MATH 163, Spring 2001 **Due Date:**_____ **Name(s):** _____

Extra Project 4.5c: Graphing Functions Again

Objective

To get more exercise graphing a function f using its first and second derivatives.

Narrative

If you have not already done so, do Project 4.5b.

In this project we simply provide another example that involves graphing a function f using its first and second derivatives.

Task

Type the command lines below into Maple in the order in which they are listed. They produce a graph of the function $f(x) = (1 - x^2)/(1 + x^2)$, and three recording strips below the graph of f.

```
> # Extra Project 4.5c:  Graphing Functions Again
> restart:  with(plots):
> f := x -> (1-x^2)/(1+x^2);
> f1 := D(f);
> simplify(f1(x));
> f2 := D(f1);
> simplify(f2(x));
> plot0 := plot({-6,-5,-4,-3,0},x=-6..6,y=-6..3):
> plot1 := textplot({[-6,-3.5,'f'],[-6,-4.5,'f1'],[-6,-5.5,'f2']}):
> display({plot0,plot1});
```

At this time, make a hard-copy of your input and Maple's responses. Then, ...

a) fill in the recording strips on the graphic you produced using information about f' and f'', and

b) use the information in the recording strips to sketch the graph of f.