2(a) $\sigma'(x)$

=	$\frac{\partial}{\partial x}\left(\frac{1}{1+e^{-x}}\right)$	(1)
=	$\frac{\partial}{\partial x}\left(1+e^{-x}\right)^{-1}$	(2)
=	$-\left(1+e^{-x}\right)^{-2} e^{-x}(-1)$	(3)
=	$\frac{e^{-x}}{\left(1+e^{-x}\right)^{2}}$	(4)
=	$\left(\frac{1}{1+e^{-x}}\right)\left(\frac{e^{-x}}{1+e^{-x}}\right)$	(5)
=	$\sigma(x)(1-\sigma(x))$	(6)