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.

\[ \forall n \in Z \text{ where } n \geq 6, \ 4n < n^2 - 7 \]
2. [15 pnts.] Use strong induction to prove the following statement.

Assume:

\[ a_1 = 3, \quad a_2 = 5, \quad a_3 = 1, \quad \text{and} \quad a_n = 2a_{n-1} + 3a_{n-2} + 4a_{n-3} \quad \forall n \in \mathbb{Z} \text{ where } n > 3 \]

Prove that

\[ \forall n \in \mathbb{Z}^+, \quad a_n \in \mathbb{Z}^{\text{odd}} \]