Math 272A
Spring 2010
Instructor: Shawn Rafalski

Multivariable Calculus II
Quiz 2
Write your name on this quiz

Solution

Compute the volume of the solid lying above the xy–plane that is inside *both* the cylinder $x^2 + y^2 = 1$ and the sphere $x^2 + y^2 + z^2 = 5$.

$$\int_0^{2\pi}\int_0^1 \sqrt{5-r^2}\, r\, dr\, d\theta$$

$$= 2\pi\left(-\frac{1}{2}\cdot\frac{2}{3}(5-r^2)^{3/2}\Big|_0^1\right)$$

$$= -\frac{2\pi}{3}\left(4^{3/2} - 5^{3/2}\right) = \frac{2\pi}{3}\left(5^{3/2} - 8\right)$$