Math 1210-3
Wednesday Jan. 7 : Finish P.2, start P.3.

- Remember Ms. Kitchen's problem session tomorrow, 9:40-10:30 here (JWB 335). This is an optional, but recommended, session.
- The Friday quiz will cover P.1 - P.2. Make sure you can work problems like the ones listed in our syllabus, and that you understand the concepts.

We'll pick up the discussion from Tuesday on page 3 of those notes... thru exercise 6 on page 4. Then, from how we used Definition A to work exercise 6, you should find the following facts believable. We'll return to these facts, and other differentiation rules, in § 2.3 Varberg.

Theorem B : If f and g are functions and c is a constant, then

(1) $(cf)' = cf'$

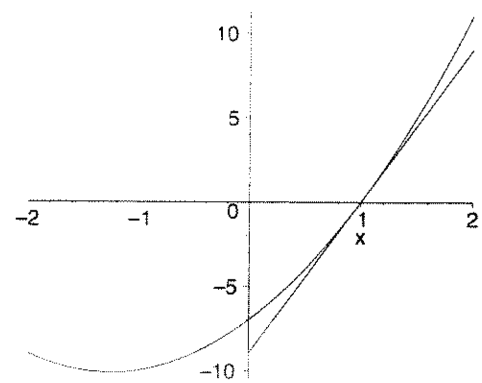
(2) $(f+g)' = f' + g'$ (so $(f+g+h)' = (f+g)' + h' = f' + g' + h'$ etc)

Exercise 1 : Using $1' = 0$, $x' = 1$, $(x^2)' = 2x$ and theorem B, rework Exercise 6 Tues notes without limits, i.e. find $f'(x)$ for $f(x) = 2x^2 + 5x - 7$

Exercise 2 Find the equation of the line passing through the point $(1,0)$ on the graph $y = f(x) = 2x^2 + 5x - 7$ from exercise 1, and with the same slope as the graph of f has there. (This is called the tangent line to the graph of f, at $(1,0)$.)

software program MAPLE

```
> with(plots):
Warning, the name changecoords has been redefined
> plot1:=plot(2*x^2+5*x-7,x=-2..2,color=black):
  plot2:=plot(9*x-9,x=0..2,color=black):
  display({plot1,plot2});
```



Using Theorem B we will be able to find the derivative (we also say "differentiate") any polynomial as soon as we figure out how to differentiate x^k for each whole number k.

So far we know

$1' = 0$

$x' = 1$

$(x^2)' = 2x$

need to fill in

$(x^3)' =$

$(x^k)' =$

Exercise 3 : Use the back of the paper and Definition A to compute $(x^3)'$.

Look for patterns