

Name _____

Mathematics 206a: Multivariable Calculus
Fall Semester 2005

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Quiz #33

November 17

Evaluate the triple integral $\int_{-1}^1 \int_{-\sqrt{1-z^2}}^{\sqrt{1-z^2}} \int_{-\sqrt{1-y^2-z^2}}^{\sqrt{1-y^2-z^2}} \sqrt{x^2 + y^2 + z^2} dx dy dz$ by converting to spherical

coordinates to give a triple integral over the solid sphere of radius 1 centered at the origin. Note

that $\left| \frac{\partial(x, y, z)}{\partial(\rho, \phi, \theta)} \right| = \rho^2 \sin \phi$.