

(1)

真数条件より, $x > 0$

$$2(\log_4 x)^2 + \log_4 x - 6 = (2\log_4 x - 3)(\log_4 x + 2) = 0$$

$$\therefore \log_4 x = \frac{3}{2}, -2$$

$$\therefore x = 8, \frac{1}{16} (\text{真数条件を考慮した.})$$

(2)

真数条件と底の条件より, $x > 0, x \neq 1$

$$\log_3 9x - 6 \log_x 9 - 3 = \log_3 9 + \log_3 x - 6 \cdot \frac{\log_3 9}{\log_3 x} - 3 = \log_3 x - \frac{12}{\log_3 x} - 1 = 0$$

$$\log_3 x - \frac{12}{\log_3 x} - 1 = 0$$

$$(\log_3 x)^2 - \log_3 x - 12 = 0$$

$$(\log_3 x - 4)(\log_3 x + 3) = 0$$

$$\therefore \log_3 x = 4, -3$$

$$\therefore x = 81, \frac{1}{27} (\text{条件を考慮した.})$$