MAT 302
Homework # 7
Due: Thursday, April 20th, 2017

Directions: Write careful solutions to each of the following problems on separate sheets of paper. (You may put more than one solution on the same sheet of paper, if you have enough room). Be sure to show all of your work. You are allowed to talk to your classmates about these problems. If you do receive help from a classmate, be sure to give them credit by noting their name on your solution. All solutions should be written in your own words, regardless of if you've received help. Partial credit is available. Each problem is worth five points.

1. Evaluate $\int_C (x^2 - y + 3z)\, ds$ where C is the line segment in $\mathbb{R}^3$ starting at the origin and ending at $(1, 2, 1)$.

2. Evaluate $\int_C x\, ds$ where C is the piecewise smooth curve in the plane made up of the line $y = x$ from the origin to the point $(1, 1)$, and the parabola $y = x^2$ from the origin to the point $(1, 1)$. Assume that the curve C has a clockwise orientation.

3. Find the work done by the force field $F(x, y, z) = \langle -\frac{1}{2}x, -\frac{1}{2}y, \frac{1}{4}z \rangle$ on a particle as it moves along the helix $r(t) = \langle \cos(t), \sin(t), t \rangle$ from the point $(1, 0, 0)$ to the point $(-1, 0, 3\pi)$.

4. Evaluate $\int_C (2x - y)dx + (x + 3y)dy$ where C is the elliptic path $x = 4\sin(t)$, $y = 3\cos(t)$ from the point $(0, 3)$ to the point $(4, 0)$.