

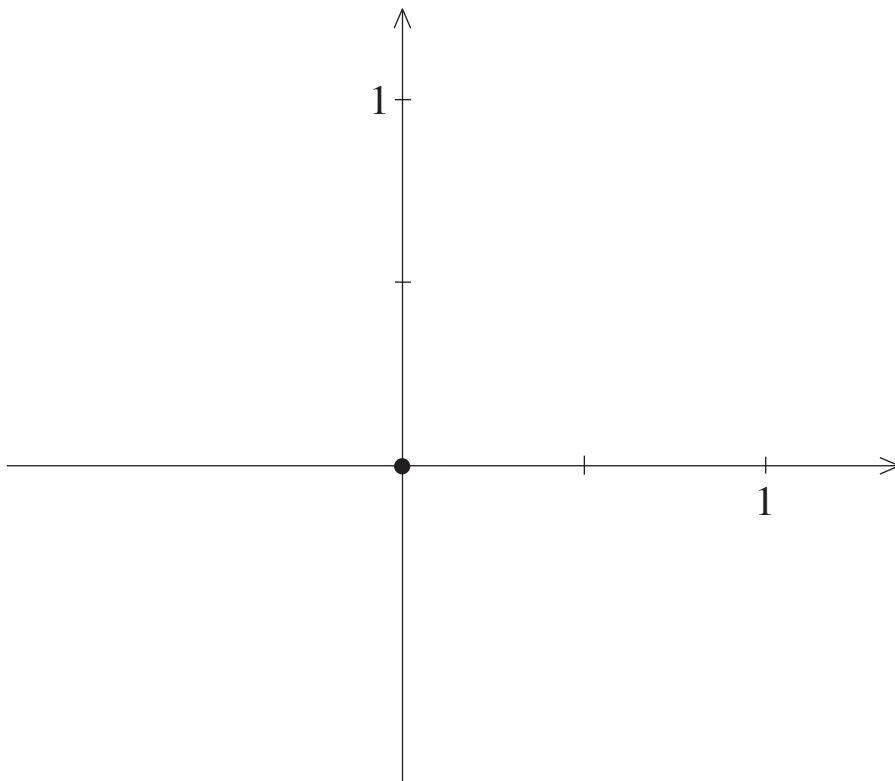
**Quiz****Name**

The three problems below deal with the polar function  $r = f(\theta) = \sin \theta + \cos \theta$  with  $\theta$  restricted to the interval  $0 \leq \theta \leq \frac{\pi}{2}$ .

1. Find the length of the graph of  $r = f(\theta)$ .

2. Find the area of the region bounded by the graph of  $r = f(\theta)$  and the lines  $\theta = 0$  and  $\theta = \frac{\pi}{2}$ . (At some point consider integration by substitution.)

3. Convert  $r = \sin \theta + \cos \theta$  into Cartesian coordinates and use the converted equation to sketch the graph of  $r = f(\theta)$  with precision into the coordinate plane below. Then make use of the graph to explain and confirm the results obtained in parts 1 and 2.



Formulas:  $L = \int_a^b \sqrt{f(\theta)^2 + f'(\theta)^2} d\theta$     and     $A = \int_a^b \frac{1}{2}f(\theta)^2 d\theta$