1. Estimate $\ln(2) = \int_1^2 \frac{1}{x} dx$ by estimating the area under $f(x) = \frac{1}{x}$ between 1 and 2.

2. Estimate the area under $f(x) = \frac{1}{x}$ between $x = 5$ and $x = 10$.

3. Let $F(x) = \arctan(x)$. What is $F'(x)$? Graph $F(x)$ and $F'(x)$.

4. What is $\lim_{N \to \infty} \int_{-N}^{N} \frac{1}{1+x^2} dx$?