

MAT 137 (Calculus II) Prof. Swift

In-class worksheet: Arc Length

1. Set up the integral for the length of the curve $y = \cos(x)$ with $0 \leq x \leq \pi$.

Recall that $\frac{d}{dx} \sinh(x) = \cosh(x)$, $\frac{d}{dx} \cosh(x) = \sinh(x)$, and $\cosh^2(x) - \sinh^2(x) = 1$.

2. Set up the integral for the length of the curve $y = \cosh(x)$ with $0 \leq x \leq 1$.

3. Set up the integral for the length of the curve $y = 2 \cosh(x)$ with $0 \leq x \leq 1$.

4. Frequently the integrals that compute arc length are not elementary. Only the integral in problem 2 is elementary. Evaluate it. Hint: Simplify the integrand.