1 Question 1

1.1 a

$$\begin{aligned}
\vec{\nabla} \cdot (\vec{\nabla} \times \vec{V}) &= \partial_l(\eta^{li}\epsilon_{ijk}\partial^j V^k) \\
&= \partial^i \epsilon_{ijk}\partial^j V^k = \epsilon_{ijk}\partial^i\partial^j V^k \\
&= \frac{1}{2}(\epsilon_{ijk}\partial^i\partial^j V^k + \epsilon_{jik}\partial^j\partial^i V^k) \\
&= \frac{1}{2}(\epsilon_{ijk}\partial^i\partial^j V^k - \epsilon_{ijk}\partial^j\partial^i V^k) \\
= \frac{1}{2}(\epsilon_{ijk}\partial^i\partial^j V^k - \epsilon_{ijk}\partial^i\partial^j V^k) &= 0 \quad \square
\end{aligned}$$