MATH 251 (Fall 2009) Hwk on Cylindrical and Spherical Coordinates (13.6, 13.7)

(1) Find the rectangular coordinates of the point with cylindrical coordinates $(r, \theta, z) = (3, \frac{3}{2}\pi, -1)$.

(2) Find the rectangular coordinates of the point with spherical coordinates $(\rho, \theta, \phi) = (4, \frac{1}{6}\pi, \frac{2}{3}\pi)$.

(3) Find both the cylindrical and spherical coordinates of the point with rectangular coordinates $(x, y, z) = (-1, 1, -1)$.

(4) Describe and sketch the graph of the equation $\theta = 3\pi/4$ in cylindrical coordinates.

(5) Describe and sketch the graph of the equation $\phi = 5\pi/6$ in spherical coordinates.

(6) Describe and sketch the graph of the equation $z^2 - 2r^2 = 4$ in cylindrical coordinates.

(7) Describe and sketch the graph of the equation $\rho = 4\cos\theta$ in spherical coordinates.

(8) Convert the equation $z = x^2 - y^2$ to both cylindrical and spherical coordinates.