Quiz # 7 for Dr. Z.’s Number Theory Course for Nov. 7, 2013

NAME: (print!) ______________________________________

E-MAIL ADDRESS: (print!) ________________________________

1. (3 points) Using the formula, find $\phi(3003)$.

2. (3 points) State and prove Euler’s Classical Formula for the sum-over-divisors of $n$ of $\phi$.

3. (4 points) For the following prime $p$ and $q$ (let $n = pq$) public key $e$, and encrypted message $c$
   (i) Check that $e$ is an OK key, i.e. that it is coprime to $\phi(n)$.
   (ii) Find the deciphering key, $d$, such that $de \equiv 1 \pmod{\phi(n)}$
   (iii) Suppose Alice sent you the encrypted message $c$. Check that this is an OK message (coprime to $n$), and if it is find her original message?, $m$

   $p = 3 \quad , \quad q = 5 \quad , \quad e = 5 \quad , \quad c = 7$