MBMT Counting and Probability Round — Ramanujan

April 1, 2017

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 by fewer competitors will be weighted more heavily. Please write your answers in the simplest possible form.

_____ **1** A machine takes in two numbers and gives 3 times their sum. Pratik gives the machine the numbers 101 and 99. What number does the machine give to Pratik?

_____ **2** There are 5 red balls, 2 blue balls, and 3 green balls in a bag. If someone randomly takes out a ball from the bag without looking, what is the probability that it is not green?

_____ **3** 4 people are at a party, and every pair of people shakes hands with each other. How many total handshakes are there?

_____ **4** What is the minimum number of balls one must take out of a bag containing 11 red balls, 7 yellow balls, and 6 blue balls to guarantee that at least one ball of each color has been taken out?

_____ **5** Timmy Turner has 4 burners, but one of them is broken. If he chooses two of his burners, what is the probability that both of them are not broken?

_____ **6** Dr. Dresnoopdogg is listening to his iPodZune through his BeatsByBose headset. He has 6 songs that he can play, and he can play them in any order. In how many possible orders can Dr. Dresnoopdogg play each of his songs once?

_____ **7** A palindrome is a nonnegative integer that reads the same forwards and backwards. For example, 12321 and 0 are both palindromes. Find the number of palindromes between 1000 and 9999, inclusive.

_____ **8** Stan has five friends: Allen, Brian, Catherine, Daniel, and Evan. Each of the 6 people took a test and the teacher told each of them their own score privately. Now they want to share their scores with each other. In a conversation, Person A tells Person B all the scores they know, but not vice versa. What is the minimum number of conversations required for every person to know all six scores?