

$$\frac{\partial J}{\partial W_j} = \frac{\partial J}{\partial y} \frac{\partial y}{\partial W_j} = - \frac{1}{y} \frac{\partial y}{\partial W_j} = - \frac{1}{\frac{e^{W_y X}}{\sum e^{XW}}} \frac{\sum e^{XW} e^{W_y X} 0 - e^{W_y X} e^{W_j X} X}{(\sum e^{XW})^2} = \frac{X e^{W_j X}}{\sum e^{XW}} = X P$$