

Last Name: \_\_\_\_\_ First Name: \_\_\_\_\_ Net Id: \_\_\_\_\_

**INSTRUCTIONS**

1. This exam must be submitted as a single pdf file. You may either scan your paper or take photos of your paper and convert to a single pdf file. (Adobe Scan App does the job. It is a free app on iOS and Android. See <https://acrobat.adobe.com/us/en/mobile/scanner-app.html>) Make sure your file is readable.
2. You may write your solution on a plain paper. If you do not use this cover page, please write your Last Name, First Name, Net Id on the top of the first page. Please keep the order of the problems as they are given in the assignment.
3. The time limit for this exam is 1 hour.
4. Your work must be hand written or typed in L<sup>A</sup>T<sub>E</sub>X.
5. You must show all work. You may receive zero or reduced points for insufficient work.
6. Your work must be neatly organized and written. You may receive zero or reduced points for sloppy work.
7. This exam is open books and notes. You may use calculator. You may not use internet to search for answers.
8. If you are disconnected from eLearning while taking this exam, you may log in to eLearning again to submit your work before 1 hour expires. elearning records the time student started the exam. If you are unable to submit your paper, email it to instructor at [anatoly@utdallas.edu](mailto:anatoly@utdallas.edu). The time stamp of your email must be before your 1 hour expires. Late exam will not be accepted.

- (1) (6 points) Find the mass of a flat circular washer with inner radius  $a$  and outer radius  $2a$  if its mass density  $\rho(x, y)$  is inversely proportional to the square of distance from the center.
- (2) (6 points) Suppose that washer from the previous problem is cut along  $x$ -axis in two equal parts. Find the center of mass of the top part. ( $y > 0$ ).
- (3) (6 points) Find the surface area of the portion of the plane  $3x + 2y + z = 24$  in the first octant.
- (4) (6 points) Determine whether the improper integral  $\int_0^\infty \frac{4x+6}{x^2+3x+1} dx$  converges or diverges. Evaluate the integral if it converges.
- (5) (6 points) Determine whether the improper integral  $\int_0^4 \frac{dx}{\sqrt{16-x^2}}$  converges or diverges. Evaluate the integral if it converges.