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. In your drawer you have two red socks and a blue sock. You randomly select socks, without replacement, from the drawer. However, every time you take a blue sock, another one magically appears in the drawer. What is the probability that you get a red pair before a blue pair?

2. Suppose a, b, c are positive integers such that $lcm(a, b) = 400$, $lcm(b, c) = 2000$, $lcm(c, a) = 1000$, and $gcf(a, b, c) = 10$. Given that a is a three-digit number, what is the value of $a + b + c$?

3. Consider a 3×3 grid with the first 9 positive integers placed in the grid. Take the greatest integer in each row and let r be the smallest of those numbers. Take the smallest integer in each column and c be the greatest of those numbers. How many arrangements are there such that $r \leq c \leq 4$?