Math 302.102 Fall 2010
Some Final Counting Problems

Problem 1. A box contains 15 balls (4 Yellow, 5 Purple and 6 Blue). Suppose 3 balls are drawn at random

(a) with replacement. Calculate $\mathbf{P}\{\text{all 3 balls are of the same colour}\}$.

(b) without replacement. Calculate $\mathbf{P}\{\text{all 3 balls are of the same colour}\}$.

(c) with replacement. Calculate $\mathbf{P}\{\text{all 3 balls are of different colour}\}$.

(d) without replacement. Calculate $\mathbf{P}\{\text{all 3 balls are of different colour}\}$.

Problem 2. How many different linear arrangements are there of the letters A, B, C, D, E, F for which

(a) A and B are next to each other, and

(b) A is before B and B is before C.

Problem 3. An ordinary deck of 52 cards is shuffled.

(a) What is the probability of *one pair*? (That is, 2 cards of the same denomination and 3 cards of different denominations.)

(b) What is the probability of a *full house*? (That is, 2 cards of one denomination and 3 cards of another denomination.)