

Spherical Triple Integral.

Spring 2016

Attendance Quizzes

March 30, 2016

Quiz 23 Spherical Triple Integral.

Consider the part of the sphere $x^2 + y^2 + z^2 = 16$ in the first octant.

Suppose that the density function is: $x + y$.

Set up the triple integral to find the mass of this part of the sphere **using spherical coordinates**. It is essential to state all limits correctly and simplify the integrand. **Evaluation may be done at home.** **Answer:**

$$\int_{\theta=0}^{\pi/2} \int_{\phi=0}^{\pi/2} \int_{\rho=0}^4 \rho \sin(\phi) (\cos(\theta) + \sin(\theta)) \rho^2 \sin(\phi) d\rho d\phi d\theta = 32\pi$$

Suppose that the density function is changed to $|x| + |y|$ and the resulting mass of the whole sphere is needed. Think how you would do the problem without much more work.