Consider the weights from input layer.

- Expression for $\frac{\partial E_n(w)}{\partial a_1^{[1]}}$. Use set of $\delta_k^{(2)}$.

$$\frac{\partial E_n(w)}{\partial a_1^{[1]}} = \sum_{k=1}^{3} \frac{\partial E_n(w)}{\partial a_k^{[2]}} \times \frac{\partial a_k^{[2]}}{\partial a_1^{[1]}}$$

$$\sum_{k=1}^{3} \frac{\partial E_n(w)}{\partial a_k^{[2]}} = \sum_{k=1}^{3} \delta_k^{[2]}.$$

$$a_k^{[2]} = \sum_{k=1}^{3} \sum_{i=1}^{3} w_{ki}^{[2]} z_i^{[1]}.$$

$$\frac{\partial a_k^{[2]}}{\partial a_1^{[1]}} = h'(a_1^{[1]}) \sum_{k=1}^{3} w_{k1}^{[2]}$$

$$\boxed{\frac{\partial E_n(w)}{\partial a_1^{[1]}} = h'(a_1^{[1]}) \sum_{k=1}^{3} w_{k1}^{[2]} \delta_k^{[2]}} \quad (1)$$

- Use this to calculate $\frac{\partial E_n(w)}{\partial w_{11}^{[1]}}$

$$\frac{\partial E_n(w)}{\partial w_{11}^{[1]}} = \frac{\partial E_n(w)}{\partial a_1^{[1]}} \times \frac{\partial a_1^{[1]}}{\partial w_{11}^{[1]}}. \quad (2)$$

$$\therefore a_1^{[1]} = w_{11}^{[1]} x_1 + w_{12}^{[1]} x_2 + w_{13}^{[1]} x_3$$

$$\boxed{\frac{\partial a_1^{[1]}}{\partial w_{11}^{[1]}} = x_1} \quad (3)$$

Sub (1) & (3) in (2)

$$\boxed{\frac{\partial E_n(w)}{\partial w_{11}^{[1]}} = h'(a_1^{[1]}) \left[\sum_{k=1}^{3} w_{k1}^{[2]} \delta_k^{[2]}\right] x_1}$$