

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. Let p be a prime and n a positive integer below 100. What's the probability that p divides n ?
2. The origami club meets once a week at a fixed time, but this week, the club had to reschedule the meeting to a different time during the same day. However, the room that they usually meet has 5 available time slots, one of which is the original time the origami club meets. If at any given time slot, there is a 30 percent chance the room is not available, what is the probability the origami club will be able to meet at that day?
3. Ankit, Bill, Charlie, Druv, and Ed are playing a game in which they go around shouting numbers in that order. Ankit starts by shouting the number 1. Bill adds a number that is a factor of the number of letters in his name to Ankit's number and shouts the result. Charlie does the same with Bill's number, and so on (once Ed shouts a number, Ankit does the same procedure to Ed's number, and the game goes on). What is the sum of all possible numbers that can be the 23rd shout?
4. Consider a regular triangular pyramid with base $\triangle ABC$ and apex D . If we have $AB = BC = AC = 6$ and $AD = BD = CD = 4$, calculate the surface area of the circumsphere of the pyramid.
5. Ankit, Box, and Clark are taking the tiebreakers for the geometry round, consisting of three problems. Problem k takes each k minutes to solve. If for any given problem there is a $\frac{1}{3}$ chance for each contestant to solve that problem first, what is the probability that Ankit solves a problem first?