Time limit: 15 minutes.
Instructions: This tiebreaker contains 3 short answer questions. All answers must be expressed in simplest form unless specified otherwise. You will submit answers to the problem as you solve them, and may solve problems in any order. You will not be informed whether your answer is correct until the end of the tiebreaker. You may submit multiple times for any of the problems, but **only the last submission for a given problem will be graded**. The participant who correctly answers the most problems wins the tiebreaker, with ties broken by the time of the last correct submission.
No calculators.

1. Five people each choose an integer between 1 and 3, inclusive. What is the probability that all 3 numbers are chosen by at least one of the five people?

2. How many ordered quadruples (a, b, c, d) satisfy $a+b+c+d = 4030$ and $a, b, c, d \in \{-2020, -2019, ..., -2011, -201$
   a, b, c, and d do not need to be distinct.

3. Adam flips a fair coin. He stops flipping when he flips the same face 2021 consecutive times. If $a^b - 1$ is the expected number of flips, where a and b are positive integers and a is prime, find $a + b$.