

Name _____ Instructor name _____

You must show and explain all work neat and organized to receive credit. Please show each step for calculations. YOU MUST TURN IN THIS SHEET to have your assignment graded.

1. Given $\vec{a} + \vec{b} = 0$, how is the magnitude of $\vec{a}$ related to the magnitude of $\vec{b}$? How are the directions of $\vec{a}$ and $\vec{b}$ related? Find the direction and magnitude of vectors $\vec{R}_1 = 6.3\vec{A} - 8.1\vec{B}$ and $\vec{R}_2 = 7.8\vec{B} - 3.5\vec{A}$ where $\vec{A} = 1.7\hat{x} - 5.1\hat{y}$ and $\vec{B} = 2.8\hat{x} - 3.4\hat{y}$. (8 pts)

2. Vector $\vec{A}$ points in the negative x - direction. Vector $\vec{B}$ points at an angle of 67.0° above the positive x - axis. Vector $\vec{C}$ has a magnitude of 13.5 m and points at an angle of 17.0° below the positive x - axis. Given $\vec{A} + \vec{B} + \vec{C} = 0$, find the magnitude of $\vec{A}$ and $\vec{B}$. (7 pts)

3. Two vectors, $\mathbf{A}$ and $\mathbf{B}$, are drawn on an $x - y$ coordinate system, as shown. Vector $\mathbf{A}$ has a magnitude of 5.00 units, and vector $\mathbf{B}$ has a magnitude of 9.00 units. Find the x - and y - components of vectors $\mathbf{A}$ and $\mathbf{B}$ in the $x - y$ system. Compute the magnitude of the resultant in the $x - y$ coordinate system. A second coordinate system, the $x' - y'$ system, is rotated 37.0° with respect to the $x - y$ system, as shown. Find the x' - and y' - components of $\mathbf{A}$ and $\mathbf{B}$ in the $x' - y'$ system. Compute the magnitude of the resultant in the $x' - y'$ coordinate system. (Hint: Calculate the angle that $\mathbf{A}$ and $\mathbf{B}$ made with respect to the $x' - y'$ axes.) (5 pts)

