

More polar and vectors

Questions

Question 1. Find the angle between the vector $-\mathbf{i} + \sqrt{3}\mathbf{j}$ and the positive x -axis.

Question 2. Let $\mathbf{v} \in \mathbb{R}^2$ be the vector $\langle 3, 7 \rangle$. How many unit vectors $\mathbf{u} \in \mathbb{R}^2$ form an angle of $\pi/3$ with the vector \mathbf{v} ?

Let $\mathbf{v} \in \mathbb{R}^3$ be the vector $\langle 2, 4, 5 \rangle$. How many unit vectors $\mathbf{u} \in \mathbb{R}^3$ form an angle of $\pi/3$ with the vector \mathbf{v} ?

Note: the specific coordinates of the vector \mathbf{v} are not actually relevant to the problem; any other nonzero vector would

work just as well. Also you are not asked to compute \mathbf{u} , only to say how many solutions there are.

Question 3. The polar curve $r = 2 + \cos(3\theta/2)$ has three points of self-intersection; see Figure 1. Find the (x, y) -coordinates of the one in the first quadrant, as well as the slopes of the two tangent lines at that point.

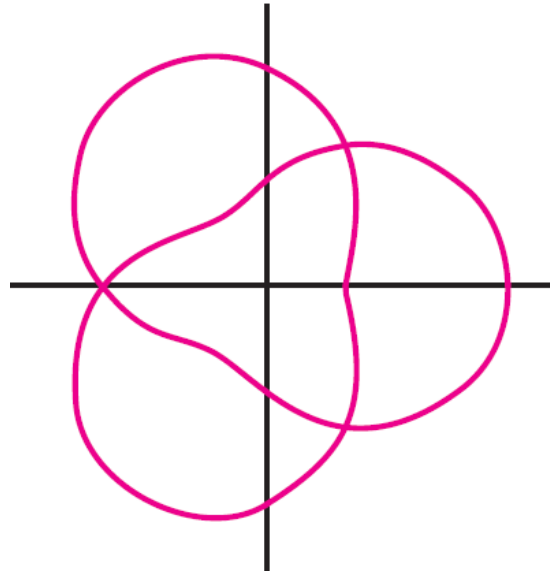


FIGURE 1. Copied from Stewart.