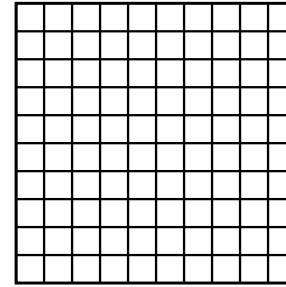
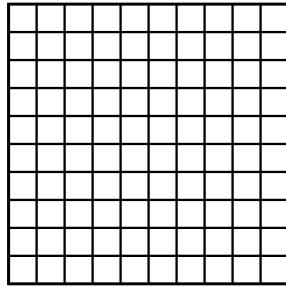

PHYS 1210 Group Work Sheet

Vectors

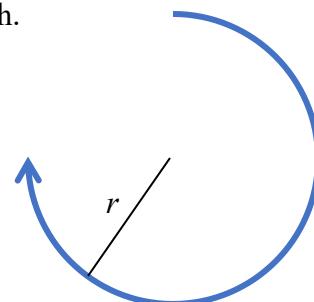
With your group, discuss how to answer these questions and write your group answer in the space provided.

Vector \vec{A} can be expressed in (x, y) components as $\vec{A} = (2.00 \text{ m/s}, 5.00 \text{ m/s}) = (2.00\hat{i} + 5.00\hat{j})\text{m/s}$. Vector $\vec{B} = (1.00 \text{ m/s}, -3.00 \text{ m/s}) = (1.00\hat{i} - 3.00\hat{j})\text{m/s}$.

1. Draw vectors \vec{A} and \vec{B} in the grid.
2. Graphically add $\vec{A} + \vec{B}$ in the grid.

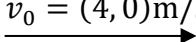
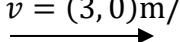


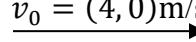
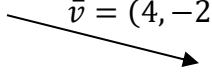
3. Find $\vec{A} + \vec{B}$ by adding the components together.
4. A pony on a lead of length $r = 5.0$ meters trots $\frac{3}{4}$ of the way around a complete circle.
 - a. What distance did the pony travel? This is its path length.
 - b. How far is the pony from where it started?
- c. We can define coordinates as we find useful. Let's place the origin $(0, 0)$ at the center of the circle containing the pony's path, set the $+x$ direction as \rightarrow , and the $+y$ direction as \uparrow .
 - i. What is the position vector of the start of the pony's path?
 - ii. What is the position vector of the end of the pony's path?

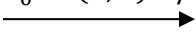
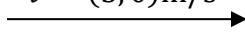


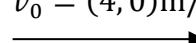
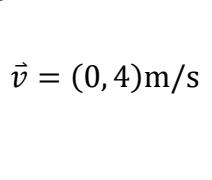
iii. What is the pony's displacement vector?

5. From the illustrated initial and final velocity vectors \vec{v}_0 and \vec{v} , specify the vector of the change in velocity $\Delta\vec{v} = \vec{v} - \vec{v}_0$ (sketch and components).

a. $\vec{v}_0 = (4, 0)\text{m/s}$  $\vec{v} = (3, 0)\text{m/s}$ 

b. $\vec{v}_0 = (4, 0)\text{m/s}$  $\vec{v} = (4, -2)\text{m/s}$ 

c. $\vec{v}_0 = (4, 0)\text{m/s}$  $\vec{v} = (5, 0)\text{m/s}$ 

d. $\vec{v}_0 = (4, 0)\text{m/s}$  $\vec{v} = (0, 4)\text{m/s}$ 

Define vectors $\vec{A} = (10\hat{i} + 30\hat{j})\text{ N}$ and $\vec{B} = (0.50\hat{i} + 0.1\hat{j})\text{ m}$.

6. What are the magnitudes of the vectors?

$A:$ _____ $B:$ _____

7. What is the dot product of vectors \vec{A} and \vec{B} as defined above?

8. What is the angle between vectors \vec{A} and \vec{B} as defined above?