

Problem 1:

$$\begin{aligned}a_1 &= x_0 w_1 = 2(-1) = -2 \\a_2 &= x_1 w_2 = 3(-2) = -6 \\a_3 &= x_2 w_3 = 7(-6) = -42\end{aligned}$$

$$e = t - a_3 = -40 - (-42) = 2$$

$$\begin{aligned}\delta_3 &= -ef'(a_3) = -2 * 1 = -2 \\ \delta_2 &= \delta_3 w_3 f'(a_2) = -2(7)(1) = -14 \\ \delta_1 &= \delta_2 w_2 f'(a_1) = -14(3)(1) = -42\end{aligned}$$

$$\begin{aligned}\frac{\delta L}{\delta w_3} &= \delta_3 x_2 = -2(-6) = 12 \\ \frac{\delta L}{\delta w_2} &= \delta_2 x_1 = (-14)(-2) = 28 \\ \frac{\delta L}{\delta w_1} &= \delta_1 x_0 = -42(2) = -84\end{aligned}$$

$$\frac{\delta L}{\delta w_3} = 12, \quad \frac{\delta L}{\delta w_2} = 28, \quad \frac{\delta L}{\delta w_1} = -84$$