

Worksheet 1

1. A new group of 100 students arrive at Hogwarts and line up in the great hall. The sorting hat assigns each student to one of 4 different houses: Slytherin, Hufflepuff, Gryffindor and Ravenclaw.
 - (a) How many different ways can the sorting hat assign houses? Hint: number the students 1 through 100. Each is assigned to one of 4 different houses.
 - (b) What is the number of outcomes where the sixth student is the first Gryffindor?
 - (c) What is the number of outcomes where the ninth student is the fourth Gryffindor?
2. We toss three different dice: green, red and blue.
 - (a) What is the probability that the outcome of the green die is even?
 - (b) What is the probability that the sum of the outcomes of the green and red dice equals to the outcome on the blue die?
3. A tennis tournament has $2n$ participants, n Swedes and n Norwegians. First, n people are chosen at random from the $2n$ (with no regard to nationality) and then paired randomly with the other n people. Each pair proceeds to play one match. An outcome is a set of n (ordered) pairs, giving the winner and the loser in each of the n matches.
 - (a) Determine the number of outcomes.
 - (b) What do you need to assume to conclude that all outcomes are equally likely?
 - (c) Under this assumption, compute the probability that all Swedes are the winners.