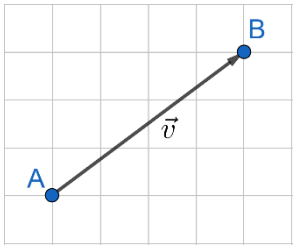
Precalculus

6-03 Vectors

Vector

- _____line segment $\vec{v}$
- Has _____and _____
- Magnitude $\|\vec{v}\|$ is _____of the segment



Component form

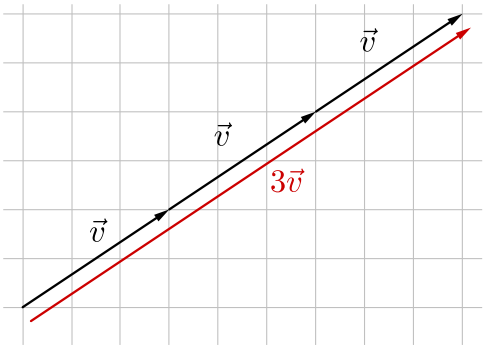
- $\vec{v} = \langle v_1, v_2 \rangle$
- _____– _____point
- $\vec{v} = \langle q_1 - p_1,\ q_2 - p_2 \rangle = \langle v_1, v_2 \rangle$
- $\|\vec{v}\| = \sqrt{(q_1 - p_1)^2 + (q_2 - p_2)^2}$
  $= \sqrt{v_1^2 + v_2^2}$

Find the component form of the vector and its magnitude if its initial point is (1, 7) and its terminal point is (4, 3).

Vector Operations

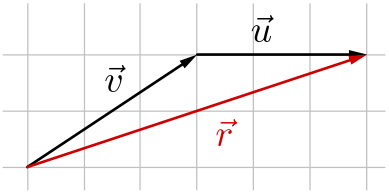
Scalar Multiplication

- $k\,\vec{v} = \langle kv_1, kv_2 \rangle$
- If k is negative it goes in _____direction



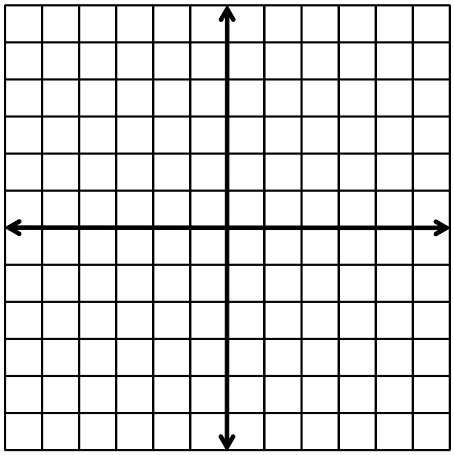
Add

- Add _____components
- $\vec{v} + \vec{u} = \langle v_1 + u_1,\ v_2 + u_2 \rangle$

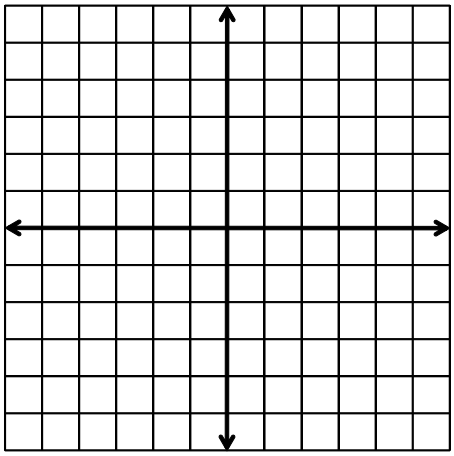


$\langle 2,\ 3 \rangle + \langle 1,\ 0 \rangle$

Let $\vec{u} = \langle 1,\ 6\rangle$ and $\vec{v} = \langle -4,\ 2\rangle$, find $3\vec{u}$



Let $\vec{u} = \langle 1,\ 6\rangle$ and $\vec{v} = \langle -4,\ 2\rangle$, find $2\vec{v} + \vec{u}$



Unit Vectors

- Vector in the _____direction, but magnitude is _____
  - $\hat{u} = \frac{\vec{v}}{\|\vec{v}\|}$
- Special Unit Vectors
  - $\hat{\imath}$ =_____
  - $\hat{\jmath}$ =_____

Linear Combination Form

- $3\hat{\imath} + 2\hat{\jmath} = \langle 3,\ 2\rangle$

Let $\vec{v} = 3\hat{\imath} - 4\hat{\jmath}$ and $\vec{w} = 2\hat{\imath} + 9\hat{\jmath}$, find $2\vec{v} + \vec{w}$.