1. Evaluate the following limits.
   a) $\lim_{x \to \infty} \frac{x^3}{3^x}$
   b) $\lim_{x \to \infty} (1 + \frac{1}{x})^{2x}$
   c) $\lim_{x \to 1^+} (\frac{1}{\ln x} - \frac{1}{x-1})$

2. Evaluate the following integrals.
   a) $\int_1^\infty e^{-x}$
   b) $\int_1^\infty \frac{1}{\sqrt{x}}$
   b) $\int_0^1 \frac{1}{\sqrt{x}}$

3. a) Explain the difference between a sequence and a series.
   b) What does it mean to say that a sequence converges? (Please use at least one Greek letter in your answer.)
   c) What does it mean to say that a sequence diverges?
   d) What does it mean to say that a series converges?
   e) Can a sequence converge if its terms don't go to zero?
   f) Can a series converge if its terms don't go to zero?
   g) What does it mean if a series is absolutely convergent?
   h) What does it mean if a series is conditionally convergent?
   i) If a series is conditionally convergent, what can you do by rearranging the terms?
   j) What if it's absolutely convergent? (We didn't discuss it, but think about it. I'll tell you if you ask me on Friday.)

4. For each of the following, determine whether or not the series converges.
   a) $\sum_{n=1}^\infty \frac{\ln n}{n}$
   b) $\sum_{n=1}^\infty \frac{1}{n^2+1}$
   c) $\sum_{n=1}^\infty \frac{(-1)^n}{\sqrt{n}}$
   d) $\sum_{n=1}^\infty \frac{n^2}{2^n}$
   e) $\sum_{n=1}^\infty (\frac{3n}{2n+50})^n$
   f) Pick a bunch of odd numbers and do 'em.