Math 392 Quiz 6B
July 16, 2019

Name: ____

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

In this quiz, the less shorthand the better. For example, when writing a formula for which you need a normal vector $\vec{n}$, don't just write "$\vec{n}$", but rather the formula used to find it. Everything is positively oriented.

1. Define the following:

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

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

   $(c)\ \int_C f(x,y,z)\,dy =$ ______________________________

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

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

3. State the equation in Stokes' Theorem: ______________________________

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

5. State the equation in Green's Theorem: ______________________________

6. State the equation in the Divergence Theorem: ______________________________

7. 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? ______________

8. 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? ______________

9. Let S_1 be a surface parametrized by $\vec{r}(s,t)$. Find a formula for a normal vector $\vec{n}_1$ to S_1: $\vec{n}_1 =$ ______________

10. Let S_2 be a surface given by $z = g(x,y)$. Find a formula for a normal vector $\vec{n}_2$ to S_2: $\vec{n}_2 =$ ______________

11. For S_1 above, define $\iint_{S_1} \vec{F}(x,y,z)\cdot d\vec{S} =$ ______________________________

12. For S_2 above, define $\iint_{S_2} \vec{F}(x,y,z)\cdot d\vec{S} =$ ______________________________