# 115 Homework 6

Due Friday November 12

**Question 1** (Rosen 4.2.10) Find all integers $1 \leq a \leq 14$ which have an inverse modulo 14 and compute it when it exists.

**Question 2** (Rosen 4.3.4d) Solve the system of congruences $x \equiv 2$ mod 11, $x \equiv 3$ mod 12, $x \equiv 4$ mod 13, $x \equiv 5$ mod 17 and $x \equiv 6$ mod 19.

**Question 3** (Rosen 4.3.12) Ancient Indian eggs are removed from a basket, 2,3,4,5 and 6 at a time and there remains, respectively 1,2,3,4 and 5 eggs. But if the eggs are removed 7 at a time, none remain at the end. What is the smallest number of eggs that could have been in the basket?

**Question 4** (Rosen 6.1.2) Show $12! + 1$ is divisible by 13 by grouping pairwise inverses modulo 13 appearing in 12!.