

$$MSE = \frac{(0.7)^2 + (0.9)^2}{2}$$

$$= \underline{\underline{0.65}}$$

② $m = 0.8, b = 0.5$

$$y_1 = 0.8(1) + 0.5 = 1.3$$

$$y_2 = 0.8(2) + 0.5 = 2.1$$

$$Error = y_i - \hat{y}_i$$

$$Error_1 = 2 - 1.3 = 0.7$$

$$Error_2 = 3 - 2.1 = 0.9$$

Gradients

$$\frac{\partial J}{\partial m} = -\frac{2}{2} (1 \times 0.7 + 2 \times 0.9)$$

$$= -1(0.7 + 1.8)$$

$$= \underline{\underline{-2.5}}$$

$$\frac{\partial J}{\partial b} = -\frac{2}{2} (0.7 + 0.9)$$

$$= -1(1.6)$$

$$= \underline{\underline{-1.6}}$$

Update m & b :

$$m_{new} = 0.8 - 0.1(-2.5)$$

$$= 0.8 + 0.25$$

$$= \underline{\underline{1.05}}$$

$$b_{new} = 0.5 - 0.1(-1.6)$$

$$= 0.5 + 0.16$$

$$= \underline{\underline{0.66}}$$

\hat{y} - predicted:

$$\hat{y}_1 = 1.05(1) + 0.66$$

$$= \underline{\underline{1.71}}$$

$$\hat{y}_2 = 1.05(2) + 0.66$$

$$= \underline{\underline{2.76}}$$

$$Error = y_i - \hat{y}_i$$

$$Error_1 = 2 - 1.71 = 0.29$$

$$Error_2 = 3 - 2.76 = 0.24$$

$$MSE = \frac{(0.29)^2 + (0.24)^2}{2} = \underline{\underline{0.07085}}$$