Name

1. (25 pts) Find the negation of these statements
   (a) If it snows today, then I will cancel classes.
   (b) Every person in on the train is reading the newspaper
   (c) All the children like chocolate
   (d) At every ball game everybody stays until the end

2. (25 pts) Show by induction on $n$ that $1 + 2 + \ldots + n = n(n + 1)/2$

3. (25 pts)
   (a) Define what it means for $a$ and $b$ to be congruent modulo $m$.
   (b) Find the greatest common divisor of the pair $(312, 785)$

4. (10 pts) State the pigeonhole principle. If there are 8 men and 8 women in the room, how many do you have to call on to make sure you get a couple (one of each)?

5. (15 pts) How many ways are there to fill 7 chairs in a room when you have a pool of 10 people. It matters who sits in which chair.