Homework due 12/13

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Sec. 17.3

1) $div(F) = 0 \rightarrow \iiint_E 0 \, dV = 0$

3) $div(F) = 2 \int_0^{2\pi} \int_0^1 \int_0^2 2r \, dz \, dr \, d\theta = 4\pi$

5) $\int_0^{\pi} \int_0^{2\pi} \int_0^1 \rho^4 \cos^2\phi \sin\phi \, d\rho \, d\theta \, d\phi = \frac{4\pi}{15}$

7) $\int_0^{2\pi} \int_0^2 \int_0^3 (r^2 + z^2) r \, dz \, dr \, d\theta = 60\pi$

11) $\int_0^{\frac{\pi}{2}} \int_0^{\frac{\pi}{2}} \int_0^2 \left(3(\rho \sin\phi \cos\theta)^2 + 3(\rho\cos\phi)^2\right) \rho^2 \sin\phi \, d\rho \, d\theta \, d\phi$

$= \frac{32\pi}{5}$

15) $\int_{-3}^{3} \int_{-\sqrt{9-x^2}}^{\sqrt{9-x^2}} \int_0^{9-x^2-y^2} 2 \, dz \, dy \, dx = 81\pi$