

Your name:

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Math 11 Fall 2015, Homework 6, due Wed Oct 28

Please show your work. No credit is given for solutions without work or justification.

- (1) Use polar integration to find the volume of the solid inside the sphere $x^2 + y^2 + z^2 = 9$ but outside the cylinder $x^2 + y^2 = 1$.

- (2) Find the average value of the function $f(x, y, z) = y$ over the region in the first octant lying above $z = 2x$ and below $z = 1 - y^2$.

(3) Convert the Cartesian integral below into spherical coordinates. *Do not evaluate!*

$$\int_0^{\sqrt{2}} \int_0^{\sqrt{2-x^2}} \int_{\sqrt{x^2+y^2}}^{\sqrt{4-x^2-y^2}} (x^2 + y^2 + z^2) dz dy dx$$