Problem 1. Consider the function $f(x) = e^x + \cos(\pi x)$.

(a) Prove that $f(x)$ has a root in $(-1, 1)$ using the intermediate value theorem. What properties of $f(x)$ allow us to use this theorem?

(b) Use the bisection method twice to find a smaller interval in which the root falls.

It is helpful to remember that $e \approx 2.72$.

Problem 2. For two differentiable functions $f(x), g(x)$, state the quotient rule for computing $(f/g)'(x)$. Then explain with an example why

$$\left(\frac{f}{g}\right)'(x) \neq \frac{f'(x)}{g'(x)}$$