**Homework 6**

**Instructions:** Do as many of the problems as you like, but make sure to complete at least **three**. Then I will create a solution from your work.

1. Find a solution, by hand, to the congruence
2. a. Considering as an element of (the invertible elements mod 11), find .

b. Considering as an element of (the invertible elements mod 12), find .

1. Is (can’t get the right phi to show up) even for every *n*>2? If so, justify why. If not, give a counterexample.
2. Find all solutions in to the equation
3. Prove the next-to-last corollary on page 2 of the class activity (If gcd(a, n) = 1 and ax ≡ ab (mod n), then x ≡ b (mod n)) directly, without using Theorem 1 or its corollaries.
4. Find a complete residue system modulo 5 composed entirely of multiples of 9.
5. Write a code to find the inverse of a given number *a* mod *n.* Your code should give an error if there is no inverse. (If possible, use an efficient algorithm.)