PHILADELPHIA UNIVERSITY

DEPARTMENT OF BASIC SCIENCES

Exam 2   **Number Theory**   **13–12–2011**

Solutions must be complete in order to receive full credit.

1. Find a reduced residue system mod 9 with all prime numbers.

2. Evaluate $3^{12345} \% 25$ with the help of Euler theorem.

3. Count how many primitive roots are in mod 98.

4. Find all the primitive roots mod 7.

5. Solve the discrete logarithm problem $7^x \equiv 3 \pmod{13}$ using the primitive root $g = 2$.

–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				