

نام و نام خانوادگی پایسن (مربانی) پاسخنامه تشریحی تکلیف شماره ۲ ... کلاس B

۲ آفرین عالی نوشتی

$$f(x) = \begin{cases} (a+1)(x+2) & x > 1 \\ 3a+2x & x \leq 1 \end{cases} \quad \text{و } 2f(0) = f(-2) + a$$

$$f(0) = (a+1) \times 2 \rightarrow f(0) = 2a+2$$

$$2f(0) = f(-2) + a$$

$$f(-2) = 3a - 4$$

$$\rightarrow 2f(0) = 3a - 4 \xrightarrow{\div 2} 2a - 2$$

$$\left. \begin{array}{l} f(0) = 2a+2 \\ f(0) = 3a-4 \end{array} \right\} \rightarrow 2a+2 = 3a-4 \rightarrow 2a-3a = -4-2 \rightarrow -a = -6 \rightarrow a = 6$$

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

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

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

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

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

$$\rightarrow \sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}}$$

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$$2f(x) - 3f(-x) = 5x^2 - x$$

$$2f(-x) - 3f(x) = 5(-x)^2 - (-x) = 5x^2 + x$$

$$\xrightarrow{x^2} 2f(x) - 3f(-x) = 5x^2 - x$$

$$\xrightarrow{x^2} -2f(x) + 3f(-x) = -5x^2 + x$$

$$\left. \begin{array}{l} 2f(x) - 3f(-x) = 5x^2 - x \\ -2f(x) + 3f(-x) = -5x^2 + x \end{array} \right\} \rightarrow -6f(x) = 10x^2 - 2x \rightarrow f(x) = -\frac{5}{3}x^2 + \frac{1}{3}x$$

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$$2f(0) = 3x - 1$$

$$+ 9f(0) = 19 + 2x + 3x - 1$$

$$\left. \begin{array}{l} 2f(0) = 3x - 1 \\ + 9f(0) = 19 + 2x + 3x - 1 \end{array} \right\} \rightarrow m = \frac{1+2f(0)}{3}$$

$$9f(0) = 10 + \frac{0+10f(0)}{3} \rightarrow 11f(0) = 10 + 10f(0) \rightarrow 1f(0) = 10$$

$$\rightarrow f(0) = \frac{10}{1} = 10$$

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$$f(-1) + f(1) = +3 + 2 + 3 \xrightarrow{\div -1} -18 \rightsquigarrow f(-1) = -9$$

$$f(x) + f\left(\frac{1}{x}\right) = ax + b + \frac{a}{x} + b = \frac{ax^2 + 2bx + a}{x} \rightarrow a = 3, b = -9$$

$$f(-1) = 3(-1) + (-9) = -12$$

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$\begin{cases} f(x) = (x-1)\sqrt{1-x} \rightarrow 1-x \geq 0 \rightarrow 1 \geq x \rightarrow Df = (-\infty, 1] \rightarrow \sqrt{1-x(x-1)^2} \\ g(x) = \sqrt{(1-x)^3} \rightarrow (1-x)^3 \geq 0 \rightarrow 1-x \geq 0 \rightarrow (-\infty, 1] \end{cases} \quad Df = Dg$ $f(x) = -(1-x)\sqrt{1-x} = -\sqrt{(1-x)^2(1-x)} = -\sqrt{(1-x)^3} = g(x)$ $m \rightarrow f = g$	6
$\begin{cases} f(x) = x\sqrt{x} \rightarrow x \geq 0 \rightarrow Df = [0, +\infty) \\ g(x) = \sqrt{x^3} \rightarrow x^3 \geq 0 \rightarrow x \geq 0 \rightarrow Dg = [0, +\infty) \end{cases} \quad Df = Dg$ $x \geq 0 \rightarrow f(x) = x\sqrt{x} = \sqrt{x^2 \cdot x} = \sqrt{x^3} = g(x)$ $\rightarrow f = g$	7
$\begin{cases} f(x) = [\sqrt{x} - \lfloor \sqrt{x} \rfloor] \rightarrow \sqrt{x} \rightarrow x \geq 0 \rightarrow Df = [0, +\infty) \\ g(x) = \sqrt{x - x } \rightarrow x - x \geq 0 \rightarrow Dg = [0, +\infty) \end{cases}$ $f(x) = [\sqrt{x}] - \lfloor \sqrt{x} \rfloor = 0$ $g(x) = 0 \rightarrow x \geq 0 \rightarrow x - x = x - x = 0 \rightarrow f = g$	8
ا) $\frac{f(1) + g(1)}{f(1) - g(1)} = \frac{2+1}{2-1} = \frac{3}{1} = 3$ ب) $\frac{f(2) + g(2)}{f(2) - g(2)} = \frac{2+3}{2-2} = \frac{5}{0}$ $\rightarrow$ غير محدد ج) $f(0) * g(-1) = 0 * 1 = 0$	9
ا) $3x-1 = 3 \rightarrow 3x = 4 \rightarrow x = \frac{4}{3} \rightarrow (\frac{4}{3}, -1)$ و $3x-1 = -2 \rightarrow 3x = -1 \rightarrow x = -\frac{1}{3} \rightarrow (-\frac{1}{3}, 2)$ $3x-1 = 0 \rightarrow 3x = 1 \rightarrow x = \frac{1}{3} \rightarrow (\frac{1}{3}, 5)$ و $3x-1 = -1 \rightarrow x = 0 \rightarrow (0, 4)$ و $(-\frac{1}{3}, 2)$ $3x-1 = 2 \rightarrow 3x = 3 \rightarrow x = 1$ و $g = \{(\frac{4}{3}, -1), (\frac{1}{3}, 2), (\frac{1}{3}, 5), (0, 4), (1, 1)\}$ ب) $x = 3 \rightarrow x = \pm 3 \rightarrow (3, -1), (-3, -1)$ $3 x = -2 \rightarrow$ غير ممكن و $x = 0 \rightarrow x = 0$ و $x = -1 \rightarrow$ غير ممكن $x = 2 \rightarrow x = -2$ و $x = 2 \rightarrow (\frac{4}{3}, -1), (-3, -1), (2, 0), (3, 1), (-2, 1)$	10