Problem Set 5

Due: Monday, February 10th

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 be an integer such that a^2 is divisible by 3. Show that a is divisible by 3.
2. Let a, b, and c be integers such that $a^2 + b^2 = c^2$. Prove that at least one of a, b, and c is even.
3. Show that $2^{1/3}$ is irrational.
4. Prove or give a counter example: If q is a rational number and x is an irrational number then $q + x$ is irrational.
5. Prove or give a counter example: If x and y are irrational numbers then $x + y$ is irrational.
6. Prove or give a counter example: If a is irrational then a^2 is irrational.
7. Prove or give a counter example: If a^2 is irrational then a is irrational.