Name _____ SSN _____

CMSC 203 - Homework Assignment 3 - Due October 31, 2002

1. Use the Method of Contraposition to prove: **If *n* is an integer and n^2 is even, then *n* is even.**

Name _____ SSN _____

CMSC 203 - Homework Assignment 3 - Due October 31, 2002

2. Using the previous problem and the definition of a Rational Number (x = p/q is rational provided p and q are integers, q is non-zero, and p and q are in lowest terms), prove by the Method of Contradiction that $\sqrt{2}$ is irrational.

Name _____ SSN _____

CMSC 203 - Homework Assignment 3 - Due October 31, 2002

3. Find the terms a_4, a_5, a_6, and a_7 for the recursively defined sequence given by:

$$a_0 = 1,\ a_1 = 3 \text{ and } a_n = 3a_{(n-1)}a_{(n-2)} \text{ for } n > 1.$$

Name _____ SSN _____

CMSC 203 - Homework Assignment 3 - Due October 31, 2002

4. Using Mathematical Induction, prove for all integers $n > 0$,

$$\sum_{i=1}^{n+1} i \cdot 2^i = n \cdot 2^{n+2} + 2 .$$

Name _____ SSN _____

CMSC 203 - Homework Assignment 3 - Due October 31, 2002

5. Suppose Maryland issues license plates of the form CCLLDDC, where:

L is a letter from {A, B, ..., Z},
D is a digit from {0, 1, 2, ..., 9},
C is a character from {A, B, ..., Z, 0, 1, 2, ..., 9}.

How many distinct plates can be produced if the first character must be “X” and the last character must be “9”?

Name _____ SSN _____

CMSC 203 - Homework Assignment 3 - Due October 31, 2002

6. The Mars Candy Company sells bags of M&M candies with 60 pieces candy colored from 8 different colors in them.

(a) How many different bags can they produce?

(b) How many different bags can they produce if each bag must contain at least 5 of each color?