Name _____

Homework 18
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) Find the volume of the ice cream cone in the previous problem by evaluating an integral in the coordinates of your choice.