1. Multiple choice. Clearly mark your answers. No justification is required but may result in partial credit if provided.

   (a) [3 pts] If $|\mathbf{v} \times \mathbf{w}| = 0$ for two unit vectors $\mathbf{v}$ and $\mathbf{w}$, then $\mathbf{v} = \mathbf{w}$.

   (a) True.
   (b) False.
   (c) Indeterminable.

   (b) [3 pts] If $\mathbf{a} \cdot \mathbf{b} > 0$, and $\mathbf{b} \cdot \mathbf{c} > 0$, then $\mathbf{a} \cdot \mathbf{c} > 0$.

   (a) True.
   (b) False.
   (c) Indeterminable.

   (c) [3 pts] If $\mathbf{u} \times \mathbf{v} = \mathbf{0}$ and $\mathbf{u}$ is not the zero vector, then which of the following is necessarily true?

   (a) $\mathbf{u} \cdot \mathbf{v} = 0$
   (b) Either $\mathsf{proj}_{\mathbf{u}}\mathbf{v} = \mathbf{v}$ or $\mathsf{proj}_{\mathbf{u}}\mathbf{v} = -\mathbf{v}$
   (c) $|\mathbf{u}| = |\mathbf{v}|$
   (d) All of the above.
   (e) None of the above.

2. [4 pts] If $\mathbf{a} = \mathbf{j} - \mathbf{k}$ and $\mathbf{b} = \mathbf{k} - \mathbf{i}$, then determine the value of the coss product $\mathbf{a} \times \mathbf{b}$.

3. [4 pts] Let $\mathbf{a}$ and $\mathbf{b}$ be two vectors in $\mathbb{R}^3$ such that the projection of $\mathbf{b}$ onto $\mathbf{a}$ is $\mathsf{proj}_{\mathbf{a}}(\mathbf{b}) = \mathbf{i} - \mathbf{j}$. Determine the value of the projection vector $\mathsf{proj}_{\mathbf{a}}(3\mathbf{b})$.