1 Exercise 2

1.1 a) and b)

This section answers Question a) and b).
Rewrite the function: $\frac{1}{1+\exp(-z)} = (1+\exp(-z))^{-1}$
We can now calculate $(1+exp(-z))^{-1}$‘:
$(1+\exp(-z))^{-1}$‘ $= -1 \cdot (1+\exp(-z))^{-2} \cdot \exp(-z) \cdot (-1)$
$=> \frac{\exp(-z)}{(1+\exp(-z))^2} = \frac{1}{1+\exp(-z)} \cdot \frac{\exp(-z)}{1+\exp(-z)} = \sigma(z) \cdot \frac{\exp(-z)}{1+\exp(-z)}$
$=> \sigma(z) \cdot \frac{1+\exp(-z)-1}{1+\exp(-z)} = \sigma(z) \cdot (\frac{1+\exp(-z)}{1+\exp(-z)} - \frac{1}{1+\exp(-z)}) = \sigma(z) \cdot (1-\sigma(z))$ qed.