Monday 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 120 cm to m:
   - Convert 500 cm^2 to m^2:
   - One "atmosphere" of pressure, or 1 atm, is equal to 101325 Pascals, or Pa. A Pascal is defined as 1 N m^{-2}. Convert 610 Pa to atm. (This is roughly the air pressure on Mars).

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?