Calculus 1 Quiz 5

NAME

Show details in the space next to each problem.
You must show your work to receive full credit.

1. \[
\int_{-1}^{1} x(\sin x)^2 \cos x \, dx
\]
   This function is odd, and the integral is between -1 and 1, so the answer is 0.

2. \[
\int \frac{\ln x}{x} \, dx
\]
   Let \( u = \ln x \) so \( du = \frac{1}{x} \, dx \). Hence
   \[
   \int \frac{\ln x}{x} \, dx = \int \sqrt{u} \, du = \frac{2}{3} u^{\frac{3}{2}} + C = \frac{2}{3} (\ln x)^{\frac{3}{2}} + C
   \]

3. \[
\int \frac{e^x}{1 + e^{2x}} \, dx
\]
   Let \( u = e^x \) so \( du = e^x \, dx \) hence
   \[
   \int \frac{e^x}{1 + e^{2x}} \, dx = \int \frac{1}{1 + u^2} \, du = \arctan(u) + C = \arctan(e^x) + C
   \]