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

Quiz 9 on March 24, 2016: "Work Backwards", the Pigeonhole Principle, and "Argue by Contradiction". You have 30 minutes to solve the following two problems. Please write on both sides of the page.   **Good Luck!**

Problem 1 (near Larson's 2.6.11).

1. Prove that if all the edges and diagonals of a hexagon (6-gon) are each coloured red or green, then you can find a single-colour triangle.

2. Prove that if all the edges and diagonals of a 17-gon are each coloured red, green, or blue, then you can find a single-colour triangle.

Problem 2 (Larson's 2.6.9, modified). Fifteen chairs are evenly placed around a circular table on which are name cards for fifteen guests. The guests fail to notice these cards until after they have sat down, and it turns out that no one is sitting in front of her own card. Prove that the table can be rotated so that at least two of the guests are simultaneously correctly seated. *Hint.* How far to the right of her assigned seat is each person?