

**Math 215**  
**Homework 8**  
Due Friday, October 24

Read Sections 10 and 11. Exercises from the text: 10.1, 10.3, 10.4, 11.1, 11.5

**To turn in:**

1. Give the formula for a bijection

$$f : \mathbb{N}_n \rightarrow S$$

for some integer  $n > 0$ , where  $S$  is the set of odd numbers between 0 and 100. What is the cardinality of  $S$ ?

2. Suppose there are 100 people in a room, and that 45 of them are wearing green shirts, and 75 of them are wearing blue jeans. Use the inclusion-exclusion principle to prove that there are at least 20 people wearing both.

3. Suppose  $n$  men and  $m$  women are on a boat. By definition, a *couple* is a set of two people. Use the ideas and statements in §10.2 to answer (with proof):

(a) What is the total number of possible heterosexual couples among the people on the boat? (Heterosexual means one man and one woman.)

(b) What is the total number of possible couples (heterosexual or homosexual)?

(c) What is the maximum number of *disjoint* heterosexual couples? What is the maximum number of disjoint couples (of any type)?