Work Sheet (#1)

1. Find the arc length of the parametrized curve

$$x = t^2, \quad y = t\,sint\,, \quad z = t\,cost, \qquad 0 \le t \le 1$$

2. If f and u are differentiable with sutably restricted domains, prove the chain rule:

$$[u\,f(t)]' = f(t)'u'(f(t))$$

3. Find r(t) subject to the given conditions

$$r'(t) = 2i - 4t^3 j + 6\sqrt{t}\,k \qquad\qquad r(0) = i + 5j + 3k.$$

4. Find the curvature of the curve $y = \cos(2x)$ $at\ P(0,1)$.

5. Find the points on the given curve at which the curvature is a maximum $y = coshx$

6. Find general formulas for the tangential and normal components of acceleration and for the curvatureof curve C determine by

$$r(t) = 4ti + t^2 j + 2t^2 k$$

7. Let C be the curve determined by $r(t) = (e^t sint)i + (e^t cost)j + e^t k \qquad 0 \le t \le 1$
   a- Find a unit tangent vector to C at the point corresponding to t=0.
   b- Find an equation of the tangent line to C at the point corresponding to t=0.