

# Tuesday Reading Assessment: Unit 0, Review of 135A

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## 1 Memory Bank

- $\vec{a} = a_x\hat{i} + a_y\hat{j}$  ... Component notation for 2D vector
- $\vec{a} + \vec{b} = (a_x + b_x)\hat{i} + (a_y + b_y)\hat{j}$  ... Adding vectors
- $\vec{a} - \vec{b} = (a_x - b_x)\hat{i} + (a_y - b_y)\hat{j}$  ... Subtracting vectors
- $|\vec{a}| = \sqrt{a_x^2 + a_y^2}$  .. Magnitude of a 2D vector
- $a_x = |\vec{a}| \cos \theta$  ... x-component of a 2D vector
- $a_y = |\vec{a}| \sin \theta$  ... y-component of a 2D vector
- $\vec{a} \cdot \vec{b} = a_x b_x + a_y b_y$  ... Dot product of two vectors

## 2 Warm-Up Exercises

1. Perform the following unit conversions:
  - Convert 320 gm to kg:
  - Convert  $2.4 \times 10^5 \text{ cm s}^{-1}$  to  $\text{km hr}^{-1}$ :
  - Convert the density of ice,  $0.9167 \text{ gm cm}^{-3}$ , to  $\text{kg m}^{-3}$ .
2. Let  $\vec{x} = 0.5\hat{i} - 0.5\hat{j}$ , and  $\vec{y} = -0.5\hat{i} + 0.5\hat{j}$ . (a) Calculate  $\vec{x} + \vec{y}$ . (b) Calculate  $\vec{x} - \vec{y}$ . (c) What is the magnitude of  $\vec{a}$ ? (d) What is the magnitude of  $\vec{b}$ ?
3. Let  $\vec{F}$  be a 10 N force that makes a 60 degree angle with the x-axis. (a) What is the x-component of this force? (b) What is the y-component? (c) Suppose this force displaces a system 3 m along the x-axis. What is the work done? Recall that  $W = \vec{F} \cdot \Delta\vec{x}$ .