

1. For the vectors $\vec{A} = \begin{pmatrix} 5\text{cm} \\ -6\text{cm} \end{pmatrix}$ and $\vec{B} = \begin{pmatrix} 3\text{cm} \\ 4\text{cm} \end{pmatrix}$. Find $\|\vec{A}\|$, $\|\vec{B}\|$, $\vec{A} + \vec{B}$, and $\vec{A} - \vec{B}$ graphically.
2. For the vectors \vec{C} (magnitude 7cm pointing 35° CCW from the +x-axis) and \vec{D} (magnitude 4cm pointing 240° CCW from the +x-axis). Find $\vec{C} + \vec{D}$ using analytical methods.
3. It is a beautiful weekend day and, since winter will soon be here, you and four of your friends decide to spend it outdoors. Two of your friends just want to relax while the other two want some exercise. You need some quiet time to study. To satisfy everyone, the group decides to spend the day on the Allegheny river. Two people will put a canoe in the river and just drift downstream with the 1.5 mile per hour current. The second pair will begin at the same time as the first from 10 miles downstream. They will paddle upstream until the two canoes meet. Since you have been canoeing with these people before, you know that they will have an average velocity of 2.5 miles per hour relative to the shore when they go against this river current. When the two canoes meet, they will come to shore and you should be there to meet them with your jeep. You decide to go to that spot ahead of time so you can study while you wait for your friends. Where will you wait?