Problem Set 4

Due: Thursday, February 6th

Instructions: Answer each of the following questions and provide a justification for your answer. In addition to the points assigned below, you will receive 0-2 writing points for the entire problem set.

1. Let a, b and c be integers. Prove that if $a|b+c$ and $a|c$ then $a|b$.
2. Prove that for any integers a, b, if ab is even then either a is even or b is even.
3. Let a, b and c be integers. Show that $11|(a-b+c)$ if and only if $11|(100a+10b+c)$.
4. We define a positive integer p to be **prime** if whenever $p|ab$ either $p|a$ or $p|b$.
   We define a positive integer p to be **irreducible** if whenever $p = ab$ either $a = 1$ or $b = 1$.
   Prove that for any integer p, if p is prime, then it is irreducible.