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$$\Rightarrow D_f = \mathbb{R} - \left\{ -x, \frac{\infty}{x}, -1, 0, 1 \right\}$$

$$\Rightarrow D_f = [1, 12]$$

$$\Rightarrow D_f = (-\infty, -1) \cup (2, +\infty)$$

$$[-2, b] \Rightarrow [-2, -1/a] \Rightarrow a+b = 0/a - 1/a = \boxed{1}$$

$$f(u) = \begin{cases} 3u-2 & ; u \geq 1 \\ 3u+3 & ; u < 1 \end{cases}$$

$$g(u) = \sqrt{f(u)-u} \Rightarrow f(u)-u \geq 0$$

$$D_g = ?$$

$$\begin{aligned} \text{for } u \geq 1: f(u) = 3u-2 \Rightarrow 3u-2-u \geq 0 &\Rightarrow 2u \geq 2 \Rightarrow u \geq 1 \quad (I) \\ \text{for } u < 1: f(u) = 3u+3 \Rightarrow 3u+3-u \geq 0 &\Rightarrow 2u \geq -3 \Rightarrow u \geq -1.5 \end{aligned}$$

(II) $\Rightarrow D_g = [-1.5, +\infty)$

$$f(u) = \begin{cases} (a+1)(u+2) & ; u > 1 \\ 3a+2u & ; u \leq 1 \end{cases} \rightarrow f(a) = (a+1)(a+2) = 3a+2$$

$$2f(a) = f(-1) + a \Rightarrow 2(3a+2) = 3a-1+a \Rightarrow 6a+4 = 4a-1 \Rightarrow 2a = -5 \Rightarrow a = -2.5$$

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

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

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

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

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

$$\begin{aligned} (I) + (II) &\Rightarrow \sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}} + 2 + \sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}} + 2 \\ &= 2(\sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}}) + 4 \Rightarrow a \Rightarrow a^2 = 2\sqrt{2-\sqrt{3}} + 2\sqrt{2+\sqrt{3}} + 4 = 8 \Rightarrow a = \sqrt{8} \end{aligned}$$

$$\Rightarrow 2(\sqrt{8}) + 4 = f(2-\sqrt{3}) + f(2+\sqrt{3})$$

$$\begin{cases} 2f(u) - 3f(-u) = 5u^2 - u \xrightarrow{x=u} 2f(u) - 3f(-u) = 5u^2 - u \\ 2f(-u) - 3f(u) = -5u^2 + u \xrightarrow{x=u} 2f(-u) - 3f(u) = -5u^2 + u \end{cases}$$

(I) $2f(u) - 3f(-u) = 5u^2 - u$
 $-5f(u) = 5u^2 - u \Rightarrow f(u) = \frac{5u^2 + u}{-5}$

$$(u+2)f(u) - 3uf(u+2) = 5u^2 - m + 2m - 1$$

$$u = -2 \Rightarrow \begin{cases} 2f(0) = 5m - 1 \xrightarrow{x=0} -10f(0) = -5m + 1 \\ 2f(0) = 5m + 1 \xrightarrow{x=0} 10f(0) = 5m + 1 \end{cases}$$

(II) $10f(0) = 5m + 1 \Rightarrow f(0) = \frac{5m+1}{10}$

$$\begin{cases} f(u) = au + b \\ f(\frac{1}{u}) = \frac{a}{u} + b \end{cases} \Rightarrow au + b + \frac{a}{u} + b = \frac{5u^2 - 12u + 3}{u} \Rightarrow au + \frac{a}{u} + 2b = 5u - 12 + \frac{3}{u}$$

(I) $\Rightarrow \begin{cases} a = 5 \\ b = -9 \end{cases} \Rightarrow f(-1) = 5(-1) - 9 = -14$