1. Find the Maclaurin series expansion of each function.
   
   (a) \( f(z) = \frac{z}{4 + z^2} \)
   
   (b) \( f(z) = z \sinh z^2 \)

2. Obtain the Taylor series representation of \( f(z) = e^z \) centered at \( z_0 = -1 \).

3. Find the Laurent series expansion centered at \( z_0 = 0 \) that represents the function
   
   \( f(z) = z^3 \cosh \left( \frac{1}{z} \right) \)

4. Find the three possible Laurent series expansion centered at \( z_0 = 0 \), of
   
   \( f(z) = \frac{z}{(z - 1)(z - 3)} \)

5. (Extra credit) Repeat problem 4 when \( z_0 = -1 \), and for the function
   
   \( f(z) = \frac{z}{(z - 1)^2(z - 3)} \)