

MBMT Counting and Probability Round – Bernoulli

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 What is the probability that a fair dice rolls onto a 1 or a 6?
- _____ 2 A fair coin is flipped and a fair six-sided die is rolled. How many possible outcomes are there?
- _____ 3 There are two boxes: one red and one white. How many ways are there to put 30 identical blue balls in the two boxes?
- _____ 4 You are invited to play the “octopus game”. One of the games requires you to jump over 8 rows of tiles. Each row has 2 tiles, one of which is safe (the other will land you harmlessly into the octopus tank). Calculate the probability that you will make it through if you are the first to go.
- _____ 5 How many ways are there to make \$1.23 using only quarters, dimes, and pennies (nickels do not exist in the world of this problem)?
- _____ 6 A sock drawer has 4 red, 4 blue, and 4 yellow socks. How many socks does Patrick have to take out to ensure he has at least two pairs?
- _____ 7 Alex randomly plays a note on his mini 12-key piano. He then randomly plays a different note. What are the chances that the two keys he played are right next to each other on the piano?
- _____ 8 Whenever Evan tries to pronounce a word with a T in it, he ignores all the Ts. How many unique pronunciations of a 6-letter word can Evan make, given that the word can only contain the letters M, B, and T? For example, Evan pronounces ‘MMBMMT’ the same as ‘MMTBMM’, but he pronounces ‘BBTBBB’ differently from ‘BBTBTB’. Note that ‘TTTTTT’ is a distinct pronunciation.