MATH 636, Fall 2015
Homework 5
To be prepared for presentation on Thursday, September 25.

Background reading: Combinatorics: A Guided Tour, Sections 1.3–1.4.

Only consult with your classmates or professor to discuss the problem set.

We will discuss solutions to these questions in class.

5-1. (a) Let f be a well-defined function from A to B and let g be a well-defined function from B to A. Suppose that $g(f(a)) = a$ for all $a \in A$. Show that it is not necessarily the case that f is a bijection between A and B.

(b) Let f be a well-defined function from A to B and let g be a well-defined function from B to A. Suppose that $g(f(a)) = a$ for all $a \in A$ and $f(g(b)) = b$ for all $b \in B$. Prove that f is a bijection between A and B.

[*Important: You* **must** *use the definition of bijection.*]

5-2. (a) Use the equivalence principle to solve Exercise 1.4.15.

(b) Write a paragraph explaining why we can not use the equivalence principle to count the number of different necklaces where **two** of the n beads are indistinguishable (the same color, for example).