Written homework. Due in writing, at the beginning of class,

  Thursday, September 29. 3.23, 3.26, 3.37, 3.38, 3.47

Warmup exercises. To present in class

  Tuesday, September 27. No new problems.

  Thursday, September 29. 3.54, 3.72, 3.73

Reading assignment. Read the rest of Chapter 3, and the the first half of Section 4.1, up through and including Example 4.16. Ideally, we will finish Chapter 3 on Tuesday, and start Chapter 4 on Thursday.

1. Draw the location on the complex plane of the roots of unity for $n = 5$ and for $n = 6$ (one diagram for $n = 5$, and another for $n = 6$). Which of these roots are primitive?

2. Find $\phi(n)$ for $n = 1, \ldots, 8$.

3. Solve problems (i), (ii), and (iii) from the subsection "Pippins and Cheese".

4. What are Gaussian integers, and what are Eisenstein integers? How are they similar, and how are they different?

5. Pick several "good" examples illustrating Proposition 4.2(ii) when $m = 7$. Find some a and b that *are* congruent mod 7, and some that are *not*, and look at the remainders.

6. Pick several "good" examples illustrating Proposition 4.5(i).

7. Illustrate all three parts of Theorem 4.9 with $p = 7$, and several values of a. Note on computation: If you are computing, say, 3^7 (mod 7) you don't have to first compute 3^7, and then reduce (mod 7). Think of shortcuts you can take using Proposition 4.5 that allow you to reduce (mod 7) smaller powers of 3. For instance, $3^2 = 9 \equiv 2$ (mod 7). How can that help you?