

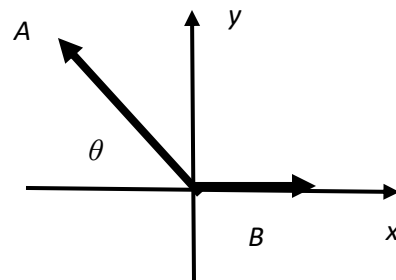
Physics 1135 Homework for Recitation 3: Vectors and 2-d Kinematics

1. Two vectors are given as $\vec{A} = 4.0\hat{i} + 6.0\hat{j}$ and $\vec{B} = 5.0\hat{i} - 2.0\hat{j}$

- Sketch the vectors in a diagram and find magnitude and direction of each vector.
- The vector $\vec{C} = \vec{B} + \vec{A}$. Sketch the vector $\vec{C}$, express it in unit vector notation, and find its magnitude and direction.

2. In the figure, the magnitudes of the vectors are $A=5$ and $B=2$. The angle θ equals 30° .

- Calculate the vector components A_x , A_y , B_x , B_y .
- The vector $\vec{C} = \vec{B} + \vec{A}$. Sketch vector $\vec{C}$ in the diagram and calculate its components, magnitude, and direction.



For problems 3 and 4, remember to follow the Recipe for Kinematics Problems:

- Draw complete diagrams. Every symbol you use in your calculation must be defined in the diagram.
- Begin with a starting equation from the equation sheet.
- Work in symbols and derive symbolic expressions before using numerical values.

3. In a lecture demonstration, two balls start at the same height above the floor. Ball 1 is dropped from rest. Ball 2 is launched horizontally with an initial speed V_0 .

- Draw a complete diagram, including x - and y - axes. What are the x - and y - components of the acceleration and the initial velocity, respectively, for each of the balls?
- Derive an expression for the time it takes the balls to reach the ground.

4. You roll a small ball on a horizontal table that is 1.2m above the floor. It rolls off the edge with a horizontal velocity of magnitude 0.5m/s.

- How long does it take the ball to hit the floor?
- At what horizontal distance from the table does it land on the floor?
- What is the ball's speed as it hits the ground? (Hint: velocity has x - and y - components!)
- Sketch, qualitatively, the horizontal and vertical components of velocity as functions of time.