$$l = -y \ln z - (1 - y) \ln(1 - z)$$

$$-y/z + (1 - y) \frac{1}{1 - z}$$

$$z = \sigma(s) = \frac{1}{1 + e^{-s}}$$

$$\sigma(s)(1 - \sigma(s))$$

$$s = \mathbf{w}^{\top} \mathbf{x}$$

$$\mathbf{x}$$