

MATH 34B VOLUME, AVERAGE VALUE

I. Fundamental Theorem of Calculus

II. Volume of rotation

Example. Let R be the region bounded by $y = e^x$ and $x = 0$ and $x = 4$. Find the volume generated by rotating R about the x -axis.

III. Average value/Average rate of change

Example. The velocity of a car is given by the function $v(t) = 4t^2 - t + 10$. Find the average value (i.e. average velocity) of $v(t)$ over the time interval $[0, 2]$.

II. Integration by parts

Formula:

When to use integration by parts?

Example. Find $\int_0^1 x \sin(2x) dx$.

III. Partial fractions

When to use partial fractions?

Idea:

Example. Find $\int \frac{x}{x^2-4x-5} dx$