Written Homework # 8

Due at the beginning of class 08/06/08

1. Let n be a positive integer.

   (a) Suppose that n is a perfect square. Show that $n = 5m$, $5m + 1$, or $5m + 4$, for some integer m.

   Using only part (a) and Proposition 15.2.3, determine whether or not

   (b) 288 is a perfect square,

   (c) 2369 is a perfect square.

2. Use the Division Algorithm to prove the following: If n is an integer then 7 divides n^2 implies 7^2 divides n^2.

3. For integers a and b in each case below find the unique integers q, r which satisfy $a = qb + r$ and $0 \leq r < b$:

   (a) $a = 293$ and $b = 27$;

   (b) $a = -2931$ and $b = 17$.

4. Use the Euclidean algorithm to find the greatest common divisor of:

   (a) 89 and 17 ;

   (b) 298 and 8.