

1. Differentiate $y = \cot^{-1}(\sqrt{x}) + 3^{\csc^{-1} x}$

2. Evaluate $\int_0^{\pi/4} \frac{\sec^2 x}{\sqrt{1 - (\tan x)^2}} dx$

3. Sketch the region bounded by $y = \sin(x)$, $y = 2 + \cos(x)$, $x = 0$, $x = \pi$. Then find the area of the region.

