Name (Last, First): _____   Student ID: _____

Quiz 9 on March 17, 2015: "Pursue Parity". You have 25 minutes to solve two of the three problems below. Please write on both sides of the page. **Good Luck!**

Marking Comment. My decision remains to simplify the management of this course and mark the quizzes myself, though at a delay of one week, in a symbolic acknowledgement of the ongoing TA strike.

Problem 1. Can you cover an 8×8 chessboard with 21 rectangles of size 3×1 and a single extra 1×1 square? If you can, what chessboard positions might the 1×1 square occupy? (You need to justify your assertions, of course). For reference, in the chessboard on the right, the rook is at position g4.

Problem 2 (Larson's 1.10.1, reworded). Given 9 distinct points in $\mathbb{Z}^3$, show that there is some point in $\mathbb{Z}^3$ which is exactly half way between two of these 9 points.

Problem 3 (Larson's 1.10.10, reworded). Show that for every positive integer a, the equation $x^2 - y^2 = a^3$ has solutions with $x, y \in \mathbb{Z}$.