

VECTORS: ASSIGNMENT 1

- p309 (all) and 7.1&7.2 is a good review

2 questions

- one question based on forces and/or velocity
- one question based on vectors (first 3 lessons)

Dot Product

$$\vec{a} = \langle 1, 2, -3 \rangle$$

$$\vec{b} = \langle 0, 3, -1 \rangle$$

$$\begin{aligned} \vec{a} \cdot \vec{b} &= \langle 1, 2, -3 \rangle \cdot \langle 0, 3, -1 \rangle \\ &= 0 + 6 + 3 \\ &= 9 \end{aligned}$$

$$|\vec{a}| = 4 \text{ units} \quad |\vec{b}| = 7 \text{ units}$$

$$\theta = 35^\circ \quad \vec{a} \cdot \vec{b} = ?$$

$$\begin{aligned} \vec{a} \cdot \vec{b} &= |\vec{a}| |\vec{b}| \cos \theta \\ &= (4)(7) \cos 35^\circ \\ &= 22.9 \end{aligned}$$

$$\begin{aligned} &(\vec{a} + 3\vec{b}) \cdot (4\vec{a} - \vec{b}) \\ &= 4\vec{a} \cdot \vec{a} - \vec{a} \cdot \vec{b} + 12\vec{b} \cdot \vec{a} - 3\vec{b} \cdot \vec{b} \\ &= 4|\vec{a}|^2 + 11\vec{a} \cdot \vec{b} - 3|\vec{b}|^2 \end{aligned}$$

