Proofs involving congruences

- Read carefully pages 103 through 105 (section 4.2)
- Some key questions to answer (try these without looking at the book, but after you've read the book):

  1. For integers a, b, n, what is the definition of the phrase "a is *congruent* to b modulo n"?
  2. True or False: Every integer is congruent to 0, 1, 2 or 3 modulo 4 (an exactly one of these is correct).
  3. For integers a, b, k, n, prove that if a is congruent to b modulo n then ka is congruent to kb modulo n.
  4. For integers a, b, c, d, n, prove that if a is congruent to b modulo n and c is congruent to d modulo n, then $a + c$ is congruent to $b + d$ modulo n and also ac is congruent to bd modulo n.
  5. Show that for an integer n, if n^2 is not congruent to n modulo 3, then n is not congruent to 0 modulo 3 or to 1 modulo 3.

- Practice problems from section 4.2 (page 114): 4.15, 4.17, 4.18, 4.21