Math 2001: Homework P7

Due: October 21, 2009

1. From the book do problems:
   (a) 1.3: 4, 7
   (b) 4.2: 4, 7, 8 (Note you may leave answers in terms of binomial coefficients).

2. The genetic code can be viewed as a sequence of four letters $T$, $A$, $G$, and $C$.
   (a) How many 6-letter sequences are there?
   (b) How many 6-letter sequences are palindromic (the same when read in the reverse order)?

3. How many ways can 6 men and 6 women be seated at a table with 12 place settings such that gender alternates as one goes around the table?

4. Suppose one has $\ell$ tasks, and suppose for $1 \leq j \leq \ell$ task $j$ has $m_j$ different ways of being completed. Use induction to show that the total number of ways to complete a sequence these $\ell$ tasks is $m_1 m_2 \cdots m_\ell$. 