Math 392 Quiz 3A
February 13, 2018

Name: ANSWERS

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

1. Define the following:

   (a) $\int_C f(x,y)\,ds =$ $\int_a^b f(x(t),y(t))\,\|\vec{r}\,'(t)\|\,dt$

   (where C is a smooth curve parametrized by $\vec{r}(t)$)

   (b) $\nabla f(x,y,z) =$ $\langle f_x, f_y, f_z \rangle$

2. Setup an integral to find the length of the curve parametrized by $x = tsint, y = tcost$ for $0 \le t \le 1$.

   $L =$ $\int_0^1 \sqrt{1+t^2}\,dt$

3. Let $f = ze^{x/y} - xyz$, find $\nabla f =$ $\left\langle \frac{z}{y}e^{x/y} - yz,\ -\frac{xz}{y^2}e^{x/y} - xz,\ e^{x/y} - xy \right\rangle$

4. Let C be the line segment from (1,2) to (3,4), compute $\int_C 6x^2\,ds$

   Integral set-up: $12\sqrt{2}\int_0^1 (1+2t)^2\,dt$ Answer: $52\sqrt{2}$

Bonus:

1. Define $\int_C \vec{F}\cdot d\vec{r} =$ $\int_a^b \vec{F}(\vec{r}(t))\cdot\vec{r}\,'(t)\,dt$