In the divergence theorem replace $\mathbf{v}$ by $\mathbf{v} \times \mathbf{c}$, where $\mathbf{c}$ is a constant vector, to show

$$
\int_{V}(\boldsymbol{\nabla} \times \mathbf{v}) d \tau=-\oint_{S} \mathbf{v} \times d \mathbf{a}
$$

