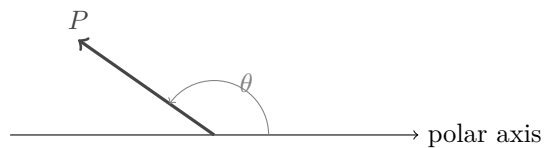
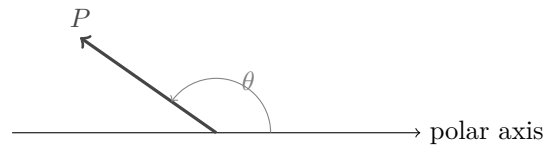


Question 7**Problem**

Find the Cartesian equation corresponding to $\theta = 2\pi/3$ and explain why r must be unrestricted.



Question 7 – 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 line has slope $\tan(2\pi/3) = -\sqrt{3}$, so $y = -\sqrt{3}x$.
4. Allowing negative r supplies the opposite ray and therefore the entire line.