

Homework on §9

Due: Thursday, March 7

- A. Write a program that takes as input positive integers n and b , and returns n in base b . The output can be a list of digits. You may assume $b \leq 10$.
- B. Silverman 9.1.
- C. Silverman 9.2.
- D. Silverman 10.2.
- E. Let p be a prime, and suppose $\gcd(a, p) = 1$. Show that if $ax \equiv c \pmod{p}$, then $x \equiv ca^{p-2} \pmod{p}$.
- F. Suppose $\gcd(x, 97) = 1$ and $x^n \equiv 1 \pmod{97}$, where $1 \leq n \leq 96$. Show that $n \mid 96$.
- G. Let $p(x) = x^{33} - x$. Show that if n is an integer, then $15 \mid p(n)$.
- H. Suppose a, n are integers with $n \neq 0$ and $\gcd(a, n) \neq 1$. Show that $a^r \not\equiv 1 \pmod{n}$ for any positive r .