

$$\begin{aligned}
 \text{6.12} \quad 1) \quad \vec{a} + \vec{b} - \vec{c} &= (2\vec{e}_1 - \vec{e}_2 + 5\vec{e}_3) + (\vec{e}_1 - \vec{e}_3) - (\vec{e}_1 + \vec{e}_2 - 3\vec{e}_3) \\
 &= 2\vec{e}_1 - \vec{e}_2 + 5\vec{e}_3 + \vec{e}_1 - \vec{e}_3 - \vec{e}_1 - \vec{e}_2 + 3\vec{e}_3 \\
 &= 2\vec{e}_1 - 2\vec{e}_2 + 7\vec{e}_3
 \end{aligned}$$

$$\begin{aligned}
 2) \quad 3\vec{a} + 3\vec{b} &= 3(2\vec{e}_1 - \vec{e}_2 + 5\vec{e}_3) + 3(\vec{e}_1 - \vec{e}_3) \\
 &= 6\vec{e}_1 - 3\vec{e}_2 + 15\vec{e}_3 + 3\vec{e}_1 - 3\vec{e}_3 \\
 &= 9\vec{e}_1 - 3\vec{e}_2 + 12\vec{e}_3
 \end{aligned}$$

$$\begin{aligned}
 3) \quad \vec{a} - \vec{b} - \vec{c} &= (2\vec{e}_1 - \vec{e}_2 + 5\vec{e}_3) - (\vec{e}_1 - \vec{e}_3) - (\vec{e}_1 + \vec{e}_2 - 3\vec{e}_3) \\
 &= 2\vec{e}_1 - \vec{e}_2 + 5\vec{e}_3 - \vec{e}_1 + \vec{e}_3 - \vec{e}_1 - \vec{e}_2 + 3\vec{e}_3 \\
 &= -2\vec{e}_2 + 9\vec{e}_3
 \end{aligned}$$

$$\begin{aligned}
 4) \quad 3\vec{a} + 2\vec{c} &= 3(2\vec{e}_1 - \vec{e}_2 + 5\vec{e}_3) + 2(\vec{e}_1 + \vec{e}_2 - 3\vec{e}_3) \\
 &= 6\vec{e}_1 - 3\vec{e}_2 + 15\vec{e}_3 + 2\vec{e}_1 + 2\vec{e}_2 - 6\vec{e}_3 \\
 &= 8\vec{e}_1 - \vec{e}_2 + 9\vec{e}_3
 \end{aligned}$$