Name (PRINTED): _____

Student ID #: _____

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

CMSC 250 Quiz #10 ANSWERS Wed., Apr. 5, 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. [12 pnts.] Assuming $\Sigma = A = \{x, y\}$ and B = {a,x}, give the following:

   a. List the elements of $(A \cap B) \cup (B - A)$.

$$
\begin{aligned}
&(A \cap B) \cup (B - A) \\
&= (\{x, y\} \cap \{a, x\}) \cup (\{a, x\} - \{x, y\}) \\
&= (\{x\} \cup \{a\}) \\
&= \{a, x\} \\
&= B
\end{aligned}
$$

   b. Give the elements of $B \times A$.

$$
\begin{aligned}
&B \times A \\
&= \{a, x\} \times \{x, y\} \\
&= \{(a, x), (a, y), (x, x), (x, y)\}
\end{aligned}
$$

   c. Give the elements of Σ^3.

$$\Sigma^3 = \{xxx, xxy, xyx, xyy, yxx, yxy, yyx, yyy\}$$

2. [8 pnts.] List the elements in each of the sets (A and B) assuming $A - B = \{a, b, c\}$, $B - A = \{d, e\}$ and $A \cap B = \{f\}$.

$$A = \{a, b, c, f\}$$

$$B = \{d, e, f\}$$

3. [10 pnts.] Prove or give a counter example to the following.

For all sets A, B and C.
$A \subseteq B \wedge B \subseteq C$, then $(C - A) \cap B \neq \emptyset$

FALSE
Disproof by counter example:
Let $A = \emptyset$
Let $B = \emptyset$
Let $C = \emptyset$

$A \subseteq B$ and $B \subseteq C$ because the empty set is a subset of every set.
Therefore the antecedent of the implication is true.

$C - A = \emptyset$ by def of set difference
$(C - A) \cap B = \emptyset \cap \emptyset = \emptyset$ by def on intersection
$\emptyset = \emptyset$ Therefore the consequent is false.

Since the antecedent is true and the consequent false, this is a valid counterexample.