NUMBER THEORY: CLASS 13

1. Exercise

1) Use Fermat's little theorem to find the residue of 473^{38} mod 5.

2) Show the reverse of Fermat's little theorem is not true.
Find a number a and a composite number n where $\gcd(a, n) = 1$ such that $a^{n-1} \neq 1 \bmod n$.

3) Show that $n^7 - n$ is divisible by 42 for all positive integers n.

4) Show $1^p + 2^p + 3^p + ... + (p-1)^p \equiv 0 \pmod{p}$ for any odd prime p.

Date: Tuesday, October 7, 2008.