

**Homework Assignment 03:**

1. Consider all possible curves of the form  $y^2 = x^3 + ax + b$  over the field  $\text{GF}(103)$  where  $a, b \in \text{GF}(103)$ . Write a C, Python, or Mathematica program that will find the order of all elliptic curves with different values of  $a, b \in \{0, 1, \dots, 102\}$ . All arithmetic is performed mod 103, and you may want to write separate functions for computing addition, subtraction, multiplication, inversion, and square root computation. List 10 pairs of  $a$  and  $b$  parameters for which the curve order is prime and the largest.

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**Due 5pm Tuesday February 21**

Either, upload an electronic copy to the Dropbox link or bring a paper copy to the class. Electronic copy of your homework can be in Text or PDF. You could also scan/pdf your handwritten work; however, do not send low-resolution or small phone-camera images.