MATC44 - Fall 2025
Assignment 3 - Solutions

Due: October 16, 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)

Determine the number of nonnegative integer solutions to

$$x_1 + x_2 + x_3 + x_4 \leq 19$$

in which $x_1 \geq 1$, $x_2 \geq 2$, $x_3 \geq 3$ and $x_4 \geq 4$. Briefly show how you obtained your answer.

Solution. Let $y_1 = x_1 - 1$, $y_2 = x_2 - 2$, $y_3 = x_3 - 3$ and $y_4 = x_4 - 4$. Then the answer to the original inequality is equal the number of nonnegative integer solutions to