$$\cancel{= -\tfrac{1}{2}\left(\left(\begin{smallmatrix}\\ 1\\ \end{smallmatrix}\right) - \tfrac{}{2}\right)}$$

$$= -\tfrac{1}{2}\left(\begin{pmatrix}2\\2\\0\end{pmatrix} - \begin{pmatrix}0\\2\\0\end{pmatrix}\right) \times \left(\begin{pmatrix}1\\1\\1\end{pmatrix} - \begin{pmatrix}0\\2\\0\end{pmatrix}\right)$$

$$= -\tfrac{1}{2}\begin{pmatrix}2\\0\\0\end{pmatrix} \times \begin{pmatrix}1\\-1\\1\end{pmatrix}$$

$$= -\tfrac{1}{2}\begin{vmatrix}\hat{i} & \hat{j} & \hat{k}\\ 2 & 0 & 0\\ 1 & -1 & 1\end{vmatrix}$$

$$= -\tfrac{1}{2}\begin{pmatrix}0\\-2\\-2\end{pmatrix}$$

$$= \begin{pmatrix}0\\1\\1\end{pmatrix}$$ ok then check the 3 others. They should be symmetric $\begin{pmatrix}0\\1\\1\end{pmatrix}, \begin{pmatrix}0\\-1\\1\end{pmatrix}, \begin{pmatrix}1\\0\\1\end{pmatrix}, \begin{pmatrix}-1\\0\\1\end{pmatrix}$

$\Sigma = \begin{pmatrix}0\\0\\4\end{pmatrix}$

c) Taking the x-y plane to be horizontal

Let $\vec{S}$ = vector area of lampshade
Let $\vec{S_b}$ = vector area of base
Let $\vec{S_t}$ = vector area of top

$\vec{S_b} = -\pi r_b^2 \hat{k} = -16\pi\hat{k}$

$\vec{S_t} = \pi r_t^2 \hat{k} = 9\pi\hat{k}$

$\vec{S} + \vec{S_b} + \vec{S_t} = \vec{0}$

$\therefore \vec{S} = -\vec{S_b} - \vec{S_t} = 16\pi\hat{k} - 9\pi\hat{k}$ ok
$= 7\pi\hat{k}$

irrespective of the height of the lampshade

try finding $\vec{S}$ directly without using $\Sigma\vec{S} = \vec{0}$