1. Find the exact value of the length of the curve along \( \ell(x) = \frac{1}{2}x^2 - \frac{1}{4}\ln(x) \), from \( x = 1 \) to \( x = e \).

2*. Find the length of the portion of the curve \( g(t) = \ln(\sec(t)) \) from \( t = 0 \) to \( t = \frac{\pi}{4} \). There is a way to find the exact value of this curve. Hint: recall that \( \tan^2(\theta) + 1 = \sec^2(\theta) \).