Math 202 **Name (Print):** _____
Sparing 2019
Midterm
04/12/2019
Time Limit: 50 Minutes

This exam contains 8 pages (including this cover page) and 5 problems. Check to see if any pages are missing.

Statement of Ethics

I agree to complete this exam without unauthorized assistance from any person, materials, or device.

Signature _____ Date _____

1 Lin T 1:30-2:20 Shriver 104
2 Lin T 3:00-3:50 Hodson 301
3 Sherwood Th 4:30-5:20 Gilman 119
4 Sherwood Th 3:00-3:50 Maryland 309
5 Koh T 4:30-5:20 Gilman 119
6 Stubis Th 1:30-2:20 Hodson 313
7 Stubis Th 3:00-3:50 Hodson 301
8 VanBlargan T 3:00-3:50 Gilman 119

Your section number: _____

You are required to show your work on each problem on this exam. The following rules apply:

- **Organize your work**, in a reasonably neat and coherent way, in the space provided. Work scattered all over the page without a clear ordering will receive very little credit.
- **Mysterious or unsupported answers will not receive full credit**. A correct answer, unsupported by calculations, explanation, or algebraic work will receive no credit; an incorrect answer supported by substantially correct calculations and explanations might still receive partial credit.
- If you need more space, use the back of the pages; clearly indicate when you have done this.

Do not write in the table to the right.

Problem	Points	Score
1	20	
2	20	
3	20	
4	20	
5	20	
Total:	100	

1. (a) (5 points) Compute the arc length of $\boldsymbol{c}(t) = (x(t), y(t)) = (|t|, |t - \frac{1}{2}|), -1 \leq t \leq 1$.

(b) (5 points) Let $\boldsymbol{F}(x, y, z) = (x, y, z)$. Find a function $f : \mathbb{R}^3 \to \mathbb{R}$ such that $\boldsymbol{F} = \nabla f$.

(c) (5 points) Compute the curl of $V(x, y, z) = y\boldsymbol{i} - x\boldsymbol{j} + 0\boldsymbol{k}$.

(d) (5 points) Let $\boldsymbol{F} = (xy, yz, zx)$, compute $\nabla \cdot (\nabla \times F)$.

2. (20 points) Find the volume of the region which is defined by $\{(x, y, z)|0 \leq x \leq 1, 0 \leq y \leq 1, 0 \leq z \leq 1, 0 \leq x + y + z \leq 1\}$.

3. (20 points) Let $D_a = \{(x, y)|x^2 + y^2 \leq a^2\}$, compute

$$\iint_{D_a} e^{-(x^2+y^2)} dxdy.$$

4. (20 points) Calculate

$$\int_0^1 \int_{\sqrt{x}}^1 \frac{1}{\sqrt{1+y^3}} dydx.$$

5. (20 points) Let $f(x, y) = xy$, let D be the parallelogram in the xy plane bounded by lines $x - 2y = 0$, $x - 2y = 3$, $2x - y = 0$, $2x - y = 3$. Use the linear change of variables $u = x - 2y, v = -2x + y$ to evaluate $\iint_D f(x, y)dxdy$.

Please estimate your score.