

**Exercise 1**

Calculate  $(3\mathbf{i} + 2\mathbf{j} + \mathbf{k}) \cdot (\mathbf{i} + 2\mathbf{j} - \mathbf{k})$ .

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**Solution**

$$\begin{aligned}(3\mathbf{i} + 2\mathbf{j} + \mathbf{k}) \cdot (\mathbf{i} + 2\mathbf{j} - \mathbf{k}) &= (3)(1) + (2)(2) + (1)(-1) \\ &= 3 + 4 - 1 \\ &= 6\end{aligned}$$