**Homework 10**

**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. Solve the following quadratic congruences, if possible. If not possible, justify why.  
   a.   
   b.   
   c.
2. Calculate  
   a.   
   b.   
   c.
3. Let be a prime number. Show that at least one of 2, 3, or 6 must be a quadratic residue modulo *p.*
4. Let *p* be an odd prime and suppose that *a* is an element modulo *p* with odd order. Show that *a* is a quadratic residue. (Hint: Euler’s criterion)
5. Compute by hand (Hint: 8831 is prime and )
6. Let *p* be an odd prime not equal to 5. Show that if and only if