

PHILADELPHIA UNIVERSITY
DEPARTMENT OF BASIC SCIENCES

Exam 2

Number Theory

03–05–2015

Solutions must be complete in order to receive full credit.

1. (4 pts) Find all the integer solutions for the system of three congruences.

$$x \equiv 1 \pmod{4}$$

$$x \equiv 2 \pmod{5}$$

$$x \equiv 3 \pmod{9}$$

2. (1 pt) Evaluate $\phi(160)$.
3. (4 pts) Compute $3^{3750} \% 35$ using Euler's theorem.
4. (4 pts) Find all the integer solutions for the congruence $x^{35} \equiv 5 \pmod{64}$.
5. (4 pts) Given that $5917 = p \times q$, find the primes p and q using the fact that $\phi(5917) = 5760$.
6. (1pt) Evaluate $|5|_{11}$.
7. (2 pts) Find all the primitive roots mod 14 using the fact that $a = 3$ is one of the primitive roots mod 14.

–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				