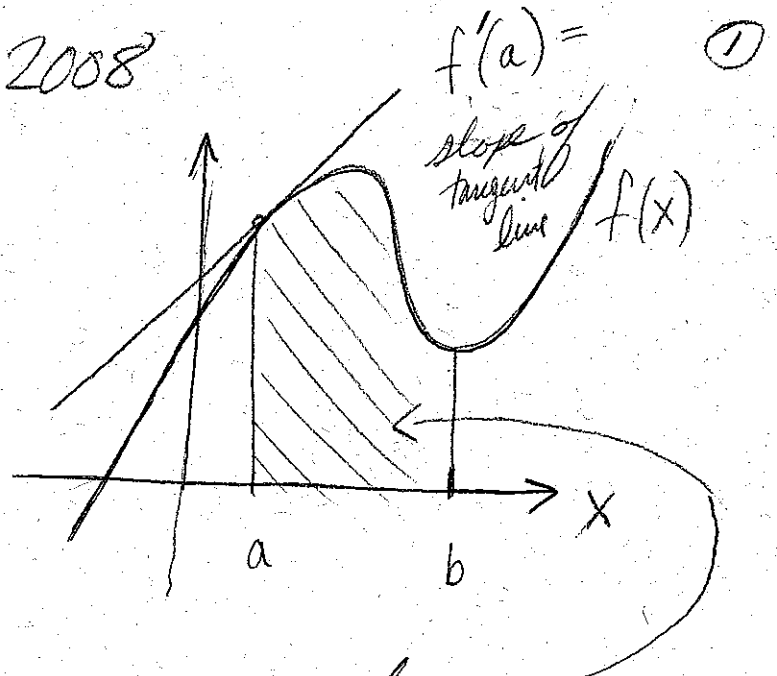


Math 241 H: Urbana Spring 2008

Honors Calculus III

Review in a picture of
single variable
calculus



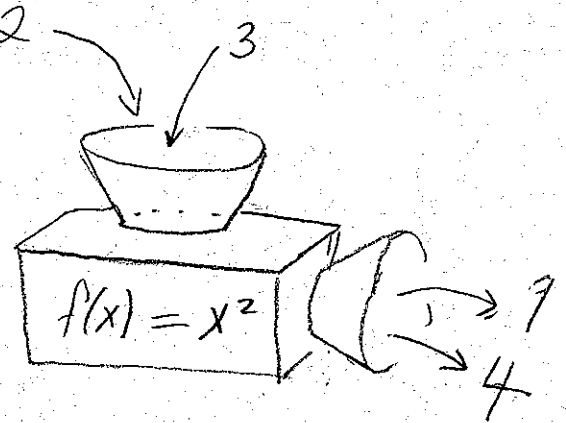
Fundamental
Theorem
of
Calculus

$$\int_a^b f(x) dx = F(b) - F(a)$$

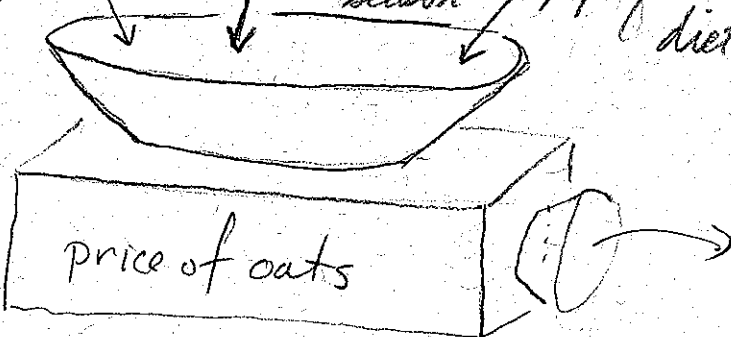
where $F' = f$

Another way to think of $f(x)$

Problem: real life is rarely so
simple...



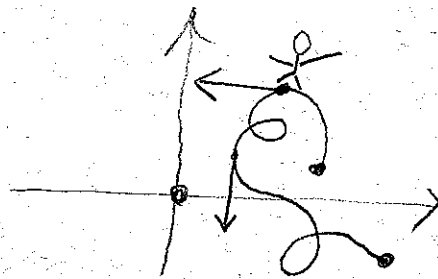
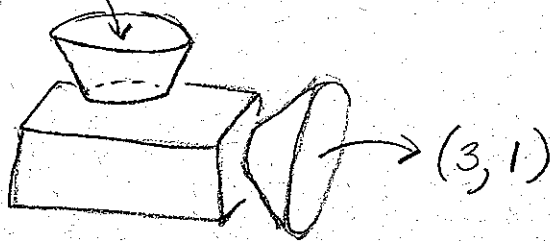
rain fall first day of growing season pop of Atkins diet



Want to be
able to understand
such functions.

Law have many outputs, too

3:30 pm



need to numbers to describe his position

Outline of course:


Vectors and geometry of n -dimensional spaces

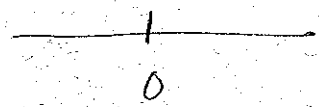
- Plane, 3-space, directions, planes, [dot and cross products...]
- Linear transformations, matrices.

Functions of several variables: Differentiation

What are other ways of thinking about f' ?

- 1) rate of change
- 2) Taylor series


$$f(x) = f(0) + f'(0)x + \frac{f''(0)}{2}x^2 + \dots$$

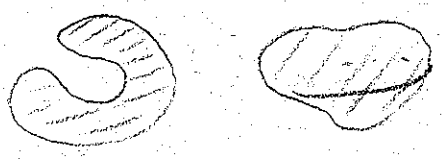


[What are "simple" functions of one variable? Linear transformations]

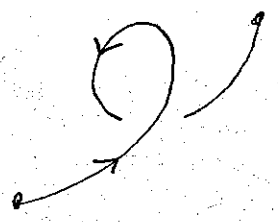
Optimization: [Finding min/max.]

- With constraints
- Linear programming

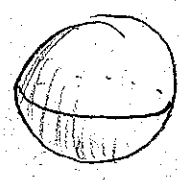
Integration: Areas, Volumes, Averages over multidimensional objects



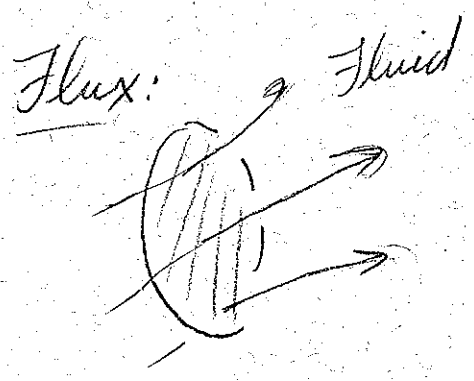
Curves and Surfaces in 3-space:



Length



Surface area



[Amount of current induced in a wire by a magnetic field...]

Finally, we will study interrelationships between these
which generalize the fundamental theorem
of calculus (Stokes theorem.)

[Warning: This course gets harder
as time goes on....]



Area in
terms of
something
computed
along the
boundary.

