

Quiz 1: Parametric equations, polar coordinates, vector operations

Name:

1. Consider the vectors $\vec{u} = \langle 0, 1, 1 \rangle$, $\vec{v} = \langle 2, 1, -1 \rangle$.

(a) (2 points) What is the angle between \vec{u} and \vec{v} ?

(b) (3 points) Construct a vector perpendicular to both \vec{u} and \vec{v} .

2. Consider the curve given by parametric equations $x(t) = t - 1/t$, $y(t) = t + 1/t$

(a) (2 points) Sketch the curve traced by this parametric equation (You can do this by writing it as a function $y(x)$, plotting points, or any other means)

(b) (3 points) Find the equation for the tangent line to this curve at $t = 1$.

3. Consider the polar curve $r(\theta) = 2 + \cos(3\theta)$

(a) (2 points) sketch the curve

(b) (3 points) Find the area inside the curve. (you may use that $\int_0^{2\pi} \cos^2(x)dx = \pi$.)