# Math 290-Number Theory for Teachers
## Problem of the Day #7
Due Friday, January 31, 2014

**1.** Which elements of $\mathbb{Z}_6$ have a multiplicative inverse? (Note: A number $x$ has a multiplicative inverse if there is another number $y$ such that $xy = 1$.) What about $\mathbb{Z}_7$? Which elements of $\mathbb{Z}_7$ have a multiplicative inverse? Any guesses about which elements of $\mathbb{Z}_m$ have a multiplicative inverse? How does this relate to which fractions exist in $\mathbb{Z}_m$?

Now to give some more names to things: we define $U_m$ to be the set of elements in $\mathbb{Z}_m$ that have a multiplicative inverse (or in other words, are invertible).