

Homework 3 Solutions

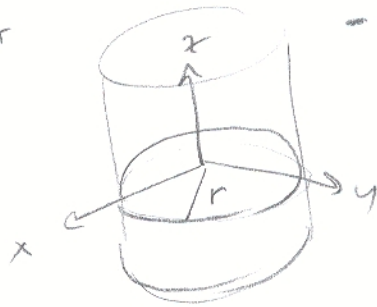
Math 212

Feb. 4, 2009

Section 1.4

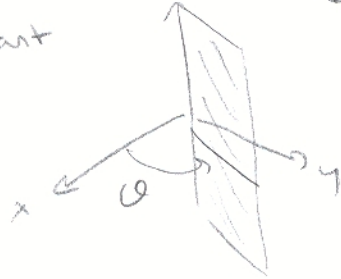
4. a) Describe the surfaces given in cylindrical coordinates.

$r = \text{constant}$



• the surface of a cylinder if $r = c > 0$
 (or the z-axis if $r = 0$).

$\theta = \text{constant}$



• Half of a vertical plane through the origin if you require $r \geq 0$.
 (The whole plane if you allow $r < 0$.)

$z = \text{constant}$

• A horizontal plane

b) Describe the surfaces given in spherical coordinates.

$\rho = \text{constant}$

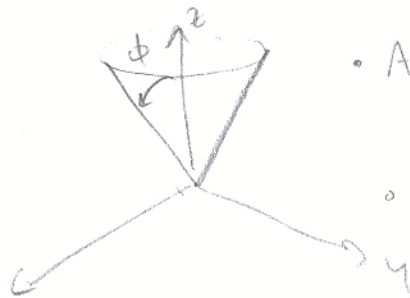


• the surface of a sphere if $\rho = c > 0$
 (or the origin if $\rho = 0$).

$\theta = \text{constant}$

• Same answer as in part (a).

$\phi = \text{constant}$



• A cone opening upward if $0 < c < \frac{\pi}{2}$

• A cone opening downward if $\frac{\pi}{2} < c < \pi$

• If $c = \frac{\pi}{2}$, the xy plane. • If $c = 0$ or π , it's half the z-axis.