♢♡ Mass of a Lamina(薄鐵皮質量) ♡♢

A thin spherical shell of radius a has density $\delta(\vec{r}(\phi,\theta))$ per unit area at $\vec{r}(\phi,\theta)$. What is its total mass?

$$\int_0^{2\pi}\int_0^{\pi}\delta(\vec{r}(\phi,\theta))a^2\sin\phi\,d\phi\,d\theta$$

A thin sheet (say, of aluminium foil) has the shape of a surface $S:\vec{r}(u,v)$, $(u,v)\in D$ and has density $\delta(x,y,z)$ per unit area at (x,y,z). What is its total mass?

$$\iint_D \delta(\vec{r}(u,v))||\vec{r}_u\times\vec{r}_v||\,du\,dv$$
