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



**Quiz 10** on March 26, 2015: "Consider Extreme Cases". 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** (Larson's 1.11.4). Prove that the product of $n$ successive integers is always divisible by $n!$.

**Problem 2** (Larson's 1.11.2, reworded). Let $A$ be a set of $2n$ points in the plane, no three of them on the same line. Suppose that $n$ of them are coloured red and $n$ are coloured blue. Show that you can choose a pairing of the reds and the blues such the straight line segments between the pairs do not intersect.

**Problem 3** (Larson's 1.11.7). Show that there exists a rational number $c/d$, with $d < 100$, such that $\lfloor k\frac{c}{d} \rfloor = \lfloor k\frac{73}{100} \rfloor$ for $k = 1, 2, \ldots, 99$.