

$$2f(a) = 1(a+1)(a+2) = 1a + 1 \quad \left\{ \begin{array}{l} f(-2) = 3a + 2(-2) = 3a - 4 \\ 1a + 1 = 3a - 4 + a \end{array} \right. \Rightarrow \boxed{a = -1, 1}$$

①

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

$$\frac{1}{\sqrt{2 - \sqrt{3}}} = \sqrt{2 + \sqrt{3}}, \quad \frac{1}{\sqrt{2 + \sqrt{3}}} = \sqrt{2 - \sqrt{3}}$$

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

$$= \sqrt{2 - \sqrt{3}} + \sqrt{2 + \sqrt{3}} \Rightarrow S = 4 + 2\sqrt{4} = 8 \Rightarrow S \leq \sqrt{4} \rightarrow \boxed{2\sqrt{4} + 4}$$

۲

$$\begin{cases} 2f(x) - 1f(-x) = 1x^2 - x \\ 1f(-x) - 3f(x) = 1x^2 + x \end{cases} \Rightarrow \begin{cases} 2f(x) - 4f(x) = 1x^2 - 2x \\ 4f(-x) - 9f(x) = 1x^2 + 3x \end{cases}$$

$$-5f(x) = 1x^2 + x \Rightarrow \boxed{f(x) = -\frac{1}{5}x^2 - \frac{x}{5}}$$

③

$$\lim_{x \rightarrow 0} 1f(x) - 0 = 1m - 1 \Rightarrow f(0) = \frac{1m - 1}{1}$$

$$\lim_{x \rightarrow 0} 4f(x) = 14 + 1m + 1m - 1 \Rightarrow 14m + 0 = 1$$

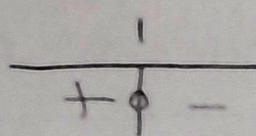
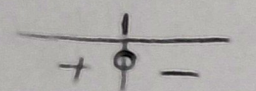
$$4\left(\frac{1m - 1}{1}\right) \leq 10 + 0m \quad 1m \leq 1 \rightarrow m \leq \frac{9}{4}$$

$$1\left(\frac{1m - 1}{1}\right) \leq 10 + 0m \quad f(0) \leq \frac{1\left(\frac{9}{4}\right) - 1}{1} \Rightarrow \boxed{\frac{5}{4}}$$

۴

$$\lim_{x \rightarrow -1} f(-1) + f(-1) = \frac{1 + 11 + 1}{-1} = \boxed{-12} \Rightarrow \boxed{-9}$$

۵

$f(x) \rightarrow$  $D_f = (-\infty, 1]$ $g(x) \rightarrow$  $D_g = (-\infty, 1]$ $(1-x)^n > 0 \rightarrow 1-x > 0 \rightarrow 1 > x$	بررسی شده: - برای هر عدد، متغیر یکسان می باشد $f(x) = g(x)$	۶	
$f(x) \rightarrow$ $D_f = [0, +\infty)$ $g(x) \rightarrow$ $D_g = [0, +\infty)$ $x^n > 0 \rightarrow x > 0$	بررسی شده: - برای هر عدد x ، قدری یکسان می باشد $f(x) = g(x)$	۷	
$f(x) \rightarrow$ $D_f = [0, +\infty)$ $g(x) \rightarrow$ $D_g = [0, +\infty)$ $x - x \geq 0 \rightarrow x \geq x $	بررسی شده: - هر دو به ازای هر عددی $x \geq 0$ می باشد $f(x) = g(x)$	۸	
$f(x) \cdot g(-1) = 0 \times 1 = 0$	$\frac{x^3 + 1}{x^3 - 1} = 0$ تعریف نشده	$\frac{x^3 + 1}{x^3 - 1} = 3$	۹
$h(u) = f(u)$ $ u \in 0, 1, 2, 3 \rightarrow u = 0 \rightarrow u = 0$ $ u = 1 \rightarrow u = \pm 1$ $ u = 2 \rightarrow u = \pm 2$ $ u = 3 \rightarrow u = \pm 3$ $h(0) = f(0) = 0$ $h(1) = h(-1) = f(1) = 1$ $h(2) = h(-2) = f(2) = 1$ $h(3) = h(-3) = f(3) = 1$	$g(x) = \left\{ (1, 1), (0, 4), \left(\frac{1}{3}, 9\right), \left(-\frac{1}{3}, 9\right), \left(\frac{2}{3}, 9\right), \left(-\frac{2}{3}, 9\right) \right\}$ $x_n - 1 \leq 2 \rightarrow x_n - 1 = -1 \rightarrow x_n = 0$ $x_n \leq 1 \rightarrow x_n = 1$ $x_n - 1 \leq -2 \rightarrow x_n = -1$ $x_n \leq -1 \rightarrow x_n = -1$ $x_n = \frac{1}{n}$ $x_n = -\frac{1}{n}$	۱۰	

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