

Math 53 - Multivariable Calculus

Quiz # 9

November 3rd, 2011

Exercise 1. Evaluate the line integral $\int_C (x^2y^3 - \sqrt{x})dy$, where C is the arc of the curve $y = \sqrt{x}$ from $(1,1)$ to $(4,2)$.

Exercise 2. Evaluate the line integral $\int_C \vec{F} \cdot d\vec{r}$, where $\vec{F} = \sin(x)\hat{i} + \cos(y)\hat{j} + xz\hat{k}$ and C is the curve given by the vector function $\vec{r}(t) = t^3\hat{i} - t^2\hat{j} + t\hat{k}$, $0 \leq t \leq 1$.

Exercise 3. Recall, the work done by a force field \vec{F} on a particle along some trajectory C is given by the line integral $\int_C \vec{F} \cdot d\vec{r}$. Use this to show that a constant force field does zero work on a particle that moves once uniformly around the circle $x^2 + y^2 = 1$.