

Each problem is worth 5 points. Clear and complete justification is required for full credit.

Let $\mathbf{a} = 3\mathbf{j} - 2\mathbf{k}$, and $\mathbf{b} = -2\mathbf{i} + 5\mathbf{j} - \mathbf{k}$.

1. Find $\mathbf{a} \cdot \mathbf{b}$.

$$\langle 0\mathbf{i}, 3\mathbf{j}, -2\mathbf{k} \rangle \cdot \langle -2\mathbf{i}, 5\mathbf{j}, -1\mathbf{k} \rangle$$

$$(0 \cdot -2) + (3 \cdot 5) + (-2 \cdot -1)$$

$$0 + 15 + 2$$

$$\boxed{17}$$

Great!

2. Find $\mathbf{a} \times \mathbf{b}$.

$$\mathbf{a} = \langle 0, 3, -2 \rangle$$

$$\mathbf{b} = \langle -2, 5, -1 \rangle$$

$$\mathbf{a} \times \mathbf{b} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 0 & 3 & -2 \\ -2 & 5 & -1 \end{vmatrix}$$

$$= (-3\vec{i} + 4\vec{j} + 0\vec{k}) - (-10\vec{i} + 0\vec{j} - 6\vec{k})$$

$$= \underline{\underline{7\vec{i} + 4\vec{j} + 6\vec{k}}}$$

Excellent!