

$$n^2 f(n+1) \geq 0 \rightarrow f(n+1) = \left(\frac{1}{n}\right)^{n-1} - 1$$

$$\Rightarrow n^2 \times \left(\left(\frac{1}{n}\right)^{n-1} - 1\right) \geq 0 \Rightarrow \begin{array}{c} 1 \\ - \quad + \quad - \end{array} \Rightarrow D_f = [0, 1] \checkmark$$

(۲)

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

$$\Rightarrow -n + |2-n| \geq 0 \Rightarrow 2-n \geq n \quad \vee \quad 2-n \leq -n$$

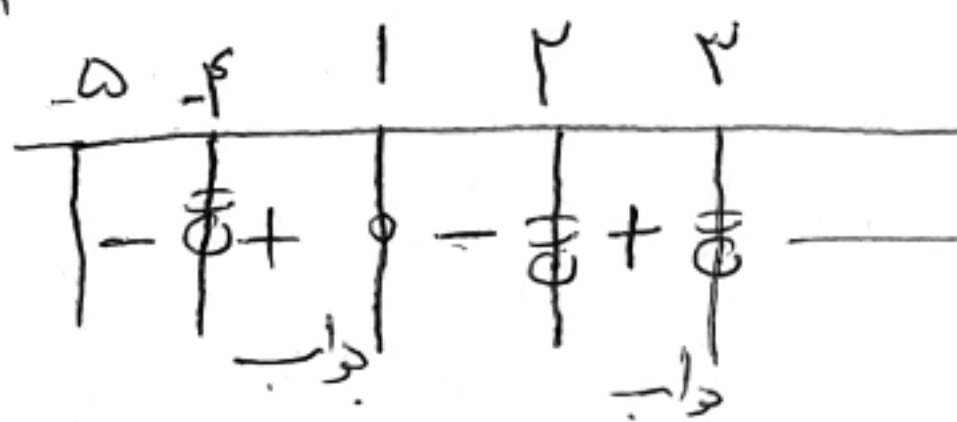
$$2-n \geq n \Rightarrow n \leq 1 \rightarrow D_{f(-n)} = (-\infty, 1] \checkmark$$

شرط انتیاد و تعریف د

(۲)

$$f(n) \neq 0 \Rightarrow n \neq -4, 2, 3$$

$$\text{تعیین علامت} \rightarrow \frac{n-1}{f(n)} \geq 0 \rightarrow \text{شرط اداکال}$$



$$D_g = (-4, 1] \cup (2, 3) \checkmark$$

(۲)

$$9n^4 - 7n^2 - 4n - 2 \neq 0 \rightarrow (2n^2 + n + 1)(2n^2 - n - 2) \neq 0$$

$$2n^2 - n - 2 = 2n^2 + an + b \Rightarrow a = -1 \checkmark, b = -2 \checkmark$$

$$\sqrt{-(a+b)} = \sqrt{-(-1-2)} = \sqrt{3} \checkmark$$

(۲)

$$f(n) - f\left(\frac{1}{n}\right) \geq 0 \Rightarrow n^2 + n - \frac{5n^2}{n^2} - \frac{1}{n} \geq 0 \Rightarrow \frac{n^4 + n^3 - 5n^2 - 1}{n^3} \geq 0$$

$$\text{شرط اداکال} \Rightarrow n \neq 0 \Rightarrow n^2 = t \Rightarrow t^2 + t - 4t - 5 \geq 0$$

$$\Rightarrow (t-5)(t^2 + 5t + 15) \geq 0 \Rightarrow n^2 - 5 \geq 0 \Rightarrow (n-2)(n+2) \geq 0$$

$$\Rightarrow D_g = [-2, 0) \cup [2, +\infty) \checkmark$$

دقت!

(۲)

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

$$f(1^2+1) = 2 \times 1^2 - 1 = f(2) = 1$$

$$n^2+n=1 \Rightarrow n=2 \Rightarrow f(2^2+2) = 2 \times 2^2 - 1 = f(6) = 7$$

$$\boxed{f(2) + f(6) = 1 + 7 = 8} \quad \checkmark$$

$$g(n) = n(n^2+9n+2V) \xrightarrow{\text{جایگزینی}} (\sqrt{V}-2)((\sqrt{V}-2)^2+9(\sqrt{V}-2)+2V)$$

$$f(n) = n(n^2-5n+12) \xrightarrow{\text{جایگزینی}} (\sqrt{2}+1)((\sqrt{2}+1)^2-5(\sqrt{2}+1)+12)$$

$$\Rightarrow g(\sqrt{V}-2) = (\sqrt{V}-2)(\sqrt{V}^2+9+2\sqrt{V}) = (\sqrt{V})^3 - (2)^3 = V - 8$$

$$\Rightarrow f(\sqrt{2}+1) = (\sqrt{2}+1)(\sqrt{2}^2+5-2\sqrt{2}) = (\sqrt{2})^3 + (1)^3 = 2+1$$

$$\Rightarrow \frac{g(\sqrt{V}-2)}{f(\sqrt{2}+1)} = \frac{-8}{1} = -8 \quad \checkmark$$

$$(f(n)+g(n))^2 = f(n)^2 + g(n)^2 + 2f(n)g(n)$$

$$\xrightarrow{\text{جایگزینی}} n + \sqrt{n-1} + n - \sqrt{n-1} + 2\sqrt{n-1} = 2n + 2\sqrt{n-1}$$

$$= 2\sqrt{n-1} = (f(n)+g(n))^2 \Rightarrow 2\sqrt{n-1}$$

$$\Rightarrow \frac{a+b}{c} = \frac{0+2}{-1} = -2 \quad \checkmark$$

$$a=0$$

$$b=2$$

$$c=-1$$

$$\frac{g}{f} = \left\{ \left(\frac{0}{-1}, 2 \right) \left(2, \frac{1}{-1} \right) \right\}$$

$$D_g = \{1, 2, 0\} \quad D_f = \mathbb{R} - \{1, 2\} \Rightarrow D_g \cap D_f = \{0, 2\}$$

$$n=0 \Rightarrow \frac{g(0)=2}{f(0)=\frac{0+2}{-1}=-2} = \frac{2}{-2} = -1 = \frac{g}{f} = \frac{2}{-2}$$

$$n=2 \Rightarrow \frac{g(2)=1}{f(2)=\frac{2+2}{-1}=-4} = \frac{1}{-4} = -\frac{1}{4} = \frac{g}{f} = \frac{1}{-4}$$

$$\text{شماره های صحیح} \rightarrow D_g = \{-2, 2, -1\} \quad D_f = \{1, 2, -1\} \Rightarrow D_g \cap D_f = \{-1, 2\}$$

$$f(2n) = f(1) = 2 \Rightarrow n = \frac{1}{2}, \quad f(2n) = f(2) = -1 \Rightarrow n = \frac{2}{2} = 1$$

$$f(n^2) = 1 \Rightarrow n^2 = 1 \Rightarrow n = \pm 1, \quad n^2 = 2 \Rightarrow n = \pm \sqrt{2}, \quad n^2 = 4 \Rightarrow n = \pm 2$$

$$\boxed{f(n^2) = \left\{ (1, 2), (-1, 2), (\sqrt{2}, -1), (-\sqrt{2}, -1), (2, 2), (-2, 2) \right\}} \quad \checkmark$$

$$2) \quad 2g^2(a)+1 \Rightarrow g(2)=2 \Rightarrow 2 \times 2 + 1 = 5, \quad g(1) = -1 \Rightarrow 2 \times (-1) + 1 = -1, \quad g(2)=2, \quad 2 \times 2 + 1 = 5$$

$$\Rightarrow 2g^2(a)+1 = (-2, 5), (1, 5), (2, 9), (-1, 1) \quad \checkmark$$

$$f(-1) = 0 \Rightarrow 2 \times 0 + 1 = 1$$