Name _____

Homework 19
Section 16.5

1. (3ea) Convert the following triple integrals to spherical coordinates.

   (a) $\displaystyle\int_{-1}^{0}\int_{-\sqrt{1-y^2}}^{\sqrt{1-y^2}}\int_{-\sqrt{1-y^2-z^2}}^{\sqrt{1-y^2-z^2}}\left(x^2+y^2+z^2\right)^{3/2}\,dxdzdy$

   (b) $\displaystyle\int_0^{2\pi}\int_0^3\int_0^r r\,dzdrd\theta$

2. (3ea) Set up an integral which represents the volume of an ice cream cone bounded by the graphs of $z = \sqrt{8 - x^2 - y^2}$ and $z = \sqrt{x^2 + y^2}$ in

   (a) Cartesian coordinates

   (b) Cylindrical coordinates

   (c) Spherical coordinates

3. (5) A large bead is constructed by taking a solid sphere with radius 5 cm, drilling a 1 cm diameter hole through the center, and cutting the top and bottom 2 cm off. If the density of the bead is given by $\delta(x, y, z) = 1 + \frac{z}{\sqrt{x^2+y^2}}$ g/cm^3, when the origin is taken to be the center of the bead, find the mass of the bead.