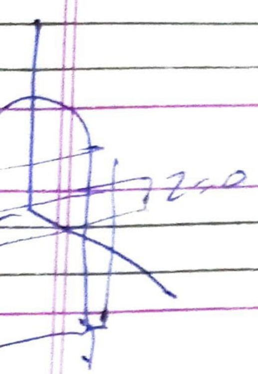
since region is closed, use divergence theorem.

$$\iint F\cdot n\,dS = \iiint \nabla F\,dV$$



$$= \int_{x=-1}^{1}\int_{y=0}^{1+x^2}\int_{z=0}^{1-x^2} (y+2y)\,dz\,dy\,dx$$

$$\Rightarrow 3\int_{x=-1}^{1}\int_{y=0}^{1+x^2} y\times(1-x^2)\,dy\,dx \qquad \left[\begin{array}{l} z-y=1-x^2 \\ y=1+x^2 \end{array}\right.$$

$$\Rightarrow \frac{3}{2}\int_{x=-1}^{1} (1-x^2)\left[y^2\right]_0^{1+x^2} dx$$

$$\Rightarrow \frac{3}{2}\int_{-1}^{1} (1-x^2)(1+x^2)^2\,dx$$

$$\Rightarrow \frac{3}{2}\int_{x=-1}^{1} (1-x^2)(1+x^4+2x^2)\,dx$$

$$\Rightarrow \frac{3}{2}\int_{x=-1}^{1} 1+x^4+2x^2-x^2-x^6-2x^4\,dx$$

$$\Rightarrow \frac{3}{2}\int_{x=-1}^{1} 1-x^4+x^2-x^6\,dx$$

$$\Rightarrow \frac{3}{2}\left[x-\frac{x^5}{5}+\frac{x^3}{3}-\frac{x^7}{7}\right]_{-1}^{1} \Rightarrow 3\left[1-\frac{1}{5}+\frac{1}{3}-\frac{1}{7}\right]$$