

Name : \_\_\_\_\_

1. Find the length of the curve  $\Gamma : \begin{cases} x = t \sin t \\ y = t \cos t \end{cases}$  where  $0 \leq t \leq \pi$ .

2. Find the area of the surface obtained by rotating the curve  $\Gamma : \begin{cases} x = a \cos^3 \theta \\ y = a \sin^3 \theta \end{cases}$  where  $0 \leq \theta \leq \frac{\pi}{2}$ , about the  $x$ -axis.