

$$f(n) \begin{cases} 2n-1 \rightarrow n > 1 \rightarrow y = \sqrt{2n-1} - n+1 \rightarrow y = \sqrt{n} \rightarrow n > 1 \\ 1 \rightarrow n < 1 \rightarrow y = \sqrt{1^2 - n+1} \rightarrow y = \sqrt{1-n} \rightarrow n < 1 \end{cases}$$

$$D_f = \left[-\frac{1}{2}, 1\right) \cup (1, +\infty) \rightarrow \boxed{D_g = \left[-\frac{1}{2}, +\infty\right)}$$

$$y = \frac{3(16n^3 + 12n^2 + 9n + 1)}{((2n+1)^2)^3} = \frac{3(2n+1)^3}{(2n+1)^6} = \frac{3}{(2n+1)^3}$$

$$D_f = \mathbb{R} - \left\{-\frac{1}{2}\right\}$$

$$\frac{n^2 + 11n^2 - n - 2}{n^2 - 1} = \frac{(n^2 - 1)(n+2)}{n^2 - 1} = n+2 \rightarrow C = 2$$

$$n=1 \rightarrow y = 1+2 = 3 = \frac{a+2}{1+b} \rightarrow 3(1+b) = a+2 \rightarrow 3+3b = a+2 \rightarrow 3b = a-1 \rightarrow b = \frac{a-1}{3}$$

$$n=-1 \rightarrow y = -1+2 = 1 = \frac{a-1}{b-1} \rightarrow b-1 = \frac{a-1}{1} \rightarrow b = a$$

$$\begin{cases} 3b = a-1 \\ b = a \end{cases} \rightarrow \begin{cases} 3a = a-1 \\ a = -\frac{1}{2} \end{cases} \rightarrow \begin{cases} a = -\frac{1}{2} \\ b = -\frac{1}{2} \end{cases} \rightarrow \boxed{C = \frac{a+b}{2} = \frac{-\frac{1}{2} - \frac{1}{2}}{2} = -\frac{1}{2}}$$

$$\frac{n^2 - 1}{n^2 + 9n + 6} = \frac{n+1}{n-2} \rightarrow \frac{(n-1)(n+1)}{(n+3)(n+1)} = \frac{n+1}{n-2} \rightarrow \frac{(n-1)(n+1)}{(n+3)^2} = \frac{n+1}{n-2}$$

دنباله این عبارت با هم برابر است
پس ریشه های صحیح یکسان دارند پس ریشه ها برابر است
دلیل ساده شدن عبارت (n-1) است

$$\boxed{a+b+C=0} \rightarrow \begin{cases} C=1 \\ a=-2 \\ b=1 \end{cases}$$

$$f(n+1) = n(n-2)^2 \rightarrow g(n) = n(n-2)^2 + n(n+2)^2 \rightarrow$$

$$f(n-1) = -n(n+2)^2 \rightarrow g(n) = n(n^2 - 4n + 4 - n^2 - 4n - 4) = n(-8n) = -8n^2$$

$$\boxed{g(n) = -8n^2}$$

$$f(-1) = f(1-2n) \rightarrow 1-2n = -1 \rightarrow n = 1 \rightarrow f(-1) = \sqrt{1} = 1$$

$$f(3) = f(1-2n) \rightarrow 1-2n = 3 \rightarrow n = -1 \rightarrow f(3) = \sqrt{-1} + 2 = 1$$

$$\boxed{f(-1) + f(3) = 2}$$

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$$f(9) = f(n+\sqrt{n}) \rightarrow n+\sqrt{n} = 9 \xrightarrow{\sqrt{n} \geq 0} +2 + -9 = 0 \rightarrow$$

$$(\sqrt{n}-2)(\sqrt{n}+3) = 0 \rightarrow \boxed{\sqrt{n} = 2} \rightarrow n = 4$$

$$\boxed{f(9) = \sqrt{4} + 3 = 2 + 3 = 5}$$

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$$f(1-n) + f(n-1) \xrightarrow{n=1} f(-1) + f(1) = 1 + 1 = 2 \geq 0 \rightarrow$$

$$\boxed{f(1-n) + f(n-1) = 2}$$

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چون دامنه f و g عینیه پس دامنه $f \circ g$ همون دامنه f است باز $(-1, 1)$ و $(-1, 1)$ و $(-1, 1)$ و $(-1, 1)$ فقط است که زیر دایره $y = 1$ قرار می گیرند

$$k - k = 0 \rightarrow a = \frac{k}{k} \text{ و } b - k = 0 \rightarrow b = k$$

$$f \circ g(1) = k - 2 - k = -2 \rightarrow -2 - k = k \rightarrow k = -1$$

$$\boxed{k - \frac{b}{k} - k = k - 2 + 1 = -1}$$

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$$Df \Rightarrow m - n \geq 0 \rightarrow n \leq m$$

$$Dg \Rightarrow 2n + 2 \geq 0 \rightarrow n \geq -1$$

$$\rightarrow D_{f \circ g} = Df \cap Dg = [-1, 1] = [-1, m]$$

$$f \circ g(3) = 9\sqrt{3} = \sqrt{V-3} + 1 - \sqrt{1} = 2 + 1 - 1 = 2 \quad m=3$$

$$1 = 1 + 1 - 2 \rightarrow \boxed{m+1 = 1 + 1 + 1 = 3}$$

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