

# Math 5010

## Sample Midterm One

1. A fair die is cast 120 times. If all possible outcomes are equally likely, then what is the probability that there are no heads tossed?
2. There are 50 men and 50 women in a room. You select 4 at random and independently [i.e., sampling with replacement]. What is the probability that the number of men in the sample is the same as the number of the women in the sample?
3. Four digits are selected independently at random (without repetition) from  $\{0, \dots, 9\}$ . What is the probability the the four digits form a run? [For example, 0, 1, 2, 3.]
4. How many different messages can be sent by using five dashes and three dots?
5. I have two coins: One is two-headed; the other is fair. I select one coin at random (both coins equally likely), and toss it  $N$  times independently. Suppose I tell you that all tosses resulted in heads. Given this information, what would you say the odds are that I had selected the fair coin?