HOMEWORK 3   (MATH 180, SPRING 2012)

Read: **MN**, sections 10.1-3 (second ed.)

Solve: §10.2, Exc. 2a, 5, 6, §10.3, Exc. 4, 5, 8a, and

I. Suppose 20 hunters see 20 ducks. Simultaneously and independently, hunters each choose a random duck, aim and shoot. Suppose all hunters are equally good, with the probability 95% of hitting a duck. Estimate (within 1%) the probabilities that
   a) neither duck is hit,
   b) all ducks are hit.
Which probability is smaller?

II. An HR department at a major pharmaceutical company received 100 application, 50 of which from LA and 50 from San Diego. They hired 10 people whose resumes were chosen at random. Estimate (within 1%) the probabilities that:
   a) they hired exactly 5 people from each town,
   b) they hired 3 from one and 7 from another (consider both possibilities)
Which probability is smaller?

III. A jumbo bag of $M\&M$ candies has 1,000 candies, of which 300 are black, 200 are green, 200 are red, 100 are orange, 150 are brown, and 50 are blue. You decided to play the following game:
   • pick random 100 candies from the bag,
   • for each black candy, you put a penny into a jar,
   • for each green candy, you put a nickel into a jar,
   • for each brown candy, you put a dime into a jar,
   • for each red candy, you put a quarter into a jar,
   • for each orange candy, you put a Kennedy half dollar into a jar,
   • for each blue candy, you put a Susan B. Anthony dollar coin into a jar.
What is the expected total dollar amount you get in the jar at the end of the game?

IV. Let W be a random shortest grid walk from $(0,0) \to (20, 20)$. Compute exactly
   a) the expected area above or to the left of W,
   b) the expected number of turns of W.

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This Homework is due Wednesday April 23, at 12:59:59 pm. (right before class). Please read the collaboration policy on the course web page. Make sure you write your name in the beginning and your collaborators' names at the end. You MUST box all answers. Remember that answers are not enough, you also need to provide an explanation exhibiting your logic.

P.S. All problems are worth 10 points.