In Class Exercise: section 5.3 Math 2335 Ritter

The length L of the parametric curve $(x, y) = (f(t), g(t))$, where $a \leq t \leq b$ and f and g are differentiable, is the value of the integral

$$L = \int_a^b \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2}\, dt.$$

Depending on the functions f and g, an integral of this form may be very difficult to evaluate exactly.

Let $(x, y) = (t, \cos^{-1} t)$ for $-1 \leq t \leq 1$.

(a) Set up an integral for the length of this curve.

(b) Then use the Gaussian integral approximation I_2 to approximate its value.

(c) What happens if you try to implement S_4?