

### Answer on Question #51517 – Math – Analytic Geometry

Find the polar equation of the line L perpendicular to the line angle= $\pi/3$  at  $P(4,\pi/3)$

#### Solution

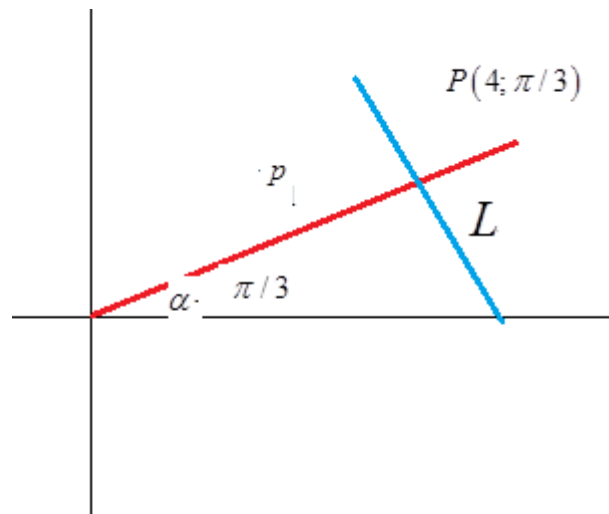


Fig.1

Take the equation of a line in the normal form

$$x \cos \alpha + y \sin \alpha - p = 0 \quad (1)$$

where  $\alpha = \pi/3$  and  $p = 4$ .

Transformation formulas are given by

$$\begin{cases} x = r \cos \varphi \\ y = r \sin \varphi \end{cases} \quad (2)$$

Then

$$r \cos \varphi \cdot \cos \frac{\pi}{3} + r \sin \varphi \cdot \sin \frac{\pi}{3} - 4 = 0 \Rightarrow r = \frac{4}{\cos(\varphi - \frac{\pi}{3})}$$

**Answer:**  $r = \frac{4}{\cos(\varphi - \frac{\pi}{3})}$