

نام و نام خانوادگی: ابوالفضل ایزدخواستی پاسخنامه تشریحی تکلیف شماره کلاس: پایه دهم

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

$$y = \sqrt{n^2 f(n+1)} \Rightarrow n^2 f(n+1) \geq 0 \rightarrow n^2 (2^{1-n} - 1) \geq 0 \xrightarrow{\text{محدود}} \begin{cases} \alpha = 1 \\ \beta = 0 \end{cases}$$

$$-\frac{1}{1+1} \Rightarrow D_f = [0, +1] \quad \checkmark$$

$$f(-x) = \sqrt{-x + |2-x|} \Rightarrow \begin{cases} f(-x) = \sqrt{-x + x - 2} = \sqrt{-2} ; x \leq 2 \\ f(-x) = \sqrt{-x + 2 - x} = \sqrt{-2x + 2} ; x \geq 2 \end{cases}$$

$$\rightarrow -x + |2-x| \geq 0 \Rightarrow \begin{cases} -2 \geq 0 \text{ غیر ممکن} \\ -2x + 2 \geq 0 \rightarrow x \leq 1 \end{cases} \Rightarrow D_f = (-\infty, 1] \quad \checkmark$$

$$\frac{x-1}{f(x)} \geq 0 \xrightarrow{f(x) \text{ ریشه: } -4, 2, 3} \frac{-4}{-} \frac{1}{+} \frac{2}{-} \frac{3}{+}$$

$$\Rightarrow D_f = (-4, 1] \cup (2, 3) \quad \checkmark$$

$$y_1 = \frac{1}{9x^2 - \sqrt{x^2 - 4}x - 3} \rightarrow D_{y_1} = D_{y_2} \rightarrow \text{ضابطه کسری} \rightarrow \text{مخرج م.ب.م}$$

$$y_2 = \frac{1}{3x^2 + ax + b} \Rightarrow 9x^2 - \sqrt{x^2 - 4}x - 3 = (3x^2 + a + 1)(3x^2 - x - 3)$$

$$3x^2 + ax + b = 3x^2 - x - 3 \Rightarrow \begin{cases} a = -1 \\ b = -3 \end{cases} \Rightarrow \sqrt{-(a+b)} = \sqrt{-(-1-3)} = 2 \quad \checkmark$$

$$f(x) = x^2 + x = x(x+1)$$

$$f(x) \geq f\left(\frac{x}{2}\right) \rightarrow x(x+1) \geq \frac{x}{2} \left(\frac{14}{2x} + 1\right) \Rightarrow x(x+1) \geq \frac{4x + 4x^2}{2x}$$

$$\Rightarrow x^2 + x - \frac{4x + 4x^2}{2x} \geq 0 \Rightarrow \frac{x^2 + x^2 - 4x^2 - 4x}{2x} \geq 0 \xrightarrow{x^2 \rightarrow 0} -2 \geq 0 \quad \checkmark$$

$$\frac{-2}{+} \frac{2}{-} \rightarrow D_f = [-2, -1] \cup [1, +\infty) \quad \frac{-2}{-} \frac{0}{+} \frac{2}{-}$$

$$f(x^2 + x) = 2x^2 - 1 \Rightarrow \begin{cases} x=1 \Rightarrow x^2 + x = 1 \Rightarrow f(1) = 2(1)^2 - 1 = 1 \checkmark \\ x=1 \Rightarrow x^2 + x = 2 \Rightarrow f(2) = 2(1)^2 - 1 = 1 \checkmark \end{cases}$$

$$\Rightarrow f(2) + f(1) = 1 + 1 = 2 \checkmark$$

$$f(x) = x^3 - 4x^2 + 12x = (x-2)^3 + 8$$

$$g(x) = x^3 + 9x^2 + 27x = (x+3)^3 - 27 \Rightarrow$$

$$f(\sqrt[3]{2} + 2) = (\sqrt[3]{2} + 2)^3 + 8 = 2 + 8 = 10$$

$$g(\sqrt[3]{2} - 2) = (\sqrt[3]{2} - 2)^3 - 27 = 2 - 27 = -25$$

$$\frac{g(\sqrt[3]{2} - 2)}{f(\sqrt[3]{2} + 2)} = \frac{-25}{10} = -\frac{5}{2}$$

$$x=4 \rightarrow f(4) + g(4) = \sqrt{4+4\sqrt{4}} + \sqrt{4-4\sqrt{4}} = a + b\sqrt{4+c} = 4$$

$$x=8 \rightarrow f(8) + g(8) = \sqrt{8+8\sqrt{1}} + \sqrt{8-8\sqrt{1}} = a + b\sqrt{8+c} = 4$$

$$\Rightarrow a + b\sqrt{8+c} = a + b\sqrt{4+c} = 4 \Rightarrow 8+c = \pm 4+c \Rightarrow c = \frac{1}{2}$$

پاسخ نه

$$f(x) = \frac{x+2}{x^2-4x+4} \Rightarrow D_f = \mathbb{R} - \{1, 2\}$$

$$D_{\frac{g}{f}} = D_g \cap D_f - \{x \mid f(x) = 0\} \Rightarrow D_{\frac{g}{f}} = \{0, 2\}$$

$$\Rightarrow \frac{g}{f} = \left\{ \left(0, \frac{4}{4}\right), \left(2, \frac{1}{-2}\right) \right\} = \left\{ \left(0, 1\right), \left(2, -\frac{1}{2}\right) \right\} \checkmark$$

$$الف) f(2x) = \left\{ \left(-\frac{1}{2}, 4\right), \left(\frac{1}{2}, 2\right), \left(\frac{3}{2}, -1\right), \left(2, 2\right) \right\} \checkmark$$

$$ب) f(x^2) = \left\{ (1, 2), (-1, 2), (\sqrt{2}, -1), (-\sqrt{2}, -1), (2, 2), (-2, 2) \right\} \checkmark$$

$$ج) 2g^2(x)+1 = \left\{ (-2, 19), (1, 13), (3, 4), (-1, 1) \right\} \checkmark$$

$$د) \frac{f}{g} = \left\{ \left(-1, \frac{1}{2}\right), \left(1, -\frac{1}{2}\right), \left(3, -1\right) \right\} = \left\{ (1, -\frac{1}{2}), (3, -1) \right\} \checkmark$$