DL - PW1 Diego Fraile

Exercise 1

a) $\sigma(z) = \frac{1}{1+\exp(-z)}$

$u(z) = 1 + \exp(-z) \qquad u'(z) = -e^{-z}$

$\sigma(z) = u(z)^{-1}$

$\sigma'(z) = -u(z)^{-2} \cdot u'(z) = -(1+e^{-z})^{2} \cdot (-e^{-z})$

$= \frac{e^{-z}}{(1+e^{-z})^{2}}$

b)

$\sigma(z) \cdot (1-\sigma(z)) = \frac{1}{1+e^{-z}} \cdot \left(1 - \frac{1}{1+e^{-z}}\right)$

$= \frac{1}{1+e^{-z}} \cdot \left(\frac{1+e^{-z}-1}{1+e^{-z}}\right) = \frac{e^{-z}}{(1+e^{-z})^{2}}$