

MCS 121

Topics

1. The derivative

(a) Conceptually

- as speed: as a rate of change
- as the slope of the tangent line
- as a limit, i.e., the "formal definition"

(b) Calculating derivatives

- from a table of values
- from a graph
- from the formal definition
- from the rules in Chapter 3 (product rule, quotient rule, chain rule, etc)
- implicitly

(c) Using derivatives

- to get information about graphs
- to find global max and min
- to find marginal cost, marginal revenue, etc.
- to solve modeling problems
- to get tangent line approximations and for local linearization
- to implement L'Hopital's Rule

2. The integral

(a) Conceptually

- as a way of getting position from velocity
- as a sum/difference of areas
- as a limit of Riemann sums (lower, upper, left, or right ...)

(b) Fundamental Theorem of Calculus

(c) Calculating definite integrals

- calculating left and right sums from a table
- using the R-Sums program: understanding what it does
- using areas (rectangles, triangles, parts of circles, etc.)
- using antiderivatives (The Fundamental Theorem, mentioned above . . .)

(d) Finding antiderivatives

- graphically
- analytically (derivative rules backwards)
- using the Second Fundamental Theorem