2)(30 points) Starting with the power series for $e^x$ find the power series for the function below. Write out the first five non-zero terms.

\[
\int_0^x x \cosh(x) \, dx
\]
1(30 points) Part a) For the function below, find a power series centered at \( a = 0 \).
   i) Write out a formula, using summation notation.
   ii) Write out the first three terms, simplified.

\[
\int \frac{x}{(1 - x)^2} \, dx
\]
4) (30 points) For the function below, find a power series centered at \( a = 0 \).

\[ \int \ln(1 + x) \, dx \]

i) Write out a formula, using summation notation.
ii) Write out the first four non-zero terms, simplified.