

Math 2215 - Calculus 1

Quiz #11 - 2011.04.12

Solutions

Evaluate the following definite integral:

$$\int_0^1 \frac{x}{\sqrt{x^2+1}} dx$$

We will use substitution, with $u = x^2 + 1$, and thus $du = 2x dx$ or $x dx = \frac{1}{2} du$. When $x = 0$, $u = 1$ and when $x = 1$, $u = 2$. Substituting all of this into the original integral gives

$$\begin{aligned} \int_0^1 \frac{x}{\sqrt{x^2+1}} dx &= \int_1^2 \frac{1}{2} \frac{1}{\sqrt{u}} du \\ &= \sqrt{u} \Big|_1^2 \\ &= \sqrt{2} - 1 \end{aligned}$$