MATC44 - Fall 2025
Assignment 2 - Solutions

Due: October 2, 2025

Instructions: You may collaborate with your peers (and professor) on homework problems related to the course, however, you must write up your own solutions independently. Generative AI tools are not permitted for solving or drafting any part of an assignment. Full credit requires correct solutions with complete justification (e.g., a proof, logical argument or counter-example).

Q1 (3 marks)

Consider the 26 letters of the English alphabet (21 consonants and 5 vowels). In how many ways can these 26 letters be arranged if all five vowels must appear in five consecutive spots and the two vowels A and E must be adjacent (i.e., either as AE or EA)? Briefly justify your answer.

Solution. Glue A and E together into a single block; which we denote □□. There are 2! such blocks (AE and EA). Next glue I, O, U and the □□ block together into a mega block. There are 4! such mega blocks for each fixed arrangement of the □□ block. Finally, there are 22! ways to arrange the