

Math 392 Quiz 6A

March 6, 2019

Name: _____

Instructions: No calculators! Answer all 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 $\vec{r}(t) = \langle x(t), y(t) \rangle$. 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. Let $\vec{F} = \langle P(x, y), Q(x, y) \rangle$ 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 $(0,0)$, $(1,0)$, and $(0,2)$. Let C be the positively oriented boundary of D .

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

(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 $\vec{F} = \langle x^2, e^y, xyz \rangle$, compute:

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

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

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

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