

Homework 20, due October 23

- (1) (Page 198, problem 5) Factor

8834884587090814646372459890377418962766907

by the $p - 1$ method.

- (2) Let $n = 1042387$. Factor $t^2 - n$ for

$t = 1021, 1027, 1030, 1061, 1112, 1129, 1148, 1175, 1217, 1390, 1520$.

Make a matrix (as in section 6.4.1) and find at least two linear dependencies (mod 2) among the rows. Use this information to factor n . Explain your work.

- (3) Let $n = 527773$. Calculate the values of the polynomial $f(x) = (x + \lfloor \sqrt{n} \rfloor)^2 - n$ for x from -17 to 17 and factor them. (Note that primes p with $\left(\frac{n}{p}\right) = -1$ will never divide $f(x)$.) Use this information to find some squares that factor into small primes (mod n), and use this information to factor n . Explain your work.