MATH 245 Exam 2 Review Spring

1. In how many ways can we select 4 books from different subjects among 7 distinct computer science books, 5 distinct math books, 6 distinct political science books and 4 distinct art books?

2. A deck of cards has 4 suits, clubs, diamonds, hearts and spades, and 13 denominations, ace, 2-10, jack, queen and king. What is the probability of getting a poker hand (5 cards) containing 3 cards of one denomination and 2 cards of a second denomination? In other words, the probability of getting a full house.

3. An inventory has a list of 80 items, each marked "available" or "unavailable." There are 45 available items. Show that there are at least two available items in the list exactly nine items apart.(For example, available items at positions 13 and 22 would satisfy the condition.)

4. Prove that either a graph or its complement is connected.

5. A simple graph that is isomorphic to its complement is **self-complementary**. Draw a self-complementary graph on 4 vertices.

6. Prove the following: G is bipartite if and only if every cycle is even.

   There are two parts to the proof: If G is bipartite, that implies every cycle is even and if every cycle is even, that implies G is bipartite.