

HW#77 Solutions

Section 11-7: Page 827

36,44,54,56,58,66

36)

Convert $\left(12, \frac{3\pi}{4}, \frac{\pi}{9}\right)$, spherical *to rect.*

$$x = 12 \sin \frac{\pi}{9} \cos \frac{3\pi}{4} \approx -2.902$$

$$y = 12 \sin \frac{\pi}{9} \sin \frac{3\pi}{4} \approx 2.902$$

$$z = 12 \cos \frac{\pi}{9} \approx 11.276$$

$(-2.902, 2.902, 11.276)$, rectangular

44)

$$\therefore x^2 + y^2 - 3z^2 = 0 \quad \text{rectangular equation}$$

$$x^2 + y^2 + z^2 = 4z^2$$

$$\rho^2 = 4 \rho^2 \cos^2 \phi$$

$$1 = 4 \cos^2 \phi$$

$$\cos \phi = \frac{1}{2}$$

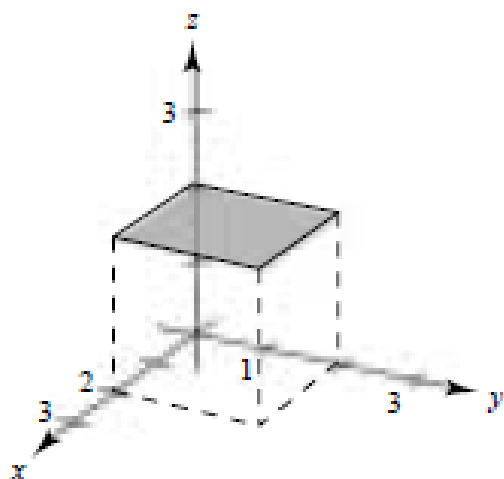
$$\phi = \frac{\pi}{3} \quad (\text{cone}) \text{ spherical equation}$$

54)

$$\text{Given } \rho = 2 \sec \phi$$

$$\rho \cos \phi = 2$$

$$z = 2$$



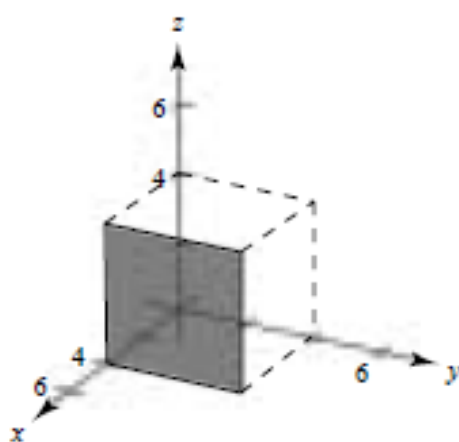
56)

$$\rho = 4 \csc \phi \sec \theta$$

$$= \frac{4}{\sin \phi \cos \theta}$$

$$\rho \sin \phi \cos \theta = 4$$

$$x = 4$$



58)

$$\Rightarrow \left(3, -\frac{\pi}{4}, 0\right), \text{cylindrical}$$

$$\rho = \sqrt{3^2 + 0^2} = 3$$

$$\theta = -\frac{\pi}{4}$$

$$\phi = \arccos\left(\frac{0}{9}\right) = \frac{\pi}{2}$$

$$\left(3, -\frac{\pi}{4}, \frac{\pi}{2}\right), \text{spherical}$$

66)

$$\left(4, \frac{\pi}{18}, \frac{\pi}{2}\right), \text{ spherical}$$

$$r = 4 \sin \frac{\pi}{2} = 4$$

$$\theta = \frac{\pi}{18}$$

$$z = 4 \cos \frac{\pi}{2} = 0$$

$$\left(4, \frac{\pi}{18}, 0\right), \text{ cylindrical}$$

