

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

$$f(5) = (a+1)(5+2) = 7a+7$$

$$f(5) = f(-2) + a$$

$$14a + 14 = f - f$$

$$14a = -14$$

$$a = -\frac{14}{14}$$

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$$1 - \sqrt{t} = \frac{1}{1 + \sqrt{t}} \rightarrow \sqrt{1 + \sqrt{t}} = t / \sqrt{1 - \sqrt{t}} = \frac{1}{t}$$

$$f(1 + \sqrt{t}) = t + \frac{1}{t} + 2 \quad f(1 - \sqrt{t}) = \frac{1}{t} + t + 2 \quad \left\{ \begin{array}{l} f(1 + \sqrt{t}) = t + \frac{1}{t} + 2 \\ f(1 - \sqrt{t}) = \frac{1}{t} + t + 2 \end{array} \right\} \rightarrow (t + \frac{1}{t})^2 \leftarrow t^2 + \frac{1}{t^2} + 2$$

$$t^2 = 1 + \sqrt{t} / \frac{1}{t^2} = 1 - \sqrt{t} \rightarrow t^2 + \frac{1}{t^2} = 1 + \sqrt{t} + 1 - \sqrt{t} = 2 \quad \text{و} \quad (t + \frac{1}{t})^2 = 4$$

$$t + \frac{1}{t} = \sqrt{4} \quad \text{و} \quad \frac{1}{t} = \sqrt{4} - t \rightarrow 1 + \sqrt{4} - t = t \rightarrow 1 + 2 - t = t \rightarrow 3 - t = t \rightarrow 3 = 2t \rightarrow t = \frac{3}{2}$$

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$$\text{if } \rightarrow -x = 2f(-x) - 2f(x) = f(-x)^2 - (-x) \times 2$$

$$\text{if } \rightarrow x = 2f(x) - 2f(-x) = f(x)^2 - x \times 2$$

$$+ \frac{f(-x)^2 - f(x)^2}{f(-x) - f(x)} = 12x^2 + 12x$$

$$\frac{f(x)^2 - f(-x)^2}{f(x) - f(-x)} = 12x^2 - 12x$$

$$-2f(x) = 10x^2 + 2x$$

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

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

$$x=-2 \rightarrow 4f(0) = 16 + 2m + 2m - 1 = 15 + 4m \rightarrow 4f(0) = (15 + 4m) \div 4$$

$$f(0) = \frac{2 \times \frac{9}{4} - 1}{2} \quad \frac{2 \times 9}{4} = 13.5 - 1$$

$$\frac{13.5}{2} = 6.75$$

$$2f(0) = 15 + \frac{4}{2}m$$

$$15 + 2m = 2m - 1$$

$$-\frac{4}{2}m = -16 \quad m = \frac{16}{4} = 4$$

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$$f(x) = ax + b \rightarrow f(\frac{1}{x}) = a(\frac{1}{x}) + b \rightarrow f(x) + f(\frac{1}{x}) = ax + 2b + \frac{a}{x}$$

$$\frac{2x^2 + 12x + 12}{x} = 2x + 12 + \frac{2}{x} = ax + 2b + \frac{a}{x}$$

$$a=2 \text{ و } 2b=12 \rightarrow b=6 \rightarrow \text{و} \quad f(x) = 2x + 6 \rightarrow f(-1) = -2 + 6 = 4$$

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$$\text{اولی (راستی)} \rightarrow 1-x \geq 0 \rightarrow x \leq 1 \leftarrow (x-1) = -(1-x) \rightarrow -(1-x)\sqrt{1-x}$$

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

$\underbrace{1-x}_{\text{پس مثبت}} \geq 0$

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$$\sqrt{x} \rightarrow x \geq 0$$

$$g(x) = \sqrt{x^2} = x^2 \geq 0 \rightarrow x \geq 0 \rightarrow \sqrt{x^2} \times \sqrt{x} = x\sqrt{x}$$

$\underbrace{x}_{\text{پس مثبتی هست}} \geq 0$

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

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$$\sqrt{x} \rightarrow x \geq 0 \rightarrow [\sqrt{x}] \leq \sqrt{x} < [\sqrt{x}] + 1 \rightarrow 0 \leq \sqrt{x} - [\sqrt{x}] < 1$$

$$\rightarrow [\sqrt{x} - [\sqrt{x}]] = 0 \rightarrow f(x) = 0$$

$$g(x) \xrightarrow{\text{بزرگ}} x \geq 0 \rightarrow g(x) = 0$$

$\downarrow$
بزرگ $x < 0 \rightarrow x - (-x) = 2x < 0 \rightarrow$ تعریف نشده

$$\rightarrow g(0) = 0 \quad g = f$$

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$$\text{الف) } \left(\frac{f+g}{f-g} \right)(x) = \frac{f(x)+g(x)}{f(x)-g(x)} \xrightarrow{x=1} \frac{2+1}{2-1} = \frac{3}{1} = 3$$

$$\text{ب) } \left(\frac{f+g}{f-g} \right)(x) = \frac{f(x)+g(x)}{f(x)-g(x)} \rightarrow \frac{2+2}{2-2} = 0 \rightarrow \text{تعریف نشده}$$

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$$\text{ج) } f(0) = 0 \rightarrow 0 \times 1 = 0$$

$$g(-1) = 1$$

الف) $2x-1=2 \rightarrow x=1 \rightarrow f(1)=1, g(1)=1$
 $2x-1=-1 \rightarrow x=0 \rightarrow f(0)=2, g(0)=2$
 $2x-1=0 \rightarrow x=\frac{1}{2} \rightarrow f(\frac{1}{2})=0, g(\frac{1}{2})=0$
 $2x-1=-2 \rightarrow x=-\frac{1}{2} \rightarrow f(-\frac{1}{2})=2, g(-\frac{1}{2})=2$
 $2x-1=2 \rightarrow x=\frac{3}{2} \rightarrow f(\frac{3}{2})=-1, g(\frac{3}{2})=-1$

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

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ب) $\xrightarrow{\text{بزرگ}} 0, 2, 2 \rightarrow |x|=0 \rightarrow x=0 \rightarrow f(0)=0, h(0)=0$
 $|x|=1 \rightarrow x=\pm 1 \rightarrow f(1)=1, h(-1)=1, h(1)=1$
 $|x|=2 \rightarrow x=\pm 2 \rightarrow f(2)=-1, h(-2)=-1, h(2)=-1$
 $h = \left\{ (0, 0), (1, 1), (-1, 1), (2, -1), (-2, -1) \right\}$