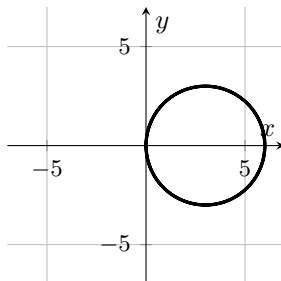
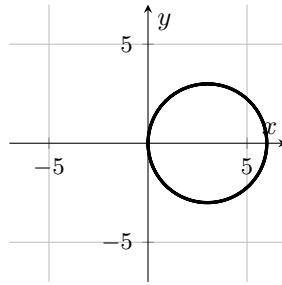


Question 5**Problem**

A circle of the same radius is $r = 2R \cos \theta$. Which interval traces it once, and what length results?



Question 5 – Solution**Solution**

1. Differentiate the polar radius to obtain $r' = dr/d\theta$ and choose an interval that traces the requested arc exactly once.
2. Use the polar arc-length formula

$$L = \int_a^b \sqrt{r^2 + \left(\frac{dr}{d\theta}\right)^2} d\theta.$$

Simplify the expression under the square root before evaluating or reporting the integral.

3. $-\pi/2 \leq \theta \leq \pi/2$ traces it once.
4. The speed simplifies to $2R$, so $L = 2R\pi = \boxed{2\pi R}$.