Assignment 1   Math 451   Spring 2009
Due: 12N Friday 20 Feb

Reading

Curved Spaces: 1.1, 1.4

Exercises

Write in concise, clear *sentences* (incorporating symbolic notation and computations).

1) ***Curved Spaces***: 1.9

2) Let $\gamma(s)$ be a smooth curve parametrized by arc length. Show

$$\dot{N}(s) = -\kappa(s)\,T(s) \qquad \text{for all } s.$$

3) For a plane curve γ show that the radius of the osculating circle is the reciprocal of the curvature κ at every point.

   Hint: Take the tangent line to be a coordinate axis and treat the curve locally as the graph of a function.