Math 275-002
Third Written Assignment
Due at class time
13 September

(1) If $r''(t) = -\mathbf{i} - \mathbf{j} - \mathbf{k}$ and $r(0) = 10\mathbf{i} + 10\mathbf{j} + 10\mathbf{k}$ and $r'(0) = 0$, find $r(t)$.

(2) Find the unit tangent vector for the curve
$$r(t) = (2\cos(t), 2\sin(t), \sqrt{5}t)$$

(3) Find the curvature $\kappa$, the unit tangent vector $\mathbf{T}$ and the unit normal vector $\mathbf{N}$ for the curve
$$r(t) = (e^t\cos(t), e^t\sin(t), 2)$$

(4) Find the length of the portion of the curve
$$t(t) = (4\cos(t), 4\sin(t), 3t)$$
for $0 \leq t \leq \pi/2$