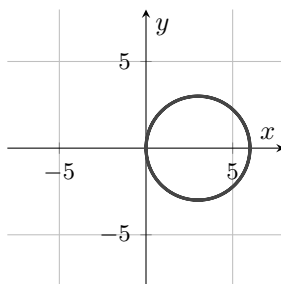
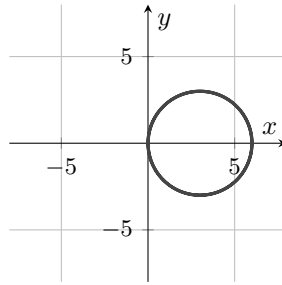


Question 10**Problem**

Choose $a > 0$ so that the circle $r = a \cos \theta$ has area 9π .



Question 10 – Solution**Solution**

1. Determine an interval of angles that sweeps out the requested region exactly once, using symmetry when it simplifies the work.
2. For a polar boundary $r = f(\theta)$, use

$$A = \frac{1}{2} \int_a^b r^2 d\theta.$$

For a region between two curves, subtract the inner squared radius from the outer squared radius before integrating.

3. It is a circle of radius $a/2$, so area is $\pi a^2/4$.
4. Setting this to 9π gives $\boxed{a = 6}$.