Exam 2   **Computational Number Theory**   **30–04–2009**

Choose 4 problems.

1. Complete the quadratic sieve example, $n = 119$, given the factorization table.

	11^2	16^2	22^2	25^2	27^2
2	1	1	3	1	–
3	–	2	–	1	1
5	–	–	–	1	1
7	–	–	–	–	–

2. Evaluate the periodic infinite continued fraction $[3, \overline{1, 4, 1}]$. Write the final answer in the form $\frac{P + \sqrt{n}}{Q}$ with P, Q, n integers.

3. Let $p = 6k + 1$ and $q = 12k + 1$ and $r = 18k + 1$ be three prime numbers. Let $n = p \times q \times r$. Prove that n is a Carmichael number.

4. Prove that 121 is a strong pseudoprime with base $a = 3$.

5. Prove that 257 is prime using the extended Fermat test, base $a = 3$.

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