Q1: If $v_1, v_2.v_3$ is a basis for $\mathbb{R}^3$, we let $\omega_1, \omega_2, \omega_3$ be a basis for $\Lambda^1 \mathbb{R}^3$ and let $\omega_1 \wedge \omega_2, \omega_2 \wedge \omega_3, \omega_1 \wedge \omega_3$ be a basis for $\Lambda^2 \mathbb{R}^3$. We can identify $\Lambda^1 \mathbb{R}^3$ with $\mathbb{R}^3$ by viewing v_i as ω_i. Similarly, we can identify $\Lambda^2 \mathbb{R}^3$ with $\mathbb{R}^3$ by $v_1 \to \omega_1 \wedge \omega_2, v_2 \to \omega_2 \wedge \omega_3, v_3 \to \omega_1 \wedge \omega_3$. We claim that the usual $\wedge$ product on $\Lambda^1 \mathbb{R}^3 \times \Lambda^1 \mathbb{R}^3 \to \Lambda^2 \mathbb{R}^3$ can be viewed as a vector product operation on $\mathbb{R}^3 \times \mathbb{R}^3$. Let $\lambda = \alpha_1\omega_1 + \alpha_2\omega_2 + \alpha_3\omega_3$ and let $\eta = \beta_1\omega_1 + \beta_2\omega_2 + \beta_3\omega_3$. We evaluate $\lambda \wedge \eta$ in the usual way;

$$\begin{aligned}
\lambda \wedge \eta &= (\alpha_1\omega_1 + \alpha_2\omega_2 + \alpha_3\omega_3) \wedge (\beta_1\omega_1 + \beta_2\omega_2 + \beta_3\omega_3) \\
&= \alpha_1\omega_1 \wedge (\beta_1\omega_1 + \beta_2\omega_2 + \beta_3\omega_3) + \alpha_2\omega_2 \wedge \beta_1\omega_1 + \beta_2\omega_2 + \beta_3\omega_3 + \alpha_3\omega_3 \wedge \beta_1\omega_1 + \beta_2\omega_2 + \beta_3\omega_3 \\
&= \alpha_1\omega_1 \wedge \beta_1\omega_1 + \alpha_1\omega_1 \wedge \beta_2\omega_2 + \alpha_1\omega_1 \wedge \beta_3\omega_3 + \alpha_2\omega_2 \wedge \beta_1\omega_1 + \alpha_2\omega_2 \wedge \beta_2\omega_2 + \\
&\alpha_2\omega_2 \wedge \beta_3\omega_3 + \alpha_3\omega_3 \wedge \beta_1\omega_1 + \alpha_3\omega_3 \wedge \beta_2\omega_2 + \alpha_3\omega_3 \wedge \beta_3\omega_3 \\
&= \alpha_1\omega_1 \wedge \beta_2\omega_2 + \alpha_1\omega_1 \wedge \beta_3\omega_3 - \beta_1\omega_1 \wedge \alpha_2\omega_2 + \alpha_2\omega_2 \wedge \beta_3\omega_3 - \beta_1\omega_1 \wedge \alpha_3\omega_3 - \beta_2\omega_2 \wedge \alpha_3\omega_3 \\
&\qquad \text{(by supercommutativity)} \\
&= (\alpha_1\beta_2 - \beta_1\alpha_2)\omega_1 \wedge \omega_2 + (\alpha_2\beta_3 - \beta_2\alpha_3)\omega_2 \wedge \omega_3 + (\alpha_1\beta_3 - \beta_1\alpha_3)\omega_1 \wedge \omega_3 \qquad \text{(by linearity of } \wedge)
\end{aligned}$$

Therefore, we have a product operation on vectors in $\mathbb{R}^3$ defined in the following way:

$$(\alpha_1, \alpha_2, \alpha_3) \times (\beta_1, \beta_2, \beta_3) \mapsto (\alpha_1\beta_2 - \alpha_2\beta_1, \alpha_2\beta_3 - \alpha_3\beta_2, \alpha_1\beta_3 - \alpha_3\beta_1)$$

Note this product inherits properties of the wedge product. It is bilinear, alternating, supercommutative.