Exam 2 **Computational Number Theory** **19–12–2010**

1. Express the rational number $\frac{2010}{1219}$ using a finite continued fraction.

2. Evaluate the periodic infinite continued fraction $[0, \overline{2, 3}]$. Write the final answer in the form $\frac{P+\sqrt{n}}{Q}$ with P, Q, n integers.

3. The following congruence is the result of QSA with $n = 56261$. Complete the algorithm.
$$17^2 \times 41^2 \equiv 3^6 \times 7^2 \ (\text{mod } 56261)$$

4. Find a prime number $p < 20$ such that $n = 73 \times 31 \times p$ is a Carmichael number. Prove your answer.

5. Illustrate Miller-Rabin test for $n = 817$ and $a = 7$. The result of the test is (choose one): (a) prime (b) composite (c) pseudoprime (d) no conclusion.

–Amin Witno