Date

Iteration 2

No.

(Start with $m_1 = 1.7$, $b_1 = 2.1$)

Predictions

- $\hat{y}_1 = 3.8$, $e_1 = -0.8$
- $\hat{y}_2 = 7.2$, $e_2 = -1.2$

Gradients:

- $\sum x_i e_i = 1 \cdot (-0.8) + 3 \cdot (-1.2) = -0.8 + (-3.6) = -4.4$

  So $\frac{\partial J}{\partial m} = -1 \cdot (-4.4) = 4.4$

- $\sum e_i = -0.8 + (-1.2) = -2.0$

  So $\frac{\partial J}{\partial b} = -1 \cdot (-2.0) = 2.0$

Update parameters:

- $m_2 = m_1 - 0.1 \cdot (4.4) = 1.7 - 0.44 = 1.26$

  (arithmetic: $0.1 \times 4.4 = 0.44$, $1.7 - 0.44 = 1.26$)

- $b_2 = 2.1 - 0.1 \cdot (2.0) = 2.1 - 0.2 = 1.9$

Predictions & MSE after update (with $m_2 = 1.26$, $b_2 = 1.9$):

- $\hat{y}_1 = 1.26 \cdot 1 + 1.9 = 1.26 + 1.9 = 3.16$

  Error: $3 - 3.16 = -0.16$

- $\hat{y}_2 = 1.26 \cdot 3 + 1.9 = 3.78 + 1.9 = 5.68$

  Error: $6 - 5.68 = 0.32$

Date

No.

MSE after iter 2:

$$MSE_2 = \frac{(-0.16)^2 + (0.32)^2}{2} = \frac{0.0256 + 0.1024}{2} = \frac{0.1280}{2}$$

$$\frac{0.1280}{2} = 0.064$$

$$= 0.064$$