Homework 10

Due Wednesday, July 22nd at the beginning of class

1. You are rolling a fair 30-sided die.
   (a) What is the expected number of rolls required to get a 27?
   (b) What is the expected number of rolls required to get a 27, followed later by a 28?
      For example,
      \[9, 28, 1, 27, 27, 3, 28\]
      would be an example of requiring 7 rolls and
      \[9, 3, 27, 28\]
      would be 4 rolls.
   (c) What is the expected number of rolls required to get a 27, and a 28 in either
       order? For example,
       \[9, 27, 3, 28\]
       would be an example of 4 rolls and
       \[1, 28, 14, 28, 5, 27\]
       would be an example of 6 rolls. [Hint: Think of the number of rolls to get 27 or
       28, and then the number of rolls to get the remaining value.]
   (d) What is the expected number of rolls to get all 30 possible values (in any order)?

2. Suppose that a book contains an average of \(\lambda\) misprints per page.
   (a) What is the probability that 10 pages will contain at most 1 misprint?
   (b) What is the probability that \(n\) pages will contain at most 3 misprints?
   (c) (*) If the book has \(n\) pages, what is the probability that there will be at least \(m\)
      pages that each contain more than \(k\) misprints?