# Math 318 – Probability – due 2023-01-13

**Problem 1.** Create a two page typeset PDF file with your name and student number near the top of page 1.

**Problem 2.** Consider arrangements of the letters `ABRACADABRA`?

(a) How many different arrangements are there?
(b) How many of these have the five `A`s at the start?
(c) How many of these have the five `A`s all together?
(d) How many of these have no two consecutive `A`s? (Hint: if the positions of the `A`s are $i < j < k < \ell < m$, then $i, j-1, k-2, \ell-3, m-4$ are distinct numebrs if and only if there are no consecutive `A`s.)

**Problem 3.** Write a python function that takes a string and returns the number of distinct arrangements of its letters. You may assume the string only includes lowercase letters. (`numpy.math.factorial(n)` can be used to calculate factorials.)