

$$2(a+1)(a+2) = 3a + 2(-2) + a$$

$$4a + 4 = 4a - 4 \rightarrow 1 \cdot a = -1 \rightarrow a = -1$$

سوال ۱

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

سوال ۲

$$2\sqrt{x-\sqrt{x}} + 2\sqrt{x+\sqrt{x}} + 4 = 2\sqrt{\left(\sqrt{\frac{x}{x}} - \sqrt{\frac{1}{x}}\right)^2} + 2\sqrt{\left(\sqrt{\frac{x}{x}} + \sqrt{\frac{1}{x}}\right)^2} + 4 = \frac{4\sqrt{x}}{\sqrt{x}} + 4 = \frac{4\sqrt{x}}{x} + 4 = 2\sqrt{x} + 4$$

$$\star: \frac{1}{\sqrt{x-\sqrt{x}}} \times \frac{\sqrt{x+\sqrt{x}}}{\sqrt{x+\sqrt{x}}} = \frac{\sqrt{x+\sqrt{x}}}{\sqrt{x-\sqrt{x}}} = \sqrt{x+\sqrt{x}}$$

$$\star: \frac{1}{\sqrt{x+\sqrt{x}}} \times \frac{\sqrt{x-\sqrt{x}}}{\sqrt{x-\sqrt{x}}} = \frac{\sqrt{x-\sqrt{x}}}{\sqrt{x+\sqrt{x}}} = \sqrt{x-\sqrt{x}}$$

$$\begin{cases} 4f(x) - 3f(-x) = 4x^2 - x & \xrightarrow{x^2} \\ 2f(-x) - 4f(x) = 4x^2 + x & \xrightarrow{x^2} \end{cases} \rightarrow \begin{cases} 4f(x) - 3f(-x) = 4x^2 - x \\ 4f(x) - 9f(x) = 12x^2 + 3x \end{cases}$$

سوال ۳

$$-5f(x) = 8x^2 + x \rightarrow f(x) = -\frac{8x^2 + x}{5}$$

$$x = -2 \rightarrow 0 - 3(-2)f(0) = 4(-2)^2 - m(-2) + 3m - 1 \rightarrow \begin{cases} 4f(0) = 16 + dm \\ 4f(0) = 9m - 3 \end{cases}$$

سوال ۴

$$x = 0 \rightarrow 2f(0) - 0 = 3m - 1$$

$$\xrightarrow{x^2} \begin{cases} 4f(0) = 16 + dm \\ 4f(0) = 9m - 3 \end{cases}$$

$$16 + dm = 9m - 3$$

$$\begin{aligned} 4m &= 19 \\ m &= 4.75 \end{aligned}$$

$$f(0) = \frac{3 \times 4.75 - 1}{4} = 3.44$$

$$\text{سوال ۵} \quad x = -1 \rightarrow 4f(-1) = \frac{3(-1)^2 - 12(-1) + 3}{-1} = -18 \rightarrow f(-1) = -4.5$$

سوال ۵

$$\text{سوال ۶} \quad ax + b + \frac{a}{x} + b = \frac{3x^2 - 12x + 3}{x} \rightarrow \frac{ax^2 + 2bx + a}{x} = \frac{3x^2 + 2(-4)x + 3}{x} \quad \begin{cases} a=3 \\ b=-4 \end{cases} \quad \begin{aligned} f(x) &= 3x - 4 \\ f(-1) &= -3 - 4 = -7 \end{aligned}$$

$$\begin{cases} f(x) \rightarrow |1-x| \geq 0 & D_f = (-\infty, 1] \\ g(x) \rightarrow (1-x)^2 \geq 0 & D_g = (-\infty, 1] \\ 1-x \geq 0 \end{cases}$$

$$\begin{cases} f(x_1) = (x_1-1)\sqrt{1-x_1} \\ g(x_1) = -\sqrt{(1-x_1)^3} \end{cases} \xrightarrow{x_1=x_2} \begin{aligned} (x-1)\sqrt{1-x} &= ? \\ (x-1)\sqrt{1-x} &= -|1-x|\sqrt{1-x} \end{aligned}$$

$$f(x) = g(x) \leftarrow (x-1)\sqrt{1-x} = -(1+x)\sqrt{1-x} \quad \checkmark$$

$$\begin{cases} f(x) \rightarrow x \geq 0 & D_f = [0, +\infty) \\ g(x) \rightarrow x^2 \geq 0 \rightarrow x \geq 0 & D_g = [0, +\infty) \end{cases} \quad \begin{cases} f(x_1) = x_1 \sqrt{x_1} \\ g(x_1) = \sqrt{x_1^3} \end{cases} \xrightarrow{x_1 = x_2} x \sqrt{x} \stackrel{?}{=} \sqrt{x^3} \leadsto \sqrt{x^2 \cdot x}$$

$$x \sqrt{x} = \underbrace{|x|}_{\substack{=x \\ x \geq 0}} \sqrt{x} \Rightarrow x \sqrt{x} = x \sqrt{x} \Rightarrow f(x) = g(x)$$

$$D_f \rightarrow x \geq 0$$

$$f(x) = [\sqrt{x} - [\sqrt{x}]] \rightarrow 0 \leq a - [a] < 1 \rightarrow [a - [a]] = 0 \quad (\text{سؤال 1})$$

$$f(x) = 0$$

$$D_g \rightarrow x \geq |x| \rightarrow x \geq 0$$

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$$g(x) = \sqrt{x - |x|} \xrightarrow{x \geq 0} \sqrt{x - x} = \sqrt{0} = 0 \Rightarrow g(x) = 0$$

$$f(x) = g(x)$$

$$\text{الف) } = \frac{2+1}{2-1} = 3$$

$$\text{ب) } \frac{3+3}{3-3} \Rightarrow \text{تعريف سده}$$

(سؤال 9)

$$\text{ج) } 0 \times 1 = 0$$

$$\text{الف) } g(x) = \left\{ (1,1) (0,2) \left(\frac{1}{2}, 2\right) \left(-\frac{1}{2}, 2\right) \left(\frac{2}{3}, -1\right) \right\}$$

(سؤال 10)

$$3x-1=2 \rightarrow x=1 \quad 3x-1=-1 \rightarrow x=0 \quad 3x-1=0 \rightarrow x=\frac{1}{3} \quad 3x-1=-2 \rightarrow x=-\frac{1}{3} \quad 3x-1=3 \rightarrow x=\frac{4}{3}$$

$$\text{ب) } h(x) = \left\{ (2,1) (-2,1) (0,2) (3,-1) (-3,-1) \right\}$$

$$|x|-2 \rightarrow x=2, x=-2 \quad |x|=-1 \times \quad |x|=0 \rightarrow x=0 \quad |x|=-2 \times \quad |x|=3 \rightarrow x=\pm 3$$