

Directions: Solve the following problems. All written work must be your own. See the course syllabus for detailed rules.

1. Two players play a game on a row of n cells, alternating turns. In each turn, a player marks one unmarked cell that is not next to a marked cell. A player with no legal moves available loses. Prove that if n is odd, then the first player has a winning strategy. (Hint: give an explicit, non-inductive winning strategy for the first player when n is odd. The general game is tricky to analyze.)
2. [SS 1.3.1] Let $a_0 = 0$ and $a_n = 3a_{n-1} + 2$ for $n \geq 1$.
 - (a) Find the first few values of the sequence a_n and use this to guess a general formula.
 - (b) Use induction to prove that your general formula from part (a) is correct.