PHILADELPHIA UNIVERSITY

DEPARTMENT OF BASIC SCIENCES

Exam 2   **Number Theory**   **17–12–2015**

1. (2 pts)

   (a) Find a reduced residue system (RRS) mod 12 using composite numbers.

   (b) Evaluate $\phi(2000)$.

2. (3 pts) Use Wilson's theorem to compute 196 ! % 199.

3. (3 pts) Use Euler's theorem to compute 2^{1983} % 49.

4. (3 pts) Let p, q be distinct prime numbers such that $pq = 10579$. Find p and q, given that $\phi(10579) = 10360$.

5. (4 pts) Find all the solutions (congruence class) for $x^3 \equiv 5 \pmod{44}$.

6. (5 pts) Find all the solutions (congruence class) for the system of congruences.

   $x \equiv 13 \pmod{15}$
   $x \equiv 1 \pmod{7}$
   $x \equiv 3 \pmod{8}$

–Amin Witno

The list of primes below 200.

2	3	5	7	11	13	17	19	23	29
31	37	41	43	47	53	59	61	67	71
73	79	83	89	97	101	103	107	109	113
127	131	137	139	149	151	157	163	167	173
179	181	191	193	197	199				