

PHILADELPHIA UNIVERSITY  
DEPARTMENT OF BASIC SCIENCES

Exam 2

Number Theory

23–04–2014

Solutions must be complete in order to receive full credit.

1. Find a complete residue system (CRS) modulo 5 using prime numbers.
2. Find a reduced residue system (RRS) modulo 9 using prime numbers.
3. Evaluate  $\phi(3024)$ .
4. Compute  $67! \% 71$ .
5. Find all the integer solutions for the system of three congruences.

$$x \equiv 4 \pmod{5}$$

$$x \equiv 3 \pmod{6}$$

$$x \equiv 1 \pmod{7}$$

6. Compute  $2^{16479} \% 19$ .
7. Find all the integer solutions for  $x^{23} \equiv 3 \pmod{55}$ .

–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				