**HW Jan 14, Johannes Byle**

**1.1** $\mathbf{b} + \mathbf{c} = 2\hat{x} + \hat{y} + \hat{z}$
$5\mathbf{b} + 2\mathbf{c} = 7\hat{x} + 5\hat{y} + 2\hat{z}$
$\mathbf{b} \cdot \mathbf{c} = \hat{x}$
$\mathbf{b} \times \mathbf{c} = \hat{x} + \hat{y} - \hat{z}$

**1.2** $\mathbf{b} + \mathbf{c} = (4, 4, 4)$
$5\mathbf{b} - 2\mathbf{c} = (-1, 6, 13)$
$\mathbf{b} \cdot \mathbf{c} = 3$
$\mathbf{b} \times \mathbf{c} = (-4, 8, -4)$

**1.4** $\mathbf{b} \cdot \mathbf{c} = |\mathbf{b}||\mathbf{c}| cos\theta$
$cos^{-1}(\frac{\mathbf{b} \cdot \mathbf{c}}{|\mathbf{b}||\mathbf{c}|}) = \theta$
$cos^{-1}(\frac{12}{21}) \approx 55.2^{\circ}$