

1. Find the surface area of the portion of the cone $z^2 = x^2 + y^2$ where $z \geq 0$ contained within the cylinder $x^2 + y^2 = 1$.

2. Compute $\int \int_S \frac{z^2}{x^2 + y^2 + z^2} dS$ where S is the cap of the sphere defined by $x^2 + y^2 + z^2 = 4$ and $z \geq 1$.

3. $\int \int_S \frac{dS}{z}$ where S is the portion of the sphere $x^2 + y^2 + z^2 = 9$ where $1 \leq x^2 + y^2 \leq 4$ and $z \geq 0$.