MATH 21A

Other Coordinate Systems

For each point, convert it to descriptions in the other coordinate systems.

Points:

1. $(x, y, z) = (2, 2\sqrt{3}, 3)$

2. $(r, \theta, z) = \left(3, \frac{\pi}{4}, 3\right)$

3. $(\rho, \theta, \phi) = \left(2, \frac{\pi}{3}, \frac{\pi}{6}\right)$

For each equation, describe the surface (changing it into rectangular/cartesian coordinates might make it look more familiar).

Surfaces:

4. $\rho = 1$

5. $\theta = \frac{2\pi}{3}$

(This is in spherical coordinates. Does it matter?)

6. $\phi = \frac{\pi}{4}$

7. $r = 3$

8. $\theta = \dfrac{\pi}{4}$

(This is in cylindrical coordinates.)

9. $z = 2$

More surfaces:

10. $z = r^2$

11. $\rho^2(3\sin^2\phi + \cos^2\phi) = 2$