

۲. آفرین

$$\{a\} \geq 2 \leadsto a \geq \omega \rightarrow \int \sqrt{r_{a-1}-a+1} = \sqrt{a} \leadsto a \geq 0 \text{ استند}$$

$$\{a\} \leq 2 \leadsto a < \omega \rightarrow \int \sqrt{r_{a+2}-a+1} : \sqrt{r_{a+2}} \rightarrow r_{a+2} \geq 0$$

$$r_a \geq -2 \Rightarrow a \geq -\frac{4}{r}$$

$$\text{استند} \Rightarrow -\frac{4}{r} \leq a < \omega$$

$$I \cup II \Rightarrow D_f : \left[-\frac{4}{r}, +\infty\right)$$

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$$f : \frac{r(1a^3 + 12a^2 + 9a + 1)}{(2a^2 + 9a + 1)^2} : \frac{r(r_{a+1})^3}{(r_{a+1})^4} = \frac{r}{r_{a+1}} \Rightarrow \frac{r}{r_{a+1}} \Rightarrow \frac{r}{r_{a+1}} \Rightarrow \frac{r}{r_{a+1}}$$

$$r_{a+1} \neq 0$$

$$r_a \neq -1$$

$$a \neq -\frac{1}{r}$$

$$\Rightarrow D_f : \mathbb{R} - \left\{-\frac{1}{r}\right\}$$

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$$a=0 \leadsto f(0) = \frac{-2}{-1} = 2, g(0) = 0 + C = C \Rightarrow \boxed{C=2}$$

$$a=1 \leadsto f(1) = \frac{a+r}{1+b}, g(1) = 1+r, \Rightarrow \frac{a+r}{1+b} = 3 \leadsto a+r = 3+3b$$

$$a=-1 \leadsto f(-1) = \frac{r-a}{b-1}, g(-1) = 1 \Rightarrow \frac{r-a}{b-1} = 1 \leadsto r-a = b-1$$

$$a+r = 3+3b$$

$$r-a = b-1$$

$$a+r-r-a = 3+3b+b-1$$

$$r = 4b+2 \rightarrow b = \frac{1}{4}r$$

$$\Rightarrow b+C = \frac{1}{4}r + 2 = 2, \omega$$

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$$f(n) = \frac{(n-1)(n+1)}{a^2 + an + b} \rightarrow$$

$$\Rightarrow f(n) = \frac{(n-1)(n+1)}{(n-C)(n-1)} \leadsto D_f \neq \{1, 2, \dots, C\}$$

$$C=1 \Rightarrow$$

$$a = -2, b = 1, C = 1 \Rightarrow a+b+C = -2+1+1 = 0$$

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$$f(n+1) = (n-2)^2(n), f(-n+1) = (-n-2)^2(-n)$$

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

$$= (n) \left\{ n^2 - 4n + 4 - n^2 - 4n - 4 \right\} = (n)(-8n) = -8n^2$$

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

$$f(r) \leadsto 1 - 2m = r \rightarrow m = -1 \leadsto f(r) = \sqrt{-1} + r = 1$$

$$\Rightarrow f(-1) + f(r) = r + 1 = \omega$$

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$$f(4) \leadsto m + \sqrt{m} = 4 \rightarrow m + \sqrt{m} - 4 = 0 \Rightarrow t^2 + t - 4 = 0$$

$$(t + r)(t - r) = 0$$

$$\begin{aligned} t = r &\Rightarrow \sqrt{m} = r \\ t = -r &\Rightarrow \sqrt{m} = -r \end{aligned}$$

$$\Rightarrow m = 5$$

$$\leadsto f(4) = \sqrt{5} + r\sqrt{5} = 4\sqrt{5}$$

$$f(m) = m^r + m = m(m^r + 1)$$

$$\rightarrow f(m-1) = (m-1)(m^r - rm + 1 + 1)$$

$$\rightarrow f(1-m) = (1-m)(m^r - rm + 1 + 1)$$

$$\rightarrow f(m-1) + f(1-m) = (m^r - rm + 2)(m-1 + 1-m)$$

$$\Rightarrow f(m-1) + f(1-m) = 0$$

$$D_f: m \geq \frac{r}{2}a, D_g: m \leq \frac{b}{2} \rightarrow D_f \cap D_g: \{1\}$$

$$\rightarrow \frac{r}{2}a = \frac{b}{2} = 1 \Rightarrow b = r, a = \frac{2}{r}$$

$$r f(1) - g(1) = r(1-r) - rk = -k-r \rightarrow -k-r = k \rightarrow -r = 2k \Rightarrow k = -1$$

$$ra - \frac{b}{r} - k = r\left(\frac{2}{r}\right) - \frac{r}{r} - (-1) = r - r + 1 = 1$$

$$D_f: m \leq m, D_g: m \geq -1 \rightarrow D_{f \cap g}: [-1, m] \Rightarrow m = 5$$

$$f(r) = \sqrt{r-r} + n = r + n, g(r) = \sqrt{r} = r\sqrt{r}$$

$$\rightarrow f(r) - g(r) = r + n - r\sqrt{r} = 4\sqrt{r} \Rightarrow n = 4\sqrt{r} - r$$

$$\Rightarrow m + n = 5 + 4\sqrt{r} - r = \omega + 4\sqrt{r}$$

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