

For our first project, your assignment is to do parts 1 to 5 of the Laboratory project on families of hypocycloids on p. 55 of Stewart. You will begin in recitation. You will probably need additional time outside of recitation to complete this project. The project is due on Friday, 9/18 at 10am.

You are to work in groups of 2 to 4. If you wish to work with someone in a different section, please see Brown to make arrangements. Each group should hand in a 2-7 page report describing what you have done and answering each of the questions in Stewart's text. Your answers to 2, 3 and 4 should be illustrated by sketches which you have copied from your calculator screen. Please label these sketches and give the values of the parameters  $a$  and  $b$  so that I can check your work, if necessary. In 1 and 5 you will want to include a sketch to illustrate the quantities which arise in your derivation. All answers should be written out in complete sentences. Use the explanations from the text as models for your answers.

**Plotting hypocycloid curves efficiently.** You will find the entering the Bezier curve into your calculator is very time consuming. Since the project involves a bit of experimentation, you will want to be able to do this as efficiently as possible. One way to do this is to enter the functions on p. 55 into your calculator with letters for the parameters  $a$  and  $b$ . (On the TI-82, letters are obtained by touching the grey ALPHA key and then touching the key with the desired letter in grey at the upper right hand corner of the key. Then you may store numerical values to the letters  $A$  and  $B$  and plot the graph. This is done entering the number, touching the STO key, entering the letter and then touching the ENTER key. For example, if you touch 5, STO, ALPHA, A, ENTER then

$$5 \rightarrow A$$

appears on your screen. Now, if you touch ALPHA, A, ENTER the calculator evaluates A to the numerical value 5. Now you may change the values of A and B in the formulas for the hypocycloid without having to reenter the entire expression.

**Policy on group work.** Each member of the group must make a substantial contribution to the project. To make sure that each of you abide by this policy, write on the cover page: "Each member of the group made substantial contribution to the completion of this project". Then each group member must sign. By signing, you are indicating that you agree with this statement.