MBMT Counting and Probability Round − Dedekind

May 21, 2022

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   Burgerly flips 2 fair coins. What is the probability that the second coin lands tails?

2   Jooby has a nickel, a dime, and a quarter. If he loses a random coin, what is the probability that he has at least 30 cents left over?

3   Two identical caps each have 4 paper slips with numbers 1, 2, 4, and 8 written on them. Madeline takes out one paper slip from each cap, multiplies the two numbers she sees, and buys that number of strawberries. How many different values are possible for the number of strawberries that she will buy?

4   Two different positive integers sum to 10. How many possibilities are there for their product?

5   Two girls play rock-paper-scissors, where each side throws out a rock, a paper, or a scissors with equal probability. They tie if they throw out the same move. What is the probability that the two girls tie?

6   A triangle has sides of length 2, a square has sides of length 3, and a pentagon has sides of length 4. Two sides are chosen from the 12 sides. What is the probability that the two chosen sides have the same length?

7   Zorian rolls two fair 6-sided dice and multiplies their results. What is the probability that his final number ends in a 0?

8   Gose shuffles a standard deck of 52 cards. He flips over the first three cards: 8, 2, and 3. What is the probability that when he flips over the fourth card, the sum of the four values is greater than 21? Jacks, queens, and kings have a value of 10, and aces have a value of 11.