

Number Theory  
Problem Set 8  
Factoring

1. Factor each integer by the Monte Carlo Method with indicated  $f(x)$  and  $x_0$ . In each case compare  $x_k$  only with the  $x_j$  for which  $j = 2^h - 1$  where  $k$  is an  $(h + 1)$ -bit integer.
  - (a)  $x^2 - 1, x_0 = 2, n = 91$ .
  - (b)  $x^2 + 1, x_0 = 1, n = 8051$ .
  - (c)  $x^2 - 1, x_0 = 5, n = 7031$ .
  - (d)  $x^3 + x + 1, x_0 = 1, n = 2701$ .
2. Use Fermat factorization to factor:
  - (a) 8633
  - (b) 809009
  - (c) 92296873
  - (d) 88169891
  - (e) 4601
3. Use generalized Fermat factorization to factor:
  - (a) 68987
  - (b) 29895581
  - (c) 19578079
  - (d) 17018759