

MATH 142: Practice Midterm 2

Show all appropriate work. Variables may represent any real number.

1. Determine if $\int_1^{\infty} xe^{-x} dx$ is convergent or divergent. If convergent, find its value.
2. Evaluate $\int_0^{10} (x-1)^{-1/5} dx$.
3. Find the volume of the solid generated by revolving the curve $y = \sqrt{4-x^2}$, $-2 \leq x \leq 2$, about the x -axis.
4. Set up, but do not solve, an integral for the volume of the solid obtained by rotating the region bound by the graphs of $y = x^2$ and $y = x + 6$ about the x -axis.
5. Evaluate the following limits:
 - (a) $\lim_{x \rightarrow 0} \tan(x) \ln(x)$.
 - (b) $\lim_{x \rightarrow \infty} \frac{1}{\sqrt{x} \ln x}$.
 - (c) $\lim_{x \rightarrow 0^+} (\tan(2x))^x$.