Number Theory I
Spring 2018

Assignment 10.1
Due April 3

Exercise 1. Find a generator $g + 37\mathbb{Z}$ of $(\mathbb{Z}/37\mathbb{Z})^\times$ so that $g + 37^2\mathbb{Z}$ does *not* generate $(\mathbb{Z}/37^2\mathbb{Z})^\times$. [*Suggestion:* Use a computer.]

Exercise 2. For each $n \geq 1$, find a generator of $(\mathbb{Z}/3^n\mathbb{Z})^\times$.

Exercise 3. Express each of the congruence classes $1 + 16\mathbb{Z}$, $3 + 16\mathbb{Z}$, $5 + 16\mathbb{Z}, \ldots, 13 + 16\mathbb{Z}, 15 + 16\mathbb{Z}$ in the form $\pm 5^k + 16\mathbb{Z}$ for some $k \in \mathbb{N}_0$.