Philadelphia University

Department of Basic Sciences

Exam 2 **Computational Number Theory** **15–12–2009**

1. Express the rational number $\frac{1512}{2009}$ using a finite continued fraction.
2. Evaluate the periodic infinite continued fraction $[2, \overline{1, 5}]$. Write the final answer in the form $\frac{P+\sqrt{n}}{Q}$ with P, Q, n integers.
3. The following congruence is found from a quadratic sieve method with $n = 1541$. Complete the algorithm.

$$389^2 \equiv 255^2 \pmod{1541}$$

4. Illustrate Miller-Rabin test (strong test) for $n = 2017$ and $a = 2$. What is your conclusion?
5. Find a Carmichael number of the form $n = 7 \times 31 \times p$ for some small prime p.

–Amin Witno