1. Find the Taylor series for $f(x) = \ln x$ centred at x = 1.

2. Find the Maclaurin series for $f(x) = \sin x$. Then find the Maclaurin series of $f(x) = \cos x$ by differentiating the series for $\sin x$

3. Find the Maclaurin Expansion for $f(x) = \frac{e^x - e^{-x}}{2}$. The function is called the hyperbolic sine function, $\sinh x$ (A comparison with the series expansion of $\sin x$ should explain why). Find the derivative of $\sinh x$ both directly and from the series expansion. This new function is called the hyperbolic cosine function, $\cosh x$.