Math Diversion 1055

P. Reany

March 18, 2026

Rest is medicine.
—Medical Adage

```
Source:  https://www.youtube.com/watch?v=ooanJuau0Ko
Title:How to Integrate - Easy Substitution Method
 Presenter: PreMath
```

1 Problem

Find the value of the integral

$$\int x\sqrt{x^2+1}\,dx\,. \tag{1}$$

2 Solution

$$\begin{aligned}\int x\sqrt{x^2+1}\,dx &= \frac{1}{2}\int \sqrt{x^2+1}\,d(x^2+1)\\ &= \frac{1}{2}\int (x^2+1)^{1/2}\,d(x^2+1)\\ &= \frac{1}{3}(x^2+1)^{3/2}+C\,.\end{aligned}$$