Math 392 Quiz 6B
March 6, 2019

Name: _____

Instructions: No calculators! Answer <u>all</u> problems in the space provided! Do your rough work on scrap paper.

1. Define the following:

   $(a)\ \int_C f(x,y)\,dy =$ _____

   $(b)\ \int_C \vec{F}\cdot d\vec{r} =$ _____

   $(c)\ \int_C f(x,y)\,ds =$ _____

   (where C is a smooth curve parametrized by $\vec{r}(t) =< x(t), y(t) >$. No shorthand, flesh out full definition.)

2. What does it mean to say "$\vec{F}$ is conservative"? _____

3. State the equation in Green's Theorem: _____

4. State the equation in the fundamental theorem for line integrals: _____

5. Let $\vec{F} =< P(x,y).Q(x,y) >$ be defined on an open, simply connected domain D. Suppose P and Q have continuous first partial derivatives on D. What equation would you use to check if $\vec{F}$ is conservative? _____

6. Let D be the triangle in the plane with vertices at (0,0), (2,0), and (0,1). Let C be the positively oriented boundary of D.

   Set-up integrals to compute (where a sum of integrals may be necessary): $\int_C 2xy\,dx + \left(\sin y + \frac{x^2+y^2}{2}\right)dy$

   (a) Line integral(s): _____

   (b) Double integral(s): _____

   (c) Compute one of the parts above to give the value of the integral in 6. Ans: _____

Bonus:

1. Let $\vec{F} =< y^2,\ e^x,\ xyz^2 >$, compute:

   (a) $curl\vec{F} =$ _____

   (b) $div\,\vec{F} =$ _____

2. If $curl\vec{F} = \vec{0}$, then $\vec{F}$ is called _____

3. If $div\,\vec{F} = \vec{0}$, then $\vec{F}$ is called _____