Name:
MATH55 Section
Homework 5
Due Tue. 2/12

17.33 A poker hand consists of 5 cards chosen from a standard deck of 52 cards. There are a variety of special hands that one can be dealt in poker. For each of the following types of hands, count the number of hands that have that type.

- **a.** Four of a kind: The hand contains four cards of the same numerical value (e.g., four jacks) and another card.
- **b.** Three of a kind: The hand contains three cards of the same numerical value and two other cards with two other numerical values.
 - c. Flush: The hand contains five cards all of the same suit.
 - d. Full house: The hand contains three cards of one value and two cards of another value.
- **e.** Straight: The five cards have consecutive numerical values, such as 7-8-9-10-jack. Treat ace as being higher than king but not less than 2. The suits are irrelevant.
 - f. Straight flush: The hand is both a straight and a flush.

$$\binom{n}{k} = \binom{k+1}{n-1}.$$

18.15 Let n, k be positive integers, prove:

$$\binom{n}{k} = \binom{n-1}{0} + \binom{n-1}{1} + \binom{n-1}{2} + \dots + \binom{n-1}{k}$$

18.16 Let n, k be positive integers, prove:

$$\binom{n}{k} = \binom{1}{k-1} + \binom{2}{k-1} + \dots + \binom{n}{k-1}$$