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DAN'S ONE-DAY CALCULUS LECTURE

Prerequisites
Slope, area, functions, inverses.

Derivatives
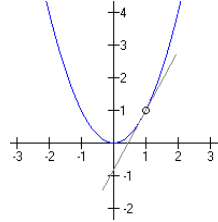The <u>slope</u> at any point of a function. Symbol: f'(x)
Ex.: Let $f(x) = x^2$. Graph this.
(Like a a roller coaster-track; use eraser as car.)
Q: At each x-value, what is the slope?

x	–2	–1	0	1	2
slope	–4	–2	0	2	4

So: f'(x) = 2x

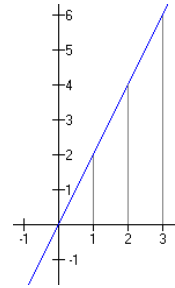**Integrals**
The <u>area</u> up to a given point of a function. Symbol: ∫f(x)
Ex.: Let f(x) = 2x. Graph this.
(Growing business income, or drag racer velocity/distance.)
Q: At each x-value, what is the area? (A=½lw)

x	0	1	2	3
area	0	1	4	9

So: ∫f(x) = x^2.

Fundamental Theorem of Calculus
Derivatives (slopes) and integrals (areas) are <u>inverses</u>.

More Detail
(1) Precisely calculate slopes instead of guessing them (using "limit" concept)
(2) Quickly calculate slope & integral functions instead of graphing points.