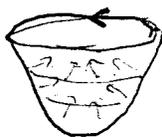


SECTION TWO

(1)

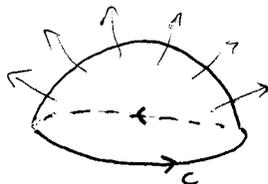


Since S is oriented upwards, C is oriented counterclockwise when viewed from the top (RH rule). Parameterize C by

$$x = \cos t \quad y = \sin t \quad z = 1 \quad 0 \leq t \leq 2\pi$$

$$\begin{aligned} \text{Then } \iint_S (\text{curl } \underline{F}) \cdot d\underline{S} &= \oint_C \underline{F} \cdot d\underline{r} \\ &= \int_{t=0}^{t=2\pi} \langle \sin^3 t, 1, 1 \rangle \cdot \langle -\sin t, \cos t, 0 \rangle dt \\ &= \int_{t=0}^{t=2\pi} (\cancel{\cos t} - \sin^4 t) dt \quad \text{(symmetry)} = \dots = \underline{\underline{3\pi/4}} \end{aligned}$$

(2)



Since S is oriented upwards, C is oriented counterclockwise when viewed from the top (RH rule). Parameterize C by

$$x = 2 \cos t \quad y = 2 \sin t \quad z = 0 \quad 0 \leq t \leq 2\pi$$

$$\begin{aligned} \text{Then } \iint_S (\text{curl } \underline{F}) \cdot d\underline{S} &= \oint_C \underline{F} \cdot d\underline{r} \\ &= \int_{t=0}^{t=2\pi} \langle 4 \cos^2 t, 4 \sin^2 t, 0 \rangle \cdot \langle -2 \sin t, 2 \cos t, 0 \rangle dt \\ &= \underline{\underline{0}} \quad \text{(symmetry)} \end{aligned}$$

SECTION THREE

$$(1) \quad \text{curl } \underline{F} = \begin{vmatrix} \underline{i} & \underline{j} & \underline{k} \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ z & 2x & 3y \end{vmatrix} = \langle 3, 1, 2 \rangle$$

~~By the normal vector field to the plane $z=1, 2$~~
 ~~$\iint_S \underline{F} \cdot d\underline{r} = \iint_S \langle 3, 1, 2 \rangle \cdot \underline{n} \, dA$~~