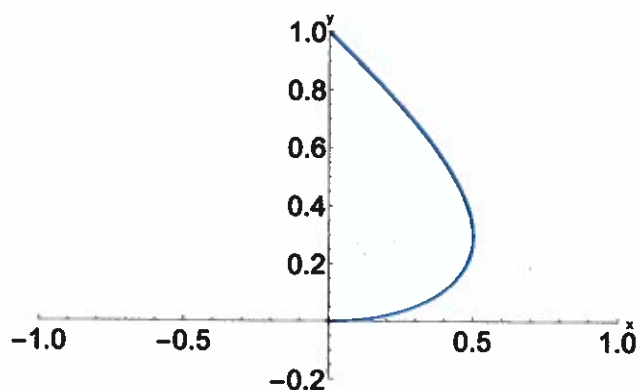


You cannot use a calculator for this quiz

Problem 1. Consider the parametric curve $x = \sin(t) \cos(t)$, $y(t) = 1 - \cos(t)$, $0 \leq t \leq \frac{\pi}{2}$ graphed below. Find the area enclosed by this curve and the y -axis.



$$\text{Area} = \int_0^1 x(y) dy = \int_0^{\pi/2} x(t) \cdot \frac{dy}{dt} dt = \int_0^{\pi/2} \sin^2(t) \cos(t) dt$$

Let $u = \sin(t)$ then $du = \cos(t) dt$ and if $t=0$, $u=0$ and if $t=\pi/2$, $u=1$.
Therefore,

$$\text{Area} = \int_0^1 u^2 du = \frac{1}{3}.$$