

$g(x) = \frac{1+x}{1+e^x}$	$g'(x) = \frac{1-xe^x}{(1+e^x)^2}$
$f(x) = x - \frac{\ln(1+x)}{1+x}$	$f'(x) = \frac{x^2 + 2x + \ln(1+x)}{(1+x)^2}$

$$g(z) = \frac{1+z}{1+e^z} \quad g'(z) = \frac{1 \times (1+e^z) - (1+z)xe^z}{(1+e^z)^2} = \frac{1+e^z - xe^z - ze^z}{(1+e^z)^2} = \frac{1-xe^z}{(1+e^z)^2}$$

$$f(z) = z - \frac{\ln(1+z)}{1+z}$$

$$f'(z) = 1 - \frac{\frac{1}{1+z} \times (1+z) - \ln(1+z) \times 1}{(1+z)^2} = 1 - \frac{1 - \ln(1+z)}{(1+z)^2}$$

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

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

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

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