

Extra Credit Project 2
Due Monday, April 7, 2003

Mathematica Option:

Before going to the computer, please do the following:

1) Choose one of the following problems from section 4.5 of the book: 22, 26, 30, 32, 36. Use all the steps given in class to sketch the graph of the function.

2) Consider the function $f(x) = x^7 - 5x^5 - x^3 + 5x + 1$. What is $f'(x)$? $f''(x)$? Can you compute the critical points and inflection points by hand? If not, why not? Find the equation of the tangent line at $x = 0$.

Now, going to Mathematica, do the following:

1) Graph the function from your problem in the book. Was your sketch a good approximation?

2) Graph the given $f(x)$ (from (2) above) and the tangent line to the graph at $x = 0$. (You may want to refer back to the first Mathematica assignment to remind yourself how to do this. You also may need to make several attempts to get a good viewing window.)

On a new set of axes, graph $f(x)$, $f'(x)$, and $f''(x)$. Can you find the critical numbers and inflection points using these graphs? Estimate their values. Find the critical numbers and inflection points algebraically (using the formulas for the above functions, rather than the graph). Again, you may want to refer back to the first assignment to see how to do this.

Please turn in all work done prior to the Mathematica session, a print-out of the Mathematica work, and a write-up (one or two paragraphs) of the project. In particular, what did you learn? How was using Mathematica helpful for these situations?

Graphing Calculator Option:

Please do one problem from each of the following sets in section 4.6 of your textbook:

1-8

9-12

13-14

20-25

19, 26, 27, 28

Draw a sketch of each graph you see on your calculator and answer all questions stated in the problem. In addition, please write a brief description (one or two paragraphs) of what you learned from using your calculator for these problems.

As before, don't hesitate to ask me if you have questions or need to borrow a graphing calculator.