(**P1**) An urn contains n blue balls and n red balls. Two balls are removed from the urn together at random.

(**a**) Write down the sample space Ω.

(**b**) Compute the probability of drawing 2 balls that are different colors.

(**c**) Let p_n be the probability the balls are the same color. Compute p_n and evaluate $\lim_{n \to \infty} p_n$.

(**P2**) Eight rooks are placed randomly on a chess board. What is the probability that none of the rooks can capture any of the other rooks? Translation for those who are not familiar with chess: pick 8 unit squares at random from an 8x8 grid. What is the probability that no two chosen squares share a row or a column?

(**P3**) Show that it is not possible to choose a uniform positive integer at random. (In other words, we cannot define a probability measure on the positive integers that can be considered uniform.)

Hint: What would be the probability of choosing a particular number?