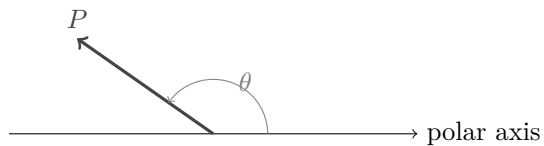
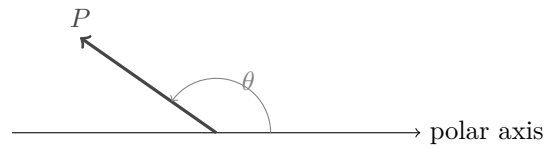


Question 5**Problem**

A polar curve is unchanged when θ is replaced by $-\theta$. What symmetry does this reveal, and why?



Question 5 – Solution**Solution**

1. Use the polar–Cartesian relationships

$$x = r \cos \theta, \quad y = r \sin \theta, \quad r^2 = x^2 + y^2.$$

Equivalent polar coordinates satisfy

$$(r, \theta) = (r, \theta + 2k\pi) = (-r, \theta + (2k + 1)\pi).$$

2. Apply the identity that matches the requested conversion, symmetry test, or intersection, and then check the resulting point or curve in the original polar equation.
3. The points at angles θ and $-\theta$ reflect across the polar axis, so the curve is symmetric about the x -axis.