① $\frac{\partial L}{\partial y}$ e.g L2 loss: $l = (y-\hat{y})^2$, $\frac{\partial L}{\partial y} = 2(y-\hat{y})$

② $\frac{\partial L}{\partial z} = \frac{\partial L}{\partial y} \cdot \frac{\partial y}{\partial z}$ e.g $g = \sigma$

$\sigma(x) = \frac{e^x}{1+e^x}$, $\sigma'(x) = \sigma(x)(1-\sigma(x))$

③ $\boxed{\frac{\partial L}{\partial b}} = \frac{\partial L}{\partial z} \cdot \frac{\partial z}{\partial b} = \frac{\partial L}{\partial z}$

$z = x' + b$, $\frac{\partial z}{\partial b} = 1$

④ $\frac{\partial L}{\partial x'} = \frac{\partial L}{\partial z} \cdot \frac{\partial z}{\partial x'}$

$z = x' + b$, $\frac{\partial z}{\partial x'} = 1$

⑤ $\boxed{\frac{\partial L}{\partial w}} = \frac{\partial L}{\partial x'} \cdot \frac{\partial x'}{\partial w} = \frac{\partial L}{\partial x'} x$

$x' = wx$, $\frac{\partial x'}{\partial w} = x$

⑥ $\frac{\partial L}{\partial y^{l-1}} = \frac{\partial L}{\partial x'} \frac{\partial x'}{\partial y^{l-1}} = \frac{\partial L}{\partial x'} w$

$x' = w y^{l-1}$, $\frac{\partial x'}{\partial y^{l-1}} = w$