Problem Set #4

due Monday, February 23, 2004

1. doCarmo, section 1.7, # 6, 13 (Hint: You might want to do problem 12(d) from section 1.5.)
2. Let α be a regular curve whose tangent indicatrix, T, is also regular. Compute the curvature and torsion of T, in terms of the curvature and torsion of α.
3. Let β be a regular closed curve of length L. Prove that if the curvature of β is bounded above by $1/R$, then $L \geq 2\pi R$.
4. Let c be a regular closed plane curve.
   (a) Prove that if c is simple, then the tangent indicatrix of c is the entire unit circle.
   (b) Give an example to demonstrate that part (a) is false without the assumption that c is simple.