1. We have introduced the curl of a tensor field via the formula

$$[\operatorname{rot} \mathbb{A}]_{ij} = \epsilon_{jkl} \frac{\partial \mathrm{A}_{il}}{\partial x_k},$$

which implies that the curl operator can be defined in the similar manner as the divergence operator of a tensor field. Namely, $\operatorname{rot} \mathbb{A}$ is the tensor field that for all constant $\boldsymbol{v}$ satisfies the equation

$$(\operatorname{rot} \mathbb{A})^{\top} \boldsymbol{v} = \operatorname{rot} \left(\mathbb{A}^{\top} \boldsymbol{v} \right).$$

Show that $\operatorname{rot} \mathbb{A}$ behaves as expected, that is

$$\operatorname{rot} (\nabla \boldsymbol{u}) = \mathbb{0},$$
$$\operatorname{div} (\operatorname{rot} \mathbb{A}) = \mathbf{0}.$$