Math 392 Quiz 8A
March 18, 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:

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

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

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

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

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

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

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

5. What does it mean to say "$\vec{G}$ is a vector potential of $\vec{F}$"? _____

6. 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? _____

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

8. Let $\vec{F} =< x^2 + yz,\ xz - y^3,\ z^2 + xy >$:

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

   (b) Compute $\int_C \vec{F}\cdot d\vec{r}$, where C is the negatively oriented curve in the yz-plane given by the line segment from (0,-1,1) to (0,1,1), followed by the line segment from (0,1,1) to the origin, followed by another line segment from the origin to (0,-1,1). $\int_C \vec{F}\cdot d\vec{r} =$ _____

   (c) Justify/show your work for part (b). Begin your answer below, you may use the reverse side of this sheet if necessary.