Assignment 4

2. $f_1(x) = 1/(1+e^{-x}) = (1+e^{-x})^{-1}$

$f_1'(x) = -(1+e^{-x})^{-2}(-e^{-x}) = (1+e^{-x})^{-1}(1+e^{-x})^{-1}e^{-x}$

$= f_1(x)\left[\frac{e^{-x}}{1+e^{-x}}\right] = f_1(x)\left[\frac{1+e^{-x}-1}{1+e^{-x}}\right]$

$= f_1(x)\left[1 - \frac{1}{1+e^{-x}}\right] = \underline{f_1(x)(1-f_1(x))}$

$f_2(x) = \frac{e^{x}-e^{-x}}{e^{x}+e^{-x}} = (e^{x}-e^{-x})(e^{x}+e^{-x})^{-1}$

$f_2'(x) = (e^{x}+e^{-x})(e^{x}+e^{-x})^{-1} + (e^{x}-e^{-x})(-1)(e^{x}+e^{-x})^{-2}(e^{x}-e^{-x})$

$= 1 - \frac{(e^{x}-e^{-x})^2}{(e^{x}+e^{-x})^2} = \underline{1 - f_2^2(x)}$