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Math 31A Lecture Notes: Summation

on an interval

, “area under the graph of ”

Sum formulas

Example 1: Compute the area under the graph of on

Solution:

Using :

Example 2: Prove that the area under the graph of on is

Solution:

= area of graph of on

Partition: on an interval . Partition of size is a choice of point subdividing into subintervals.

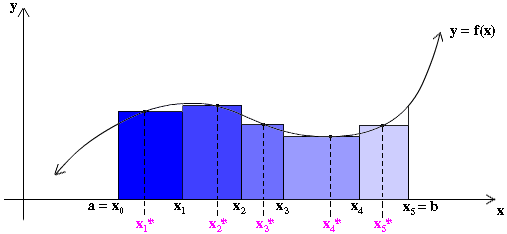
Sample points: where

\* is between two points

Define: length of the interval

“nom of P” = maximum of

Riemann Sum: R takes in three arguments; f, P, and C. f stands for the function. P stands for the partition, which is the space between each x coordinate. C stands for the points between each x coordinates to be evaluated for each partition.



\* In this graph, is equivalent to

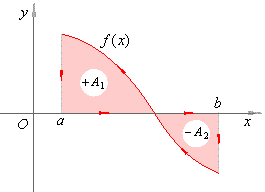
Definition:

is integrable on if all Riemann sums approach the same limit. as . The definite integral of over is defined by:

Theorem: If is continuous on or continuous up to finitely many jump discontinuities, then is integrable on .

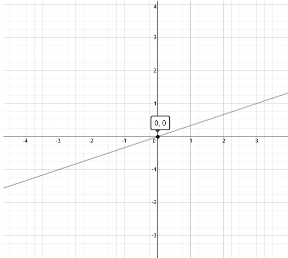
Definite Integral: “signed area of ”

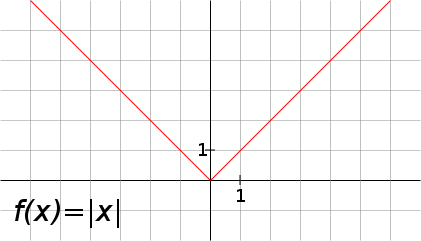
: (area around above the x-axis) – (area under the x-axis)



Example 3: Calculate and

Solution:





Properties of Definite Integrals

Theorem; Constant Rule: