**MATH 3540** **Name:** _____
**Day 12**

**Directions**

1. Complete the following questions.

1. The elements of $\mathbb{Z}_{15}^*$ are $\{1, 2, 4, 7, 8, 11, 13, 14\}$. Define $f_3(x) = [x^3 \mod 15]$. What is the result of applying $f_3$ to the elements of $\mathbb{Z}_{15}^*$, in the order just presented?

   (a) $\{1, 2, 4, 7, 8, 11, 13, 14\}$
   (b) $\{1, 8, 4, 8, 4, 8, 2, 14\}$
   (c) $\{1, 8, 4, 13, 2, 11, 7, 14\}$

2. Which of the following is a generator of $\mathbb{Z}_7^*$?

   (a) 2
   (b) 3
   (c) 5

3. Let $p, N$ be integers with $p|N$. Prove that for any integer $X$,

$$[[XmodN]modp] = [Xmodp].$$

   Show that, in contrast, $[[Xmodp]modN]$ need not equal $[XmodN]$.