# Mathematics 21a Fall 2006
# In class problems. Oct. 19

1. Convert the points in $\mathbb{R}^3$ given in spherical coordinates $(\rho, \theta, \phi)$ into the Euclidean coordinates $(x, y, z)$:

(1) $(\rho, \theta, \phi) = (2, \pi/4, \pi/4)$, $\quad (x, y, z) =$
(2) $(\rho, \theta, \phi) = (2, \pi/3, \pi/3)$, $\quad (x, y, z) =$
(3) $(\rho, \theta, \phi) = (2, \pi/2, \pi/2)$, $\quad (x, y, z) =$
(4) $(\rho, \theta, \phi) = (2, \pi, \pi/6)$, $\quad (x, y, z) =$
(5) $(\rho, \theta, \phi) = (1, 0, 0)$, $\quad (x, y, z) =$
(6) $(\rho, \theta, \phi) = (0, 0, 0)$, $\quad (x, y, z) =$

2. Imagine the line $\langle 1, 0, t \rangle$ connected to the origin by a rod attached at the point $(1, 0, 0)$. The surface $S$ is swept by revolving the line around $z$-axis. Parametrize $S$.

Now assume the surface $S'$ is obtained as above but with the line $\langle 1, t, t \rangle$ attached to the rod. Parametrize $S'$.