

MBMT Probability/Combinatorics Round — Fermat

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 worth the same number of points. Please write your answers in the simplest possible form.

- _____ 1. There are three stones in one pile and five stones in another. In how many ways can you pick one stone from each pile? (The order you pick the stones doesn't matter.)

- _____ 2. In how many different ways can the letters M, A, T, and H be arranged? For example, "AHTM" is one such arrangement.

- _____ 3. Mr. Rose has 10 different pairs of shoes. For mismatch day, he wants to wear a left shoe on his left foot and a right shoe on his right foot, but he wants the shoes to be from different pairs. In how many ways can he do this?

- _____ 4. The basketball team Vishnu's Gods (12 players) is playing against Sreenivasan's Rams (10 players). After the game, if each player shakes hands with every player on the opposing team, and then all players shake hands with the two referees, how many total handshakes are there?

- _____ 5. A fair coin is flipped and a card is drawn from a 52-card deck. Find the probability that a head comes up or that a six is drawn from the deck (or both). (Note: there are 4 sixes in a 52-card deck.)

- _____ 6. A science teacher grades each assignment with probability 50%. If he assigns 8 assignments, what is the probability that he grades more than half of them?

- _____ 7. You draw a card from a standard 52-card deck, but don't look at it. You then draw two more cards, and notice that neither of them are spades. What is the probability that the first card was a spade? (Note: there are 13 spades in a standard 52-card deck.)

- _____ 8. Connie chooses a random real number between 0 and 2. Ten other people each choose a random real number between 0 and 1. What is the probability that the number that Connie chooses is the greatest?