Name (PRINTED): ________________

Student ID #: ________________

Section # (or TA's: name and time) ________________

CMSC 250 Quiz #11 ANSWERS Wed., Apr. 12, 2006

Write all answers legibly in the space provided. The number of points possible for each question is indicated in square brackets – the total number of points on the quiz is 30, and you will have exactly 15 minutes to complete this quiz. You may not use calculators, textbooks or any other aids during this quiz.

1. [9 pnts.] Give a specific counter example to disprove or prove the following statement true.

$$\forall A, B \in \{sets\},\ \ A \cup (B^c \cup (B^c - A))^c = A \cup B$$

$A \cup (B^c \cup (B^c - A))^c$ LHS
$= A \cup (B \cap (B^c - A)^c)$ DeMorgan's Law and Double Complement
$= A \cup (B \cap (B^c \cap A^c)^c)$ Alt. Rep. of Set Diff
$= A \cup (B \cap (B \cup A))$ DeMorgan's Law and Double Complement
$= (A \cup B) \cap (A \cup (B \cup A))$ Distribution
$= (A \cup B) \cap ((A \cup A) \cup B)$ Comm & Assoc
$= (A \cup B) \cap (A \cup B)$ Idempotent
$= (A \cup B)$ Idempotent

2. [9 pnts.] Assuming you are holding a tournament between two teams (A and B). Team A is a much better team and wins on average 3 of every 4 meetings between these two teams. Assuming these two teams are going to play a best of 3 games tournament, answer the following questions:

   a. What is the probability that A wins the tournament?

$$\frac{9}{16} + \frac{9}{64} + \frac{9}{64} = \frac{36+9+9}{64} = \frac{54}{64}$$

   b. What is the probability that the tournament is done after only two games are played?

$$\frac{100}{16}$$

   c. What is the probability that B wins both the first game of the tournament and the second game of the tournament?

$$\frac{1}{16}$$

3. [12 pnts.] Assuming you have 5 indistinguishable quarters (standard two-sided), answer the following question:

   a. If you flip all five coins simultaneously, what is the probability that they will fall all heads?

   $$(\frac{1}{2})^5$$

   b. If you flip all five coins simultaneously, how many different combinations are possible - how many different ways can the table look (remember: the 5 quarters are indistinguishable).

   $$6$$

   c. If you flip all five coins simultaneously, what is the probability that exactly one of them is a head?

   $$\frac{5}{2^5}$$

   d. If you flip four of the coins and all of them come up heads, what is the probability that when you flip the fifth coin it will also come up heads?

   $$\frac{1}{2}$$