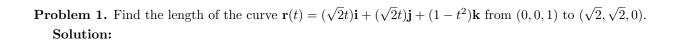
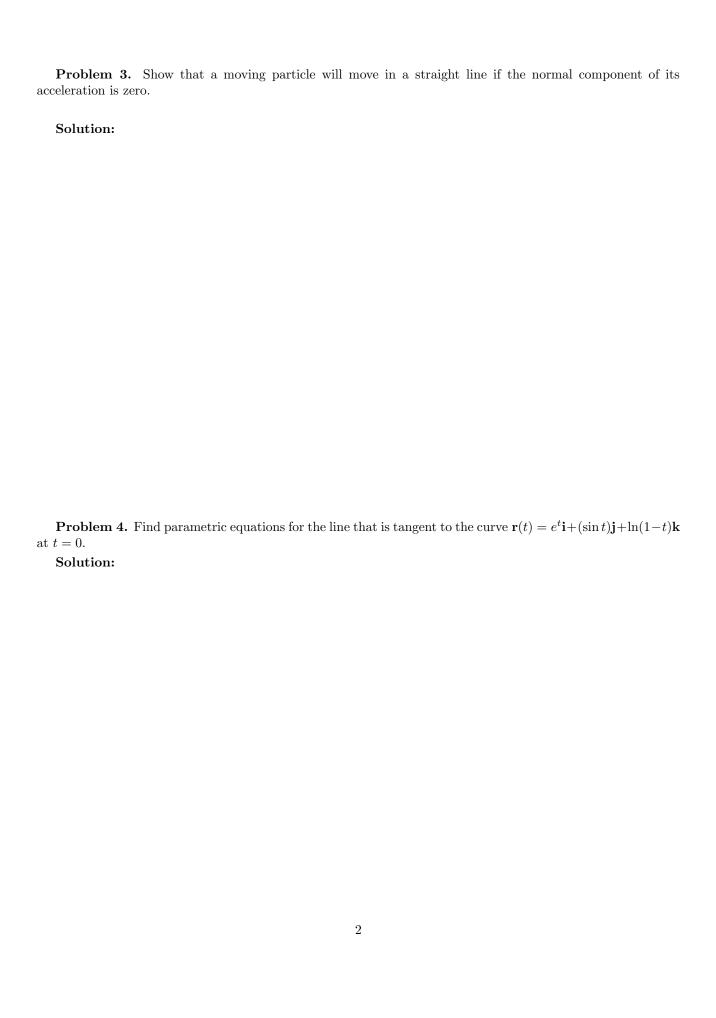
Problem Sheet 3 for the Tutorial, October 13. (Vector-Valued Functions and Motion in Space.)



Problem 2. Find **T**, **N**, and κ for the space curves defined by position vector $\mathbf{r}(t) = (\cos^3 t)\mathbf{i} + (\sin^3 t)\mathbf{j}$, $0 < t < \pi/2$.

Solution:



Problem 5. Evaluate the integrals:

$$\int_0^1 \left[t^3 \mathbf{i} + 7 \mathbf{j} + (t+1) \mathbf{k} \right] dt$$
$$\int_0^1 \left[t e^{t^2} \mathbf{i} + e^{-t} \mathbf{j} + \mathbf{k} \right] dt$$

Solution: