

Time limit: 15 minutes.

Instructions: This tiebreaker contains 3 short answer questions. 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. Mataio has a weighted die numbered 1 to 6, where the probability of rolling a side n for $1 \leq n \leq 6$ is inversely proportional to the value of n . If Mataio rolls the die twice, what is the probability that the sum of the two rolls is 7?
2. Andrew, Benji, and Carlson want to split a pile of 5 indistinguishable left shoes and 7 indistinguishable right shoes. Andrew is practical and wants the same number of left and right shoes. Benji is greedy and wants the most shoes out of the three of them. Carlson is a trickster and wants Benji to have a different number of left and right shoes. How many ways are there to split up the shoes in a way that suits everyone's desires?
3. Bessie the cow is hungry and wants to eat some oranges, which she has an infinite supply of. Bessie starts with a fullness level of 0, and each orange that she eats increases her fullness level by 85. She can also eat lemons, and each time she eats a lemon, her fullness level is halved, rounding down. What is the smallest number of lemons that Bessie should have in order to be able to attain every possible nonnegative integer fullness level?