Yichao Yu
8.311 Problem Set 1
Recitation Section 1

1.

(a)

$$
\begin{aligned}
&\left(\vec{A}\times\left(\vec{B}\times\vec{C}\right)\right)_i\\
=&\varepsilon_{ijk}A_j\left(\vec{B}\times\vec{C}\right)_k\\
=&\varepsilon_{kij}\varepsilon_{klm}A_jB_lC_m\\
=&(\delta_{il}\delta_{jm}-\delta_{im}\delta_{jl})A_jB_lC_m\\
=&B_iA_jC_j-C_iA_jB_j\\
=&\left(\vec{B}\left(\vec{A}\cdot\vec{C}\right)-\vec{C}\left(\vec{A}\cdot\vec{B}\right)\right)_i
\end{aligned}
$$