

$$\hat{y} = ax + b$$

주어진 데이터 : (1, 1), (2, 2), (3, 3)

$$Y = (ax + b) + \epsilon$$

$$\Leftrightarrow Y - (ax + b) = \epsilon$$

$$\cdot \times (a - b)^2 = a^2 - 2ab + b^2$$

$$1 - (a + b) = \epsilon_1$$

$$2 - (2a + b) = \epsilon_2$$

$$3 - (3a + b) = \epsilon_3$$

$$\begin{aligned} \sum \epsilon^2 &= (1 - (a + b))^2 + (2 - (2a + b))^2 + (3 - (3a + b))^2 \\ &= 1 - 2(a + b) + (a + b)^2 + 4 - 4(2a + b) + (2a + b)^2 + \\ &\quad 9 - 6(3a + b) + (3a + b)^2 \end{aligned}$$

$$\begin{aligned} &1 - 2a - 2b + a^2 + 2ab + b^2 + 4 - 8a - 4b + 4a^2 + 4ab + b^2 + 9 - 18a - 6b \\ &+ 9a^2 + 6ab + b^2 = \boxed{14a^2 - 28a + 3b^2 - 12b + 12ab + 14} \end{aligned}$$

$$f(a, b) = 14a^2 - 28a + 3b^2 - 12b + 12ab + 14$$

$$\frac{\partial f}{\partial a} = 28a - 28 + 12b$$

$$\frac{\partial f}{\partial b} = 6b - 12 + 12a$$

$$28a - 28 + 12b = 0 \Leftrightarrow 28a + 12b = 28$$

$$12a - 12 + 6b = 0 \Leftrightarrow 12a + 6b = 12$$

$$\begin{array}{r} 28a + 12b = 28 \\ - 24a + 12b = 24 \\ \hline 4a = 4 \end{array}$$

$$\therefore a = 1, b = 0$$