## **Assignment**

Your fifth lab project consists of the three questions from the back of this page. Each question is worth 10 points.

## **Collaboration**

You may work with others, but each student should submit a separately written project report. At the end of your report, you should list all of your collaborators. Simply copying another's work and calling it your own, or not giving credit to collaborators, is considered plagiarism and will be dealt with according to University regulations.

## What makes a good report?

Your final report for each project should have a clear and complete presentation of the project material. Each report will generally consist of paragraphs of text interspersed between various Maple commands, plots, and other output. All text should be written with complete sentences using proper grammar and correct spelling. A part of your grade will be based upon the clarity of your presentation. When proofreading your report, check to see if you are omitting important details or illustrative plots. Also check to see if you are including too many unnecessary details. Hand in work that you are proud to claim as your own.

In particular, do not simply turn in a Maple worksheet with a bunch of input and output. It is not the TA's job to figure out how your Maple output answers the various questions. It is your job to submit an easy-to-read project report. You may use pencil and paper, Microsoft Word with bits of output copied from Maple, Maple with text regions, or any other format which allows you to submit a clearly written report. Note also that you are not required to use Maple for all parts of your project. Some work is more easily done by hand.

## Submit project reports to your Lab TA (due Wed., April 28 by 5:00 PM)

<u>Sections 1 – 3 with Prof. Dix</u> Lab TA: Qi Wu Contact Info: <u>wuq@math.sc.edu</u>, LC 107B, 576-5948, mailbox for <u>Wu, Qi</u> by LC 411

<u>Sections 4 – 6 with Mr. Murphy</u> Lab TA: Elizabeth Perez Contact Info: <u>pereze@math.sc.edu</u>, LC107B, 576-5948, mailbox for <u>Perez</u> by LC 411

<u>Sections 7 – 9 with Prof. Bennett</u> Lab TA: Luke Owens Contact Info: <u>owensl@math.sc.edu</u>, LC B004, 777-4674, mailbox for <u>Owens, L</u> by LC 411

- 1. (10 points) Modify Example 1 in the Maple worksheet TaylorPoly.mws to provide a good estimate for  $|R_6(-0.5)|$ , the remainder (or error) term associated with using a 6th order Taylor polynomial centered at a = -1 to approximate  $f(x) = \ln (2 + x)$ . Include a plot of the function and the appropriate Taylor approximation on the interval [-2, 2].
- 2. (10 points) Find the terms through  $x^8$  in the Maclaurin series for  $f(x) = e^{\sin(x^2)}$ .
- 3. (10 points) Given a circle with radius r and an arc on that circle with central angle  $\theta$ , a sector is drawn and a portion of that sector is shaded in as shown below.



- (a) Obtain a formula for the shaded portion of the sector. If it helps, there are useful formulas from geometry listed at the very beginning of your calculus textbook.
- (b) Use a Maclaurin polynomial to obtain the following approximation for the shaded area.

$$A \approx \frac{r^2 \theta^3}{12}$$