

Weekly Assignment 1

1. Average value

The average of a discrete number of values x_1, x_2, \dots, x_n is $\frac{1}{n} \sum_{k=1}^n x_k$. The average of a continuous range of values, $f(x)$, $a \leq x \leq b$, is $\frac{1}{b-a} \int_a^b f(x) dx$. Use this second fact to work the following.

Find the average value of

- $f(x) = e^{x/2}$, $0 \leq x \leq 2$
 - Graph the above function and use it to estimate the x -value for which $f(x) =$ its average value.
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2. Volume

Find the volume of the solid of revolution obtained by rotating the region bounded by $y = \frac{e^x + e^{-x}}{2}$ and the x -axis for $-1 \leq x \leq 1$, rotated about the x -axis.

- Sketch the planar region before rotating.
- Set up the integral(s) you use for this volume.
- Evaluate the integral(s) and find the volume.