Math 53 - Multivariable Calculus

Quiz # 9

April 13th, 2012

Exercise 1. *Compute* $\int_c \vec{\boldsymbol{F}} \cdot d\vec{\boldsymbol{r}}$*, where* $\vec{\boldsymbol{F}} = \langle x, y \rangle$ *and* c *is given by* $\boldsymbol{r}(\vec{\boldsymbol{t}}) = \left\langle \sqrt{\sqrt{\cos(t)} - e^{\sqrt{\cos(t)}}}, \sqrt{\sqrt{\sin(t)}} \right\rangle$ *with* $0 \leq t \leq \frac{\pi}{2}$*. (Hint: Think about a "fundamental" theorem.)*

Exercise 2. *Compute* $\int_c \vec{\boldsymbol{F}} \cdot d\vec{\boldsymbol{r}}$*, where* $\vec{\boldsymbol{F}} = \left\langle \frac{-y}{x^2+y^2}, \frac{x}{x^2+y^2} \right\rangle$ *and* c *is a circle of radius* $r = 1$ *centered at the origin* $(0, 0)$*.*

Exercise 3. *Use Green's theorem to compute* $\int_c \vec{\boldsymbol{F}} \cdot d\vec{\boldsymbol{r}}$*, where* $\vec{\boldsymbol{F}} = \left\langle \frac{-y}{x^2+y^2}, \frac{x}{x^2+y^2} \right\rangle$ *and* c *is ANY simple closed loop (i.e., a curve that starts and ends at the same point and it does not intersect itself) whose interior contains the origin* $(0, 0)$*.*