

## MEC 262 Homework 1, Due on 2/2/2017 at 8:30 am

1. Given vectors  $\vec{a}$  and  $\vec{b}$  as,

$$\begin{aligned}\vec{a} &= \hat{i} + 4\hat{j} + 3\hat{k} \\ \vec{b} &= 2\hat{i} + \hat{j} + \hat{k}\end{aligned}$$

Compute,

- Compute the magnitude and direction of the sum of  $\vec{a}$  and  $\vec{b}$ .
- Dot product of the two vectors  $\vec{a}$  and  $\vec{b}$ .
- Verify that the dot product of a vector with itself is equal to the square of the magnitude of the vector.
- Compute cross product of vectors  $\vec{a}$  and  $\vec{b}$ .
- Use dot product to verify that the cross product is perpendicular to both  $\vec{a}$  and  $\vec{b}$ .

## 2. Unit conversions,

- Convert m/s to miles per hour.
- Convert slug to SI units.
- What physical quantity is slug unit of? What is the unit of this quantity in SI system.
- What physical quantity is pound unit of? What is the unit of this quantity in SI system.

In [ ]: