

M427L TNB Assignment

Name _____

Find \mathbf{T} , \mathbf{B} , \mathbf{N} , κ , ρ , and τ for the following curves.

1. $\mathbf{c}(t) = (t + 1)\mathbf{i} + 2t\mathbf{j} + t^2\mathbf{k}$.

2. $\mathbf{c}(t) = \cos^3 t\mathbf{i} + \sin^3 t\mathbf{j}$

3. The straight line through the points $(1, 1, 1)$ and $(2, 3, 4)$.

4. Find parametric equations of the osculating circle to the curve in Problem 1 at the point where $t = 2$.

5. Express the curvature of the curve $\mathbf{c}(t) = \left(\int_0^t \cos\left(\frac{1}{2}\pi\theta^2\right) d\theta\right)\mathbf{i} + \left(\int_0^t \sin\left(\frac{1}{2}\pi\theta^2\right) d\theta\right)\mathbf{j}$ as a function of the (directed) distance s measured along the curve from the origin. Try to sketch the curve.