Math 2E Quiz 6 Afternoon - May 5th, 2016

Name and ID: _____

Show all of your work (only writing the final answer is not enough for full credit). You can only use a pen, pencil, and eraser on the test. No calculators.

The pages are double sided.

Write Neatly. Don't spend too long on any one problem. Good Luck!

Problem 1: _____ / 15 points

Problem 2: _____ / 20 points

Problem 3: _____ / 15 points

Total: _____ / 50 points

Problem 1

(a) Find the length of the curve C given from $0 \le t \le 10$ by

$$\mathbf{r}(t) = \; < \cos(t) + t\sin(t), \; \sin(t) - t\cos(t) >$$

(b) Write out $\int_C x \, ds$ as an integral in time. Don't compute it.

(c) Let D be the region bounded above by the parabola $y = 2x - x^2$ and below by the line $y = 0$. Give the two expressions for $\iint_D xy \, dA$ as an iterated integral. (Don't evaluate)

Problem 2

Find the area enclosed by the curve $x^2 + xy + y^2 = 1$.
Hint: Use the substitution $x = u + v\sqrt{3}$, $y = u - v\sqrt{3}$.

Problem 3

Evaluate $\iiint_E (x - y)dV$ where E is the solid between the cylinders $x^2 + y^2 = 1$, $x^2 + y^2 = 16$, above the xy-plane, and below the plane $z = y + 4$.