

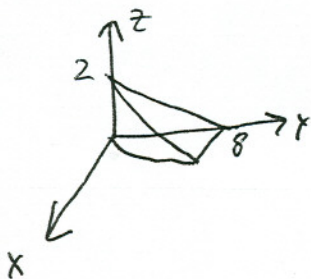
7. Find $\int_0^1 \int_0^{\sqrt{1-x^2}} (4-x^2-y^2)^{-1/2} dy dx = \int_0^{\pi/2} \int_0^1 \frac{r}{\sqrt{4-r^2}} dr d\theta$



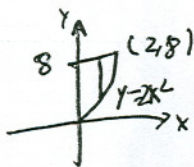
$$= \int_0^{\pi/2} \left[-\sqrt{4-r^2} \right]_0^1 d\theta = (2-\sqrt{3})\theta \Big|_0^{\pi/2} = (2-\sqrt{3})\frac{\pi}{2}$$

Volume

8. Find the ~~value~~ of the solid in the first octant bounded by $y = 2x^2$ and $y + 4z = 8$.



$$Vol = \int_0^2 \int_{2x^2}^8 (2 - \frac{1}{4}y) dy dx = \int_0^2 \left[2y - \frac{y^2}{8} \right]_{2x^2}^8 dx$$



$$= \int_0^2 \left(8 - 8 - \left(4x^2 - \frac{4x^4}{8} \right) \right) dx = \int_0^2 \left(\frac{x^4}{2} - 4x^2 + 8 \right) dx = \left[\frac{x^5}{10} - \frac{4x^3}{3} + 8x \right]_0^2$$

$$= \left(\frac{32}{10} - \frac{32}{3} + 16 \right)$$