

# MBMT Counting and Probability Round – Cantor

April 7, 2018

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

Team 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 In Kevtown, license plates consist of a single uppercase letter followed by a single digit (like B6 or Y0). How many possible license plates can be made in Kevtown?
- \_\_\_\_\_ 2 Artemis, Zeus, and Poseidon are betting on the outcome of rolling a six-sided fair die. Artemis bets that it will be a 2, Zeus bets that it will be odd, and Poseidon bets that it will be a multiple of 3. Who is most likely to be correct?
- \_\_\_\_\_ 3 Stan flips a penny, and Dilhan flips a nickel. If one of them flips tails, their coin vanishes. Otherwise, they keep the coin. What is the probability that they will have at least two cents left over?
- \_\_\_\_\_ 4 A pie is covered with various toppings. Strawberries cover 50% of the pie, blueberries cover 40% of the pie, and 25% of the pie has neither topping. What percentage of the pie has both toppings?
- \_\_\_\_\_ 5 David draws a square and puts a letter at each of its vertices. He looks at the square and reads *DAVE*. How many other names could he have possibly read (counting things like *EDAV* or *ADEV* which are not necessarily common names)?
- \_\_\_\_\_ 6 Jimmy rolls a six-sided die over and over until he gets a number less than 5. Jommy rolls a six-sided die over and over until he gets a number greater than 2. Then, they each write down their number. What is the probability that the sum of their two numbers is equal to 7?
- \_\_\_\_\_ 7 How many ways are there to place one black piece and one white piece on a 3 by 3 checkerboard such that the pieces are in neither the same row nor the same column?
- \_\_\_\_\_ 8 Tom is stringing red, blue, and green beads on a straight wire. A red bead can be followed by any color of bead. A blue bead can only be followed by a blue or green bead. A green bead can only be followed by a green bead. If the wire has to have 6 beads, in how many ways can Tom string the beads? Note that not all colors have to be used.