

Problem 1

Find all primes p such that $17p + 1$ is a perfect square.

Solution by Julia Xin

$$17p + 1 = (x + 1)^2, \quad \text{for some } x.$$

Then,

$$17p = x(x + 2).$$

Since the decomposition of a number as a product of prime numbers is unique, we deduce that $p = 19$.