1. Give an integral that computes the surface area of the surface $z = \frac{2}{3}\ (x^{3/2} + y^{3/2})$ over the region $0 \leq x \leq 2$ and $0 \leq y \leq 1$.

2. Give an integral that computes that computes the mass of a pringle shaped like the surface $z = x^2 - y^2$ over the region $x^2 + y^2 \leq 1$ if its areal density (mass per unit area) is given by $d(x, y, z) = \sqrt{1 + 4z + 8y^2}$.

3. Compute the surface integral $\int\int_S \vec{F} \cdot \hat{n}\ dS$ over the surface S consisting of the portion of a cylinder of radius 3 centered on the y-axis between $y = 0$ and $y = 2$, $\hat{n}$ is pointing away from the cylinder and $\vec{F} =< xy, e^z, yz >$.