

# MBMT Counting and Probability Round – Erdős

March 9, 2025

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. Veena is selling three pots colored purple, turquoise, and orange. If she sold the purple pot sometime after the orange pot, in how many possible orders could she have sold the pots?
- \_\_\_\_\_ 2. Frank the Frog is jumping on a row of lily pads numbered 1 through 13 in that order. He can only jump forward 2 or 5 lily pads at a time. Frank is currently on the first lily pad and wishes to reach his home on the thirteenth lily pad. How many ways are there for him to get to his home?
- \_\_\_\_\_ 3. Evan wants to become a snapping turtle. A magic genie will turn him into a snapping turtle if he flips two heads in a row with a fair coin. If Evan flips the coin three times, what is the probability that he becomes a snapping turtle?
- \_\_\_\_\_ 4. Sam is playing a round of rock paper scissors against a robotic arm. The arm picks randomly between rock, paper, and scissors while Sam picks rock 20% of the time, paper 30% of the time, and scissors 50% of the time. What is the probability Sam wins?
- \_\_\_\_\_ 5. Pete the Cat enjoys dressing tastefully to impress. He has 4 capes, 3 jackets, and 5 hats, all of which are distinct, and he can only wear up to one of each type of clothing. A tasteful outfit consists of at least 2 different pieces of clothing. How many distinct tasteful outfits can Pete the Cat make?
- \_\_\_\_\_ 6. Michelle flips a coin 9 times in a row and notices 6 flips come up heads. In how many ways can there be three distinct strings of heads of length 1, 2, and 3 in some order? (For example HTHHTHHHT would count)
- \_\_\_\_\_ 7. There are 7 boxes numbered 1 through 7, with 7 balls in each box so that box number  $x$  contains  $x$  red balls. The rest of the balls in each box are green. A box is then chosen at random and a ball is randomly drawn from it. If the ball is red, what is the probability it came from the box numbered 7?
- \_\_\_\_\_ 8. How many positive integers less than or equal to 300 are divisible by exactly two of 2, 3, and 5? (For example, 12 works because it is divisible by 2 and 3, but not by 5)