

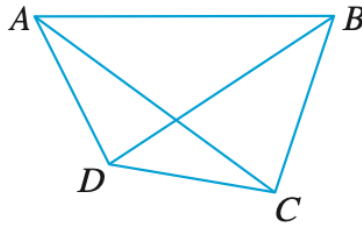
Math 203 — Introduction to Vectors

Problem 1. Consider the vectors \mathbf{a} and \mathbf{b} below. Draw the vectors $\mathbf{a} + \mathbf{b}$, $\mathbf{a} - \mathbf{b}$, $0.5\mathbf{b} - \mathbf{a}$.



Problem 2. Write the following sums of vectors each as a single vector:

- $\overrightarrow{AB} + \overrightarrow{BC}$
- $\overrightarrow{CD} + \overrightarrow{DB}$
- $\overrightarrow{DB} - \overrightarrow{AB}$



Problem 3. Consider the vectors $\mathbf{u} = \langle 2, 1 \rangle$ and $\mathbf{v} = \langle -1, -4 \rangle$.

- Sketch \mathbf{u} , \mathbf{v} on the same axes, using $(0, 0)$ as the basepoint for both.
- Add the vector $\mathbf{u} - \mathbf{v}$ to your sketch by scaling and shifting \mathbf{v} .
- Compute $\mathbf{u} - \mathbf{v}$ in component form. Check that it matches your picture.
- Find the unit vector in the direction of \mathbf{u} .
- Find the unit vector in the direction opposite of \mathbf{v} .
- Find the vector of length 3 in the direction opposite of \mathbf{u} .

Problem 4. Let $P = (4, 3)$ and $Q = (-1, 5)$.

- Find \overrightarrow{PQ} and \overrightarrow{QP} in component form.
- Suppose $\mathbf{v} = \overrightarrow{PR}$ and $\mathbf{v} = \langle 10, 3 \rangle$. What is R ?
- Are \overrightarrow{PR} and \overrightarrow{PQ} parallel?