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.

18.13 Prove:

$$\left(\!\binom{n}{k}\!\right) = \left(\!\binom{k+1}{n-1}\!\right).$$

18.15 Let n, k be positive integers, prove:

$$\left(\!\binom{n}{k}\!\right) = \left(\!\binom{n-1}{0}\!\right) + \left(\!\binom{n-1}{1}\!\right) + \left(\!\binom{n-1}{2}\!\right) + ... + \left(\!\binom{n-1}{k}\!\right)$$

18.16 Let n, k be positive integers, prove:

$$\left(\!\binom{n}{k}\!\right) = \left(\!\binom{1}{k-1}\!\right) + \left(\!\binom{2}{k-1}\!\right) + ... + \left(\!\binom{n}{k-1}\!\right)$$