

PHILADELPHIA UNIVERSITY
DEPARTMENT OF BASIC SCIENCES

Exam 1

Number Theory

28-03-2013

Solutions must be complete in order to receive full credit.

1. Is the number 239 prime or composite? Use trial division.
2. Evaluate $\gcd(1250, 6000)$ by factoring into primes.
3. Find all the integer solutions of $312x + 132y = 60$.
4. Prove that if $d \mid mn$ and $\gcd(d, m) = 1$, then $d \mid n$.
5. Find a complete residue system (CRS) modulo 11 consisting of prime numbers.
6. Evaluate $44! \% 47$ using Wilson's theorem.
7. Find all the solutions to the system of three congruences.

$$x \equiv 3 \pmod{4}$$

$$x \equiv 5 \pmod{7}$$

$$x \equiv 1 \pmod{9}$$

-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				