Math 392 Quiz 3B
February 11, 2019

Name: _____

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

1. Define the following:

    $(a)\ \nabla f(x,y) =$ _____

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

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

2. Setup an integral to find the length of the curve parametrized by $x = 3e^t \cos t$, $y = 3e^t \sin t$ for $0 \le t \le 2\pi$.

    $L =$ _____ (Simplify the integrand, but do not evaluate the integral)

3. Evaluate the above integral: $L =$ _____

4. Let $f = z \cos^2(xy)$, find $\nabla f =$ _____

5. Let C be the line segment from $(-1, -1)$ to $(1,1)$, compute $\displaystyle\int_C 2x^2\, ds$

    Integral set-up: _____ Answer: _____

Bonus:

1. Compute $\displaystyle\int_C 3y\, ds$ where C consists of the quarter circle $x^2 + y^2 = 1$ in the second quadrant, traversed counter-clockwise, followed by the line segment from (-1,0) to (-2,0).

    Integral(s) set-up: _____ Answer: _____

2. Define $\displaystyle\int_C \vec{F} \cdot d\vec{r} =$ _____

    State the meanings of the symbols in the above: _____

    _____

    (Problem 2 is all-or-nothing)

3. Define $\displaystyle\int_C f(x,y)\, dy =$ _____