MACM 203 Assignment 7
Spring 2025

This assignment is due Tuesday March 18th at 10pm. Upload your solutions to Crowdmark. Write your solutions as a single Matlab Live Script and export the script to PDF. Write the course number and assignment number as the title of the Matlab Live Script, followed by the table of contents, and then create a section for each part of the question.

Keep in mind that your assignment, including the source code, is a document that will be read in order to be marked. It has to be very clear and properly formatted.

Assignments must be written individually. You can discuss in groups, but you have to write your assignment yourself. In case of academic dishonesty SFU policies will be applied.

Preamble

This week's assignment focuses on the Symbolic Math Toolbox.

Question 1 (10 marks)

Part (a)

The notation $\int f(x)\,dx$ denotes an antiderivative of f. You do not need any knowledge of integrals, as this is not a prerequisite for MACM 203.

For a positive integer n let

$$I_n = \int x^n \sin x \, dx.$$

Use MATLAB to compute I_n for $1 \leq n \leq 10$.

Part (b)

Use the results of part (a) to guess a general formula for I_n. You will find it helpful to use expressions of the form $\dfrac{a!}{b!}$ where $k!$ denotes the factorial function. Write MATLAB function `G` such that `G(n)` returns your guessed formula for I_n. Comment on your solution method to demonstrate that you are presenting your own work.

Part (c)

Use MATLAB to verify the correctness of your guessed formula found in part (b) for $n = 1, 2, 3, \ldots$ in increasing order. Use `while` loop to terminate your calculation after 10 seconds. In a text block write down for which values of n the formula was verified, and for which n the formula gives a wrong result (if any).