4\sqrt{2}$$

$$\rightarrow n = 4\sqrt{2} \checkmark$$

$$\rightarrow m + n = 1 + 4\sqrt{2} \checkmark$$

$$m + n = 1 + 4\sqrt{2}$$