Name (PRINTED): _____

Student ID #: _____

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

CMSC 250 Quiz #9 Wednesday, Oct. 27, 2004

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 **20** minutes to complete this quiz. You may not use calculators, textbooks or any other aids during this quiz.

1. [15 pnts.]Use regular induction to prove the following inequality.

$$\forall n \in Z^{\geq 2},\ \sum_{r=2}^{n}(r^2 - r) < \frac{n^3}{3}$$

2. [15 pnts.] Use strong induction to prove the following statement.

Assume:

$$a_0 = 4, \quad a_1 = 9, \quad \text{and} \quad \forall n \in Z^{\geq 2} a_n = 6a_{n-1} - 9a_{n-2}$$

Prove that

$$\forall k \in Z^{\geq 0}, a_k = (4 - k)3^k$$