These problems are due on Wednesday, October 28\textsuperscript{th} in class, and will be graded on clarity of exposition as well as correctness. If you work in a group, please write the names of all the members on your homework sheet.

The problem set this week is 14.15, 14.29, 14.42, 14.44 14.55, and the following problem:

For any positive integer \( k \), consider the series

\[
\sum_{n=1}^{\infty} \frac{1}{n^k} = 1 + \frac{1}{2^k} + \frac{1}{3^k} + \frac{1}{4^k} + \cdots
\]

Prove that this series converges for any \( k \geq 2 \). As a hint, try proving \( 1/n^2 \leq 1/(n-1) - 1/n \).

[The sum of the series is called the Riemann zeta function, \( \zeta(k) \). The Riemann hypothesis is a problem related to this function, and solving it would make you a millionaire.]