MACM 316 - Computing Assignment 1

- Read the *Guidelines for Assignments* first.
- Submit a one-page PDF report to Crowdmark and upload your Matlab scripts (as m-files) to Canvas. *Do not use any other file formats*.
- Keep in mind that Canvas discussions are open forums.
- You must acknowledge any collaborations/assistance from colleagues, TAs, instructors etc.

From the textbook, Burden and Faires (10th edition):

(a) Write a Matlab code to solve a general quadratic equation:

$$ax^2 + bx + c = 0, \quad a \neq 0$$

using four-digit rounding arithmetic and the most accurate approximation formula from Equations (1.1), (1.2) and (1.3). In your report, give a clear description of how you compute the solutions. You may assume that $b^2 - 4ac \geq 0$.

(b) Using four-digit rounding, use *your code* and the *standard quadratic formula* given by Equation (1.1) to solve the quadratics:

$$x^2 - \sqrt{7}x + \sqrt{2} = 0,$$
$$\pi x^2 + 13x + 1 = 0,$$
$$x^2 + x - e = 0,$$
$$x^2 - \sqrt{35}x - 2 = 0.$$

In Matlab, compute the absolute and relative errors for both methods.

(c) When is your algorithm better than the standard quadratic formula? Be as precise as possible, and support your claim with computed examples.

MACM 316 - Computing Assignment 1

Submit your 1 page report for this question to Crowdmark in .pdf format according the Assignment Guidelines described in the syllabus.

Submit your Matlab code to Canvas "Computing Assignment 1 - Matlab Code". Do not include identifying information on your report.

After marking, we will post a few exemplary reports as sample solutions. We appreciate your support on this. If you do not wish to have your report posted, please state so at the top of your report.