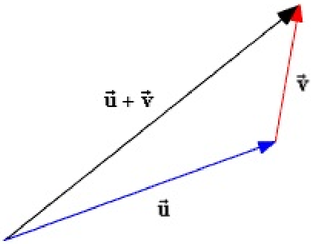
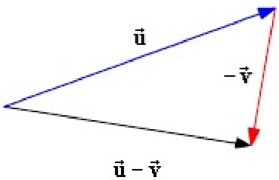
Adding and Subtracting Vectors

We can add vectors $\vec{u}+\vec{v}$ using the triangle method:



The vector $\vec{u}-\vec{v}$ can be found by using the triangle method for addition but instead of adding $\vec{v}$, you can add $-\vec{v}$, which is the same vector as $\vec{v}$ but in opposite direction.



Problems

1. For any two vectors $\vec{a}$, $\vec{b}$ show that $\vec{a}+\vec{b}=\vec{b}+\vec{a}$

2. For any three vectors $\vec{a}$, $\vec{b}$, and $\vec{c}$, prove that $(\vec{a}+\vec{b})+\vec{c}=\vec{a}+(\vec{b}+\vec{c})$

3. ABC is a triangle. Find the sum of the vectors $\overrightarrow{AB}, \overrightarrow{BC}$ and $\overrightarrow{CA}$.

4. If M is the mid-point of the line segment PQ, then $\overrightarrow{MP}$ + $\overrightarrow{MQ}$=0

5. ABCD is a quadrilateral. P and Q are mid-points of AB and CD respectively. Prove that $\overrightarrow{AD}$ + $\overrightarrow{BC}$= 2 $\overrightarrow{PQ}$

6. ABC is a triangle. P is a point on the side BC such that PC = 3PB. Show that 4$\overrightarrow{AP}$=$\overrightarrow{AC}$ +3 $\overrightarrow{AB}$.

7. ABCD is a square and M, N are mid-points of $\overrightarrow{BC}$, and $\overrightarrow{CD}$ respectively. Let $\vec{u}=\overrightarrow{AM}$ and $\vec{v}=\overrightarrow{AN}$. Express $\overrightarrow{AB}$, $\overrightarrow{AC}$, $\overrightarrow{BD}$ in terms of $\vec{u}$ and $\vec{v}$.