

# MBMT Counting and Probability Round – Brahmagupta

April 16, 2023

Full Name \_\_\_\_\_

Student ID Number \_\_\_\_\_

**DO NOT BEGIN UNTIL YOU ARE  
INSTRUCTED TO DO SO.**

This round consists of **8** questions. You will have **30** minutes to complete the round. Each question is *not* worth the same number of points. Questions answered correctly by fewer competitors will be weighted more heavily. Please write your answers in a reasonably simplified form.

- \_\_\_\_\_ 1 Dami splits 2024 in its four digits and randomly chooses one. What is the chance that she picks 4?
- \_\_\_\_\_ 2 Jenny bought 30 of mystery boxes and received 6 large prizes. If the probability of winning a large prize stays the same, how many large prizes is she expected to win from 20 mystery boxes?
- \_\_\_\_\_ 3 Carlos is picking out his lumberjack outfit. For a given outfit, he needs one pair of pants and one flannel. If Carlos has four pairs of pants and four flannels, each in red, green, blue, and purple, how many different outfits can he have if he does not want to ever wear the same color pants and flannels?
- \_\_\_\_\_ 4 Every day, Mr. Schwartz has a 30% chance of chucking a ball of paper at a sleeping student. What is the probability that he doesn't throw paper balls for 2 consecutive days? Express your answer as a common fraction.
- \_\_\_\_\_ 5 I have a fair coin and an unfair coin. If I draw a coin at random and the probability I flip heads is  $\frac{5}{12}$ , what is the probability I get heads on my unfair coin?
- \_\_\_\_\_ 6 Jason has a fair coin. Evan has a weighted coin where the probability of landing heads is  $\frac{3}{4}$ . What is the minimum number of flips such that the probability that Evan lands tails for exactly one of his flips is more than twice the probability that Jason lands tails for exactly one of his flips?
- \_\_\_\_\_ 7 Yun and Yi are playing cards. They take turns drawing cards from a standard 52-card deck with replacement, and the first person to draw one of the thirteen clubs wins. What is the probability that Yi will win?
- \_\_\_\_\_ 8 Lewis is learning to spell. He writes out all of the arrangements of the letters in his name and orders them alphabetically. For example, the first arrangement would be "eilsw". What position is the word "lewis" in?