

$$f(a) \xrightarrow{x \rightarrow 1} (a+1)(\cancel{a}) = Va + V$$

$$f(-2) \xrightarrow{x} 3a + \cancel{2} = 3a - 2$$

$$2f(a) = f(-2) + a \rightarrow 12a + 2 = 3a - 2 + a$$

$$10a = -4$$

$$a = \frac{-4}{10} = -\frac{2}{5}$$

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

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

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

$$\sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}} = \sqrt{6}$$

$$\frac{1}{\sqrt{2-\sqrt{3}}} + \frac{1}{\sqrt{2+\sqrt{3}}} = \frac{\sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}}}{\sqrt{(2-\sqrt{3})(2+\sqrt{3})}} = \frac{\sqrt{6}}{\sqrt{4-3}} = \sqrt{6}$$

$$= \boxed{\sqrt{6} + 4}$$

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

$$2f(x) - 3f(-x) = 9$$

$$x=1 \rightarrow 2f(1) - 3f(-1) = 5 - 2 = 3$$

$$x=-1 \rightarrow 2f(-1) - 3f(1) = -5 + 2 = -3$$

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

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

$$f(x) = -\frac{3}{5}$$

$$f(0) \rightarrow 2f(0) - 3f(2) = 0 - 3(2m-1) \rightarrow 2f(0) = 6m-3 \rightarrow f(0) = \frac{3m-1}{2}$$

$$f(-2) \rightarrow (-2)f(-2) - 3f(0) = f(-2) + 2m + 3m - 1 \rightarrow f(0) = \frac{19 + 5m - 1}{9}$$

$$\frac{3m-1}{2} = \frac{19+5m-1}{9}$$

$$9m-3 = 19+5m$$

$$4m = 22$$

$$m = \frac{11}{2}$$

$$\rightarrow f(0) = \frac{3 \cdot \frac{11}{2} - 1}{2} = \frac{\frac{33}{2} - 1}{2} = \frac{\frac{31}{2}}{2} = \frac{31}{4}$$

$$f(-1) \Rightarrow f(-1) + f\left(\frac{1}{-1}\right) = \frac{3+12+3}{-1} = -18$$

$$2f(-1) = -18$$

$$f(-1) = -9$$

$$\begin{cases} f(x) = (x-1)\sqrt{1-x} \rightarrow x \leq 1 \\ \quad \hookrightarrow D = (-\infty, 1] \\ g(x) = -\sqrt{(1-x)^3} \\ \quad \hookrightarrow 1-x \geq 0 \rightarrow x \leq 1 \\ \quad \quad D' = (-\infty, 1] \end{cases} \quad \begin{cases} D_f = D_g \\ R_f = R_g \end{cases} \Rightarrow f(x) = g(x)$$

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به ازای هر قدری ⊖ می شود.

$$\begin{cases} f(x) = x\sqrt{x} \gg 0 \rightarrow x \gg 0 \rightarrow [0, +\infty) \\ g(x) = \sqrt{x^3} \gg 0 \rightarrow x^3 \gg 0 \rightarrow x \gg 0 \rightarrow [0, +\infty) \end{cases} \quad \begin{cases} D_f = D_g \\ R_f = R_g \end{cases} \Rightarrow f(x) = g(x)$$

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با مثال عددی

$$\begin{array}{l} 1) \rightarrow \begin{matrix} R \\ \odot \end{matrix} \quad \begin{matrix} D \\ \odot \oplus \end{matrix} \\ \begin{matrix} 1,1 \rightarrow 0 \\ 0 \rightarrow 0 \\ -1,1 \rightarrow x \text{ و } x \end{matrix} \end{array} \Rightarrow \text{با هم برابر اند}$$

$$\begin{array}{l} 2) \rightarrow \begin{matrix} R \\ \odot \end{matrix} \quad \begin{matrix} D \\ \odot \oplus \end{matrix} \\ \begin{matrix} 1,1 \rightarrow 0 \\ 0 \rightarrow 0 \\ -1,1 \rightarrow x \end{matrix} \end{array}$$

$$f = \{(1,2), (2,3), (3,1), (0,0)\} \quad \text{و} \quad g = \{(-1,1), (1,1), (2,3), (3,5), (0,2), (\sqrt{7},1)\}$$

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

ب)  $\frac{3+3}{3-3} = x \text{ و } x$

ج)  $0 \times 1 = 0$

$$f(x) = \{(2,1), (-1,4), (0,5), (-2,2), (3,-1)\}$$

الف)  $\begin{aligned} 3x-1=2 &\rightarrow x=1 \\ 3x-1=-1 &\rightarrow x=0 \\ 3x-1=0 &\rightarrow x=\frac{1}{3} \\ 3x-1=2 &\rightarrow x=\frac{3}{3} \\ 3x-1=3 &\rightarrow x=\frac{4}{3} \end{aligned}$

ب)  $h(x) = f(|x|)$   
 $|x| \geq 0$

$$h = \{(-\infty, 0), (-3,1), (-2,1), (2,1), (3,-1), (5,0)\}$$

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