

HW1-6)

$$\vec{A} = 3\hat{i} - 4\hat{j} + \hat{k} \quad \text{and} \quad \vec{B} = -\hat{i} + 3\hat{j} + 2\hat{k}$$

$$\vec{A} \cdot \vec{B} = A_x B_x + A_y B_y + A_z B_z = (3)(-1) + (-4)(3) + (1)(2) = -13 .$$

$$\begin{aligned} \vec{A} \times \vec{B} &= \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ A_x & A_y & A_z \\ B_x & B_y & B_z \end{vmatrix} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 3 & -4 & 1 \\ -1 & 3 & 2 \end{vmatrix} \\ &= ((-4)(2) - (1)(3))\hat{i} + ((1)(-1) - (3)(2))\hat{j} + ((3)(3) - (-4)(-1))\hat{k} \\ &= -11\hat{i} - 7\hat{j} + 5\hat{k} . \end{aligned}$$