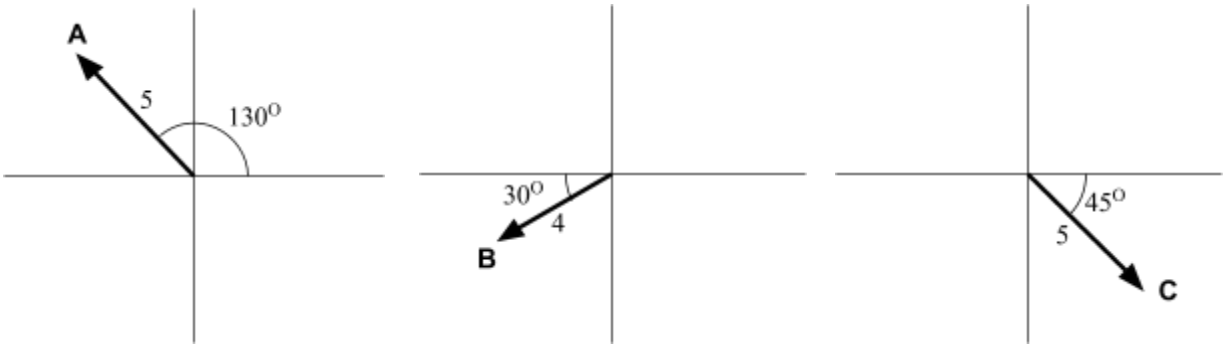
PAL Problem Set 6 for Phys 5A (Vectors and Projectile Motion)

Always explain your answers and show your work.

1. Determine the numerical values of the x- and y-components of each vector.



2. Calculate the components S_x and S_y of the vector $\vec{S} = \vec{A} - \vec{B} + \vec{C}$

3. Find the magnitude and direction of vector $\vec{S}$ (why use tan and $\tan^{-1}$?)

4. Sketch vector $\vec{S}$ by doing the graphical sum of $\vec{A} + \vec{B} - \vec{C}$. Be careful to maintain the magnitude and direction of each vector. Check that your answers to #2 above make sense (i.e., are consistent) with your drawing vector $\vec{S}$.

5. A rock thrown with speed 7.0 m/s and launch angle 30.0^{o} (above the horizontal) travels a horizontal distance of d = 20.0 m before hitting the ground. From what height was the rock thrown? Use the value g = 9.8 m/s^2 for the free-fall acceleration.

   In the y-direction, which situation do we have?
   a) Constant Position
   b) Constant Velocity
   c) Constant Acceleration

   In the x-direction, which situation do we have?
   a) Constant Position
   b) Constant Velocity
   c) Constant Acceleration

   MODEL
   What simplifying assumptions will you be using to solve this problem?

   VISUALIZE
   - Draw a motion diagram.
   - Establish a coordinate system for each part of the motion (can you use the same x-axis for both?).
   - List knowns and unknowns for each part of the motion. Identify what you are trying to find.

   PLAN OF ACTION
   What steps will you need to take to solve this problem?

   SOLVE

   ASSESS
   Do your numbers seem reasonable? Do you have the correct units and signs?