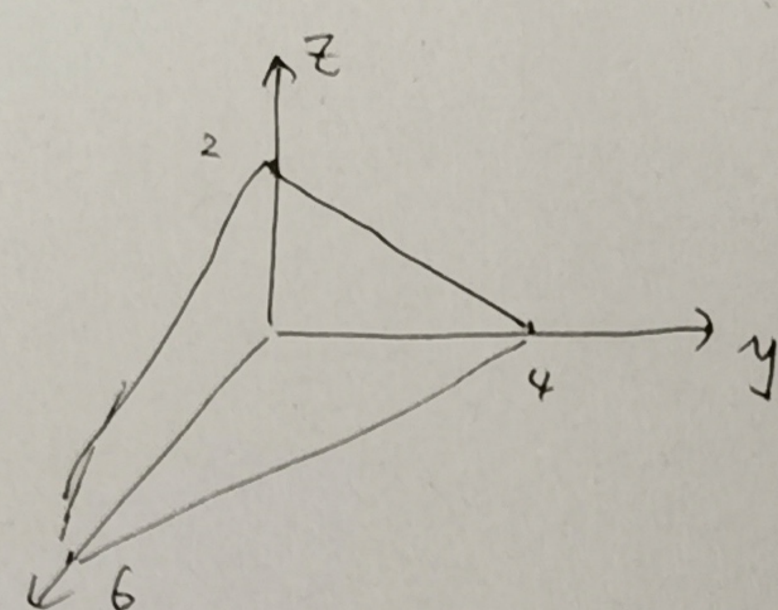
1. Compute everything in an elegent way! (Or, by computer)

2. Remember formulas!

$$\int_U \nabla\cdot\vec{F}\,dV = \oint_{\partial U} \vec{F}\cdot\vec{\nu}\,dA$$

$$\int_M \operatorname{rot}\vec{F}\cdot\vec{\nu}\,dA = \int_\gamma \vec{F}\cdot d\vec{x}$$

3 $\oint_{\partial\Omega} \vec{f}\vec{\nu}\,dA = \int_\Omega \nabla\cdot\vec{f}\,dV$



$$\overset{(ii)}{=} \int_\Omega 2x+2\,dV$$

$$= \int_0^6 dx \int_0^{4\frac{6-x}{6}} dy \int_0^{2\cdot\frac{12-2x-3y}{12}} \cancel{dz}\,(2x+2)\,dz$$

$$= \int_0^6 (2x+2)\;4\left(\frac{6-x}{6}\right)^2 dx$$

$$= 40$$

$\vec{F} = (0,0,z)$

2. $\int_{\partial\Omega} \vec{F}\vec{\nu}\,dA = \int_\Omega \nabla\cdot\vec{F}\,dV$

$$= \int_\Omega \frac{\partial z}{\partial z}\,dV$$

$$= \int_\Omega 1\,dV$$

$$= \operatorname{vol}(\Omega)$$

1. $\Omega = B_1(0)$, $\partial\Omega = \partial B_1(0)$, $\vec{F} = \cancel{(x,y,z)}\ (x_1,\dots x_n)$ $\quad \vec{F}(x_1,\dots x_n) = (x_1,\dots,x_n)$

$$\oint_{\partial\Omega} \vec{F}\cdot\vec{\nu}\,dA = \int_\Omega \nabla\cdot\vec{F}\,dV$$

$$\int_{\partial\Omega} dA = \int_\Omega n\,dV = n\operatorname{vol}(B_1(0))$$

$$= \operatorname{vol}(\partial B_1(0))$$