You have two choices for you individual project. I'll describe one on this side of the page, and the other on the back. Also on the other side of this page is a **schedule of due dates**.

Option 1: Parametric Equations – art or math?

This goal of this project is very simple: You are to use parametric plots, polar plots, and any other fun functions you want to create a drawing in Maple. This is an excellent way to really get to know Maple and be comfortable with it!

As a very basic example, try the following in a Maple worksheet:

```
[> with(plots):
[> p1 := polarplot(5+sin(3*theta),theta = 0 .. 2*Pi,color = magenta,scaling = constrained):
[> p2 := plot([2*cos(t), -1+2*sin(t), t = 5*Pi/4 .. 7*Pi/4],color = red):
[> p3 := plot([-2+.8*cos(t), 2+.6*sin(t), t = 0 .. 2*Pi],color = blue):
[> p4 := plot([2+.8*cos(t), 2+.6*sin(t), t = 8*Pi/7 .. 13*Pi/7],color = blue):
[> display(p1,p2,p3,p4);
```

A couple of comments:

- The colon at the end of the commands can be very important. It prevents Maple from printing out the plot structure each time. If you forget it, sometime you just get a single line of seeming nonsense, but other times you can get pages of junk!
- You should make sure that at least one of your plots contains the option *scaling=constrained*. This will keep Maple from scaling your plots differently in the x and y directions.
- You should use *at least* 30 different functions in your final image.
- *The more creative you are with this, the better your grade will be.* For example, you would not earn a high grade for using just lines, circles and ellipses or only one color. Include a variety of types of functions! Try to use not only as many different types of functions, but as many ways of defining them as possible (that is, not only lines, trig functions, exponential functions, but also define some parametrically, some with polar coordinates, etc). You might want to stretch or compress a function, or try to smooth out a connection between functions. What I'd really like to see is that you come up with an idea first, and then figure out how to do it using functions.
- For those of you who have had linear algebra, you know how to stretch, skew, and rotate via matrix multiplication. This gives you an easy way to manipulate any parametric plot.

  If you haven't had linear, ask me (or someone who has had linear) and we can explain it to you pretty quickly.
- We may have show-and-tell at the end of the semester where everyone can see each other's projects.
- You should turn in a printout of your final picture, and email me a copy of your Maple worksheet.
- Finally, **Have a lot of fun with this!!!!**

Option 2: Book Review

The motivation for this option is that there are a lot of cool interesting aspects of math that we can't get to in class ... but you can read about them! This is your opportunity to read about a mathematician or an area of math that you might not be exposed to otherwise.

A few possibilities include *Fermat's Enigma*, *Journey Through Genius*, *Euclid in the Rainforest*, *A Mathematician's Apology*, *Flatterland*, *The Elegant Universe*, *Warped Passages*, *The Code Book*, *e: The Story of a Number*, *An Imaginary Tale: The Story of "i"*, *To Infinity and Beyond*, *Zero: The Biography of a Dangerous Idea*, *The Liar Paradox and the Towers of Hanoi: The Ten Greatest Math Puzzles of All Time*, *The Man Who Knew Infinity*, *The Equation that Couldn't be Solved: How Mathematica Genius Discovered the Language of Symmetry*, *The Man Who Loved Only Numbers*, *The Road To Reality: A Complete Guide to the Laws of the Universe*, any book by Keith Devlin, . I'd just browse through the QA section of the library ... or go to Amazon, select one of these, and then click on the other books that they then suggest to you. Be sure to *pick something that interests you!*

Do not choose a book you've already read – although if you've only started the book but never gotten more than halfway through, that would be okay.

Your report should **not** be a summary of the book. Instead, you should give a critique of the book. Here are a few suggestions:

- You will want to give a brief one or two page overview of the book that gives the big picture.
- Address what aspects of the book were done well, which were not, and give specific suggestions that would, in your view, improve the book.
- Address the mathematical content of the book: was it explained well? was it interesting? Did the exposition make you want to learn more about the area?
- Who do you think the appropriate audience for the book is? Could anyone read the book? Does it assume some mathematical background? Do you have to be an expert to enjoy the book?
- There are no hard-and-fast rules, but I imagine the length will be at least four or five typed pages long.

Here are some important dates to keep in mind:

- **Friday, March 7:** Let me know which option you're choosing. (Doing this on time will count for 2% of your final grade.)
- **Friday, March 21:** Either give me a rough sketch of your plan, along with at least 2 functions, *or* give the title of the book you've chosen, and have read at least 1 chapter. Let me know how far you are, and include a very brief reaction to what you've read. (An additional 3% of your final grade).
- **Wednesday, April 2**: If doing option 1, turn in a hand-drawn sketch of your final project and also a print out of your Maple worksheet containing a *rough* idea of your image (with at least ten functions). If doing option 2, you should have read an absolute minimum of 75 pages. Turn in a progress report – I'd like to know about how far you in the book and how reading the book is going (please don't exaggerate. If you *haven't* read those 75 pages, and it's because the book is very dense mathematically, let me know that!) (5% of your project grade.)
- **Friday, April 27:** Final version due. (The final picture or final draft of your book critique is worth the remaining 90% of your score.)