Arc Length

If \( f'(x) \) is continuous on \([a, b]\), then the length \( L \) of the curve \( y = f(x), a \leq x \leq b \), is

\[
L = \int_a^b \sqrt{1 + \left(\frac{dy}{dx}\right)^2} \, dx
\]

Example 1

Find the length of the curve \( y = \sqrt{4 - x^2}, \ 0 \leq x \leq 2 \).
Example 2

Find the length of the curve $y = \ln(\sec x), 0 \leq x \leq \frac{\pi}{4}$. 