

Math 244 Exam 1, Spring 2022

Name:

Question	Points	Score
1	5	
2	8	
3	17	
4	11	
5	2	
Total:	43	

- You have 50 minutes to complete this exam.
- All work must be your own.
- You may use a 3x5 notecard with notes that you may turn in for extra credit.
- You must show all your work. You will get almost no credit for solutions that are not fully justified.
- Answer the questions in the space provided. Use the back of the page for scratch work or if you require additional space for your answers. Clearly indicate what is a solution, and what is scratch work.
- No electronic devices are authorized with the exception of a scientific calculator.
- Good luck!

1. (5 points) Reverse the order of integration for the integral

$$\int_0^5 \int_{x-5}^0 f(x, y) dy dx.$$

2. (8 points) Evaluate one the following two integrals. Clearly indicate which one you want graded.

(a) $\int_{-2}^2 \int_0^{\sqrt{4-x^2}} e^{x^2+y^2} dydx.$

(b) $\iint_R \frac{\sin(xy)}{1+x^{10}} dA$ where $R = [-1, 1] \times [0, \pi].$

3. (17 points) Find the center of mass of a constant density lamina D in the upper-half plane that occupies the region bounded by the lines $y = \pm x$ and by the circles $r = 1$ and $r = 2$.

(more space for problem 3)

4. (11 points) Set up the integral that finds the surface area of the part of the sphere $x^2 + y^2 + z^2 = 9$ that lies above the plane $z = 2\sqrt{2}$.

5. Let D_t be the disk centered at the origin of radius $t > 0$.
- (a) (2 points) Which t maximizes the double integral $\iint_{D_t} 9 - x^2 - y^2 dA$? You do not have to justify your answer.
 - (b) (5 points (bonus)) Prove your answer from part (a).