

Warm Up: Unit analysis and vectors

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1 Memory Bank

1. $\vec{v} = v_x \hat{i} + v_y \hat{j}$... Definition of a vector in terms of \hat{i} and \hat{j} components (representing the x-direction and y-direction).
2. $\vec{v} + \vec{w} = (v_x + w_x)\hat{i} + (v_y + w_y)\hat{j}$... Vector addition: the \hat{i} -components add with each other, and the \hat{j} -components add with each other.
3. $|\vec{v}| = \sqrt{v_x^2 + v_y^2}$... The magnitude of the vector
4. $v_x = |\vec{v}| \cos \phi$, $v_y = |\vec{v}| \sin \phi$... The x and y-components of the vector

2 Chapter 1 - Estimation

1. Using whatever techniques seem appropriate, *estimate* the following:
 - A: The number of people in class.
 - B: The number of people on this floor of the SLC.
 - C: The number of people in the SLC.
 - D: The number of books in Wardman Library.

3 Chapter 2 - Algebra of Vectors

1. Calculate the following:
 - A: If we have a velocity $\vec{v} = -3\hat{i} + 3\hat{j}$ km/hr, what is the *magnitude* of the velocity?
 - B: If we have a velocity $\vec{v} = -3\hat{i} + 3\hat{j}$ km/hr, draw a picture of the velocity in a 2D coordinate system.
 - C: If we have a velocity $\vec{v} = -3\hat{i} + 3\hat{j}$ km/hr, what is the angle the velocity makes with the positive x-axis?