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 ϕ.

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

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