

Math 11. Multivariable Calculus.
Written Homework 7.

Due on Wednesday, 11/5/14.

You can turn in this homework by leaving it in the boxes labeled Math 11 in the hallway outside of 008 Kemeny anytime before 3:00 pm on Wednesday.

1. Use polar coordinates to find the volume of the solid inside the sphere $x^2 + y^2 + z^2 = 16$ and outside the cylinder $x^2 + y^2 = 4$.
2. Find the mass of a ball B given by $x^2 + y^2 + z^2 \leq a^2$ if the density at any point is proportional to its distance from the z -axis.
Hint: even though both cylindrical and spherical coordinates work for this problem, spherical coordinates give a simpler integral.
3. Find the average distance from a point in a ball of radius a to its center.
4. Evaluate $\iint_R (x^2 - xy + y^2) dA$, where R is the region bounded by the ellipse $x^2 - xy + y^2 = 2$.
2. Use the change of variables $x = \sqrt{2}u - \sqrt{2/3}v$, $y = \sqrt{2}u + \sqrt{2/3}v$.