

University of Toronto Mississauga
CSC 338 - Numerical Methods, Spring 2009

Assignment 1

Due date: Tuesday Feb 3, 4:10pm, at the start of tutorial.
No late assignments will be accepted.

Note: The material you hand in should be legible (either typed or *neatly* hand-written), well-organized and easy to mark, including the use of good English. All computer programs should be handed in and should be well commented. In general, short, simple answers are worth more than long, complicated ones. Unless stated otherwise, all answers should be justified.

1. The following exercises from Chapter 1 in the text are to be done by hand.
 - (a) Question **1.42** on page 41.
 - (b) Question **1.1** on page 42.
 - (c) Question **1.4** on page 42, but using the function $\cos(x)$ instead of $\sin(x)$.
 - (d) Question **1.6** on page 42.
 - (e) Question **1.11** on page 43.
 - (f) Question **1.14** on page 43.
2. The following computer problems are to be done using Matlab or Octave. For each question, hand in your program code and a transcript of a terminal session demonstrating that your programs work correctly. Be sure to indicate clearly which questions the programs and the transcripts refer to.
 - (a) Compute the value of the expression $(1 + 2^{-n}) - 1$ for $n = 10, 30, 100$ and 300 . For which n is the value of the expression error-free? Find the smallest value of n for which the value of the expression is error-free. What can you say about ϵ_{mach} on your computer? Based on Table 1.1 on page 18 in the text, which standard floating point system does your computer use?
 - (b) Consider the expression $(2^n + 5) - ((2^n + 3) + 2)$. Find all numbers n for which the value of this expression is non-zero, and explain why the expression takes on these particular values. Why isn't it non-zero for other values of n ?
 - (c) For $n = 10, 20, 30$ and 35 , add all the numbers from 1 to 2^n . Do this in two ways: in ascending order, and in descending order. When are the two sums the same? Find the largest value of n for which the two sums are the same. Can you explain this value of n ? (Hint: use the fact that $\sum_{i=1}^N i = N(N + 1)/2$.)

No more questions will be added

Cover sheet for Assignment 1

Complete this page and hand it in with your assignment.

Name: _____
(Underline your last name)

Student number: _____

I declare that the solutions to Assignment 1 that I have handed in are solely my own work, and they are in accordance with the University of Toronto Code of Behavior on Academic Matters.

Signature: _____