

All problems are equally weighted. Calculators are not allowed.

You must show all of your work.

You may refer to your textbook, your notes, and your homework assignments.

- (1) Compute the average value of the function $(5 \cos 3x)^2$ on the interval $[0, 2\pi]$.
- (2) Compute the arclength of the curve $y = \ln(\sec x)$ from $x = 0$ to $x = c$. You should be able to do this symbolically, using the tables from the back of the book and a trigonometric identity.
- (3) Compute the volume of the surface of revolution obtained by rotating around the y -axis the region bounded by the curves $y = e^{-x^2}$, $y = 0$, $x = 0$, $x = 1$.
- (4) Compute the area bounded by the curves $y = \sqrt{x+1}$, $y = \sqrt{1-x}$, and $y = 0$.
- (5) Compute the definite integral

$$\int_{-1}^1 \frac{1}{\sqrt{|x|}} dx.$$

- (6) Compute the limit

$$\lim_{x \rightarrow \infty} (x - \ln x).$$

- (7) Compute the definite integral

$$\int_0^4 \frac{e^{\sqrt{x}}}{\sqrt{x}} dx.$$

- (8) Compute the indefinite integral

$$\int \arctan 4t dt.$$