

$$f(n) = \begin{cases} (a+1)(n+2); & n > 1 \\ 2a + 2n; & n \leq 1 \end{cases}$$

$$\begin{aligned} 2f(a) &= f(-2) + a \\ \Rightarrow 2(2a+2) &= 2a - f + a \\ \Rightarrow 4a + 4 &= 2a - f + a \\ \Rightarrow 1f + 1f &= 2a - f \Rightarrow 10a = -11 \Rightarrow a = -11 \end{aligned}$$

$$f(n) = \sqrt{n} + \frac{1}{\sqrt{n}} + 2 \Rightarrow \frac{n+1+2\sqrt{n}}{\sqrt{n}} = \frac{(\sqrt{n}+1)^2}{\sqrt{n}} \quad -2$$

$$\begin{aligned} f(2-\sqrt{3}) + f(2+\sqrt{3}) &= \frac{(\sqrt{2-\sqrt{3}}+1)^2}{\sqrt{2-\sqrt{3}}} + \frac{(\sqrt{2+\sqrt{3}}+1)^2}{\sqrt{2+\sqrt{3}}} \\ \Rightarrow \frac{(2-\sqrt{3}+2\sqrt{2-\sqrt{3}}+1)\sqrt{2+\sqrt{3}} + (2+\sqrt{3}+2\sqrt{2+\sqrt{3}}+1)\sqrt{2-\sqrt{3}}}{(\sqrt{2-\sqrt{3}})(\sqrt{2+\sqrt{3}})} &= 1 \\ \Rightarrow (2-\sqrt{3})\sqrt{2+\sqrt{3}} + (2+\sqrt{3})\sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}} + (2+\sqrt{3})\sqrt{2-\sqrt{3}} + (2-\sqrt{3})\sqrt{2-\sqrt{3}} &+ \sqrt{2-\sqrt{3}} = \boxed{2\sqrt{4} + 2} \end{aligned}$$

$$\begin{aligned} \left. \begin{aligned} (2f(n) - 3f(-n) &= f(n^2 - n)) \times 1 \\ (2f(-n) - 3f(n) &= f(n^2 + n)) \times 2 \end{aligned} \right\} \Rightarrow \left. \begin{aligned} 2f(n) - 3f(-n) &= 12n^2 - 2n \\ 2f(-n) - 3f(n) &= 12n^2 + 2n \end{aligned} \right\} \Rightarrow -5f(n) = 20n^2 + 2n \\ \Rightarrow f(n) &= -\frac{20n^2 + 2n}{5} \quad -3 \end{aligned}$$

$$\begin{aligned} (n+2)f(n) - 3nf(n+2) &= f(n^2 - mn + 2m - 1) \quad -4 \\ \Rightarrow (2f(0) = 3m - 1) \Rightarrow f(0) &= \frac{3m-1}{2} \\ \Rightarrow 2f(0) - 3f(0) &= 17 + 2m + 2m - 1 = 14 + 4m \Rightarrow f(0) = \frac{14+4m}{-1} = -14 - 4m \end{aligned}$$

$$f(n) + f\left(\frac{1}{n}\right) = \frac{2n^2 - 12n + 2}{n} \Rightarrow 2f(1) = \frac{2-12+2}{1} \Rightarrow f(1) = -4 \quad -5$$

$$-2 = a + b$$

$$f(2) + f\left(\frac{1}{2}\right) = \frac{14 - 12 + 2}{2} = -1 \Rightarrow f(2) + f\left(\frac{1}{2}\right) = 2a + b + \frac{1}{2}a + b \Rightarrow \frac{5}{2}a + 2b = -1$$

$$\Rightarrow a = 2 \Rightarrow b = -4, f(n) = 2n - 4 \Rightarrow f(-1) = -6$$

$$\left\{ \begin{array}{l} f(x) = (x-1)\sqrt{1-x} \\ g(x) = -\sqrt{(1-x)^3} \end{array} \right. \quad \left. \begin{array}{l} Df = Dg = x \leq 1 \\ Rf = Rg \end{array} \right\} \Rightarrow f(x) = g(x) \quad -4$$

$$\left\{ \begin{array}{l} f(x) = x\sqrt{x} \\ g(x) = \sqrt{x^3} \end{array} \right. \quad \left. \begin{array}{l} Df = Dg = x \geq 0 \\ Rf = Rg \end{array} \right\} \Rightarrow f(x) = g(x) \quad -V$$

$$\left\{ \begin{array}{l} f(x) = [\sqrt{x} - [\sqrt{x}]] \\ g(x) = \sqrt{x - [x]} \end{array} \right. \quad \left. \begin{array}{l} x \geq 0 \\ x \geq 0 \end{array} \right\} \quad \left. \begin{array}{l} Df = Dg \\ Rf \neq Rg \end{array} \right\} \Rightarrow f(x) = g(x) \quad -1$$

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

ب) $\left(\frac{f+g}{f-g}\right)(2) = \frac{4}{0}$ ∞ $\times$

ج) $f(0) \cdot g(-1) = 0 \times 1 = 0$

الف) $g(x) = f(3x-1) \Rightarrow g(x) = \left\{ (1,1) (0,4) (\frac{1}{3},0) (-\frac{1}{3},2) (\frac{2}{3},-1) \right\}$

$\hookrightarrow 3x-1 = y \Rightarrow x = \frac{y+1}{3}$

ب) $h(x) = f(|x|) \Rightarrow h(x) = \left\{ (1,1) (-1,1) (0,0) (2,2) (-2,2) \right\}$

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

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