WORKSHEET 8 - CHAPTER 13, 16 (DUE TUES, APR 28)

Math 2110Q – Spring 2015
Professor Hohn

You must show all of your work to receive full credit!

1. Let $\vec{r}(t) = \langle \sqrt{2-t}, (e^t - 1)/t, \ln(t+1) \rangle$.

   (a) Find the domain of $\vec{r}$. Write your answer using interval notation.

   (b) Find $\lim\limits_{t \to 0} \vec{r}(t)$.

(c) Find $\vec{r}'(t)$.

(d) Find $\vec{T}(t)$ at the point where $t = 1$.

2. Find the curvature of the ellipse $x = 3\cos t$, $y = 4\sin t$ at the points $(3, 0)$ and $(0, 4)$.

3. Find the gradient vector field $\vec{F} = \nabla f$ of $f(x, y) = \sqrt{x^2 + y^2}$, sketch the vector field, and draw two level curves with $k = 1, 2$.

4. Evaluate the line integral

$$\int_C x \sin y \, ds$$

where C is the line segment from $(0, 3)$ to $(4, 6)$.

5. Evaluate the line integral

$$\int_C e^x \, dx$$

where C its he arc of the curve $x = y^3$ from $(-1, -1)$ to $(1, 1)$.