SCHOOL OF MATHEMATICS AND STATISTICS

MAST30013 Techniques in Operations Research Semester 1, 2018

Assignment 1 **Due: 10am, Wednesday, 21 March**

- Submission via the OneNote page.
- All assignments must have 'typeset quality'.
- Show all necessary working.
- Please complete Plagiarism Declaration on LMS before you submit Assignment 1.

1. Let $f(x) = 8e^{1-x} + 7\log(x)$, where $\log(\cdot)$ represents the natural logarithm function.
   (a) Use Matlab (or any software) to plot $f(x)$ versus x over the interval $[1, 2]$, and verify that f is unimodal over $[1, 2]$.
   (b) Use the Fibonnacci search to locate the minimizer x^* of f over $[1, 2]$ to within an uncertainty of 0.08.

2. Consider $f(x) = (40x+1)\log(40x+1) - 200x$. Determine the minimizer x^* of f over $[0, \infty)$ using Golden section search with tolerance 0.3.

3. Consider $f(x) = (2x-1)^3 + 4(4-10x)^4$. Determine an interval that includes the minimizer and then write a Matlab code to use Method of false position to determine the root of $g(x) = f'(x) = 0$ with tolerance $\epsilon = 10^{-5}$. The code should write out the root, the value of g and the number of iterates the method takes.