PHILADELPHIA UNIVERSITY

DEPARTMENT OF BASIC SCIENCES

Exam 1 **Number Theory** **31–03–2011**

Solutions must be complete in order to receive full credit.

1. Solve the linear equation $611x + 1081y = 94$.

2. Prove the number 667 prime or composite using trial division.

3. Evaluate $\gcd(237600, 414000)$ using prime factorization.

4. Solve the system of congruences.

$$x \equiv 11 \pmod{16}$$
$$x \equiv 5 \pmod{9}$$
$$x \equiv 3 \pmod{5}$$

5. Suppose that $a^2 \equiv 1 \pmod{n}$. Prove that $\gcd(a, n) = 1$.

–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				