

## PROBLEM OF THE MONTH, SEPTEMBER 2019

After a one semester hiatus, the *Problem of the Month* column is back! Here is the challenge for September 2019.

Consider the integer sequence  $\{x_n\}_{n \geq 0}$  given by  $x_0 = 0, x_1 = 1$  and

$$x_n = 4x_{n-1} - x_{n-2}, \quad \text{for all } n \geq 2.$$

The first few terms of this sequence are

0, 1, 4, 15, 56, 209, 780, 2911, 10864, 40545, 151316, 564719, 2107560, 7865521, 29354524, ...

Find the smallest  $n \geq 2$  such that  $x_n$  is a prime number, or prove that such an  $n$  does not exist.

Submit your solutions to professor Dan Ismailescu, Mathematics Department via email at [dan.p.ismailescu@hofstra.edu](mailto:dan.p.ismailescu@hofstra.edu), or bring it in person at 103A Roosevelt Hall.