

1. (5 points) Evaluate $I = \int_{-1}^1 e^x e^{e^x} + \frac{x^2 \sin(x)}{\cosh(x)} dx$. Show work.

2. (4 points) Find the area bounded by $y = \frac{1}{x^2}$, $y = x$ and $y = \frac{1}{8}x$. Simplify your answer.

3. (4 points) Find the average value for $f(x) = 2 \cos(x) - \cos(2x)$ on the interval $[0, \pi]$.

4. (6 points) Let R be the region bounded by $y = \frac{9 \ln(x)}{x^2}$, $y = 0$, and $x = e$. Sketch the region R and then find the volume of the solid formed by rotating R about $x = 0$.
5. (6 points) Find the volume of the solid with base in the xy -plane bounded by $y = -x^2$ and $y = -1$ with semicircular vertical cross sections perpendicular to the y -axis and xy -plane with diameter in the base.