Math 117
Answers to Exam 2

1. 9

2. $81/2$

3. (a) $z = \sqrt{3}r$

(b) $\phi = \pi/6$

4. (a) a sphere of radius 4 with center at the origin

(b) an elliptic paraboloid centered along the positive z-axis

5. (a) $\int_{-4}^{0} \int_{0}^{-y} \int_{-\sqrt{y+4}}^{\sqrt{y+4}} dx dz dy$

(b) $\frac{\int_{0}^{2\pi} \int_{0}^{r} \int_{0}^{\sqrt{9-r^2}} zr \, dz \, dr \, d\theta}{\int_{0}^{2\pi} \int_{0}^{r} \int_{0}^{\sqrt{9-r^2}} r \, dz \, dr \, d\theta}$

(c) $\int_{0}^{2\pi} \int_{0}^{\pi/3} \int_{\sec \phi}^{2a} \rho^4 \sin^2 \phi \cos \theta \cos \phi \, d\rho \, d\phi \, d\theta$

6. (a) $8\pi/15$

(b) $81\pi/8$