Calculus and Analytic Geometry III   Name: _____

> The majority of the credit you receive will be based on the completeness and the clarity of your responses. **Show all of your work and justify your solutions as much as possible.**
> This is a 15 minute quiz and has 2 questions, for a total of 10 points

(5 points)   1. Let $\mathbb{F}(x,y) = (1+xy)e^{xy}\vec{i} + x^2 e^{xy}\vec{j}$. Find a function $f(x,y)$ such that $\nabla f = \mathbb{F}$.

(5 points)   2. Let $\mathbb{F}(x,y) = (1+xy)e^{xy}\vec{i} + x^2 e^{xy}\vec{j}$ and C be the curve defined by $\vec{r}(t) = \cos(t)\vec{i} + 2\sin(t)\vec{j}$ for $0 \leq t \leq \frac{\pi}{2}$. Evaluate

$$\int_C \mathbb{F} \cdot d\vec{r}.$$