

۲. آزمون مابین ترم‌ها

$$f(n) = \begin{cases} (a+1)(n+2); & n > 1 \\ 3a+2n; & n \leq 1 \end{cases} \quad \begin{cases} f(-2) = 3a-4 \\ f(5) = (a+1) \end{cases}$$

$$2f(5) = f(-2) \times a$$

$$14a+14 = 3a-4+a$$

$$14a+14 = 4a-4$$

$$10a = -18$$

$$a = -1.8$$

$$f(n) = \sqrt{n} + \frac{1}{\sqrt{2}} + 2 \quad f(2-\sqrt{3}) + f(2+\sqrt{3}) = ?$$

$$\sqrt{2-\sqrt{3}} + \frac{1}{\sqrt{2-\sqrt{3}}} + 2 = f(2-\sqrt{3}), \quad f(2+\sqrt{3}) = \sqrt{2+\sqrt{3}} + \frac{1}{\sqrt{2+\sqrt{3}}} + 2$$

$$\Rightarrow \sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}} + \frac{1}{\sqrt{2-\sqrt{3}}} + \frac{1}{\sqrt{2+\sqrt{3}}} + 4 = 2(\sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}}) + 4$$

$$S = 2 + \sqrt{3} + 2 - \sqrt{3} + 2(\sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}}) \Rightarrow S^2 = 6 \Rightarrow S = \sqrt{6} \Rightarrow 2\sqrt{6} + 4$$

$$2f(n) - 3f(-n) = 4n^2 - 2n \times 2 \Rightarrow 4f(n) - 6f(-n) = 8n^2 - 2n$$

$$2f(-n) - 3f(n) = 4n^2 + n \times 3 \Rightarrow -9f(n) + 6f(-n) = 12n^2 + 3n$$

$$\Rightarrow -5f(n) = 20n^2 + n \Rightarrow f(n) = \frac{4n^2 + \frac{n}{5}}{5}$$

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$$(n+2)f(n) - 3nf(n+2) = 4n^2 - mn + 3m - 1 \quad f(0) = ?$$

$$\Rightarrow (2)f(0) - 3 \times 0 = 3m + 1 \Rightarrow f(0) = \frac{3m+1}{2}$$

$$\Rightarrow (0)f(-2) + 6f(0) = 16 + 2m + 3m - 1 \Rightarrow f(0) = \frac{15+5m}{6}$$

$$\frac{15+5m}{6} = \frac{3m+1}{2} \Rightarrow 30+10m = 18m-6 \Rightarrow 8m = 36 \Rightarrow m = \frac{36}{8} = \frac{9}{2}$$

$$f(0) = \frac{3m+1}{2} \Rightarrow \frac{3 \times \frac{9}{2} + 1}{2} \Rightarrow \frac{25}{2} = \frac{25}{2}$$

$$f(n) + f\left(\frac{1}{n}\right) = \frac{3n^2 - 12n + 3}{n}$$

$$f(n) = an + b \quad \left. \begin{aligned} f\left(\frac{1}{n}\right) &= \frac{a}{n} + b \end{aligned} \right\} an + b + \frac{a}{n} + b = \frac{3n^2 - 12n + 3}{n} \Rightarrow an + 2b + \frac{a}{n} = 3n - 12 + \frac{3}{n}$$

$$\Rightarrow a = 3, b = -6 \Rightarrow f(n) = 3n - 6 \Rightarrow f(-1) = -3 - 6 = -9$$

$\begin{cases} f(n) = (n-1)\sqrt{1-n} \rightarrow 1-n \geq 0 \Rightarrow n \leq 1 \Rightarrow D_f = \text{deleted} (-\infty, 1] \\ g(n) = -\sqrt{(1-n)^3} \rightarrow (1-n)^3 \geq 0 \Rightarrow 1-n \geq 0 \Rightarrow D_g = (-\infty, 1] \end{cases}$ حوزه دامنه نامفنی است $g(n) = -\sqrt{(1-n)^2(n-n)} = -\sqrt{1-n} \Rightarrow -1+n\sqrt{1-n} = (n-1)\sqrt{1-n}$ برابر با $f(n)$ چون دامنه و ضابطه برابر تابع مساوی	۶
$\left. \begin{aligned} f(n) &= 2\sqrt{n} \rightarrow D_f = [0, +\infty) \\ g(n) &= \sqrt{2n} \rightarrow D_g = [0, +\infty) \end{aligned} \right\} \text{ دامنه برابر}$ $g(n) = \sqrt{2n} \Rightarrow n \sqrt{2} \Rightarrow n\sqrt{2} \rightarrow \text{ضابطه برابر دامنه}$ برابر می باشد تابع مساوی	۷
$f(n) = [\sqrt{n} - \lfloor \sqrt{n} \rfloor] \Rightarrow D_f = [0, +\infty)$ $g(n) = \sqrt{2n-1} \Rightarrow n \geq \frac{1}{2} \Rightarrow D_g = [0, +\infty)$ در $f(n)$ چون بزرگ است اصلی داخلی $[\sqrt{n}]$ - $\sqrt{n}$ فقط مثبت است و می شود $f(n) = 0$ می شود چون n نامفنی است اگر از قدر مطلق کم کنیم منفی می شود پس چون دامنه و ضابطه برابر دو تابع مساوی	۸
$f = \{(1,2), (2,3), (3,0), (0,0)\}, g = \{(1,-1), (1,1), (2,3), (3,5), (0,2), (5,7)\}$ $1) \left(\frac{f+g}{f-g}\right)(1) \xrightarrow{n=1} \begin{matrix} f(1)=2 \\ g(1)=1 \end{matrix} \Rightarrow \frac{2+1}{2-1} = \boxed{3}$ $2) \left(\frac{f+g}{f-g}\right)(2) \xrightarrow{n=2} \begin{matrix} f(2)=3 \\ g(2)=3 \end{matrix} \Rightarrow \frac{3+3}{3-3} = \frac{6}{0} \rightarrow \text{تقریب نشده}$ $2) f(0)g(-1) \Rightarrow 0 \times 1 = \boxed{0}$	۹
$f(n) = \{(2,1), (1,4), (4,5), (-2,2), (3,-1)\}$ $g(n) = \left\{ \left(\frac{4}{3}, -1\right), \left(\frac{1}{3}, 2\right), \left(\frac{1}{3}, 5\right), (0,4), (1,1) \right\}$ $h(n) = \{(3,1), (3,5), (0,5), (2,1), (-2,1)\}$ $1) h(n) = f(1/n) \quad n =3 \Rightarrow n=3 \text{ or } -3 \Rightarrow (3,1), (-3,-1)$ $2) \Rightarrow n=2 \Rightarrow n=2 \text{ or } -2 \Rightarrow (-2,2), (2,1)$	۱۰