

PHILADELPHIA UNIVERSITY
DEPARTMENT OF BASIC SCIENCES

Exam 1

Computational Number Theory

19–11–2006

1. Alia is using RSA cryptosystem with $n = 253 = 11 \cdot 23$ and $j = 17$. Bilal sends her the number $s = 010$. What is the message m ?
2. Suppose $n = 19109 = pq$ and we know that $\phi(n) = 18816$. Find p, q using quadratic formula.
3. Suppose $n = 16781 = pq$ and we know that p, q are close to each other. Find p, q using Fermat Factorization method.
4. Use Divisibility Tests with $n = 3517281383$ for checking a factor of
 - (a) 3
 - (b) 7
 - (c) 11
 - (d) 37
5. Given an integer n , remove the right-most digit, say u , and denote what remains by t . Then $13 \mid n$ if and only if $13 \mid t + 4u$.
 - (a) Illustrate this theorem with $n = 1604928$.
 - (b) Prove the theorem.

–Amin Witno