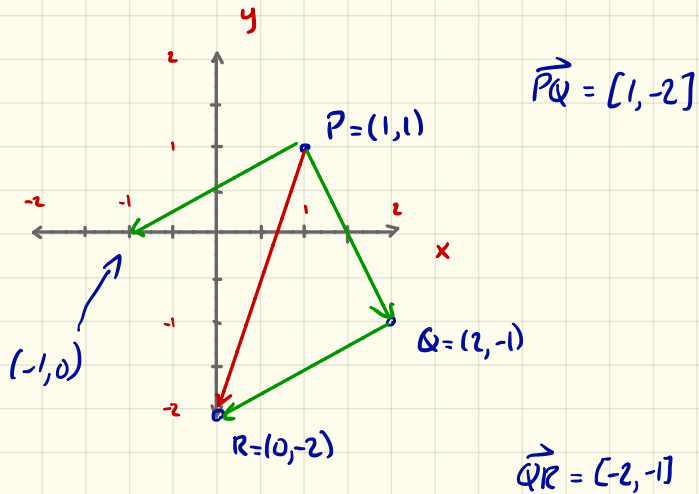


11 Sept 2017



$$\vec{PQ} + \vec{QR} = [-1, -3]$$
$$= \vec{PR}$$

$$P + \vec{QR} = (1, 1) + [-2, -1]$$
$$= (-1, 0)$$

# vector arithmetic

- subtraction?

Example:

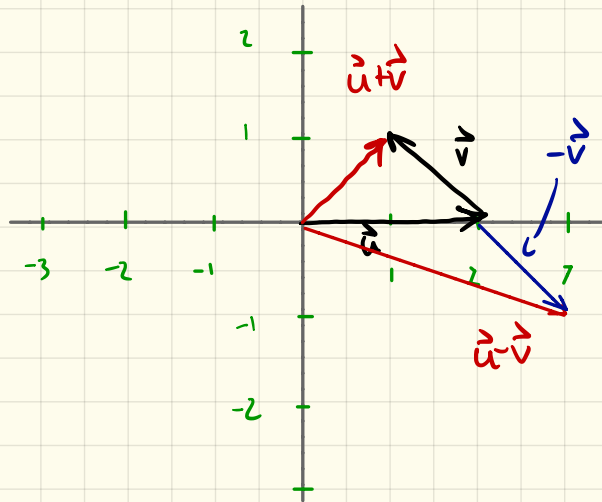
$$\vec{u} = \begin{bmatrix} 2 \\ 0 \end{bmatrix}$$

$$\vec{v} = \begin{bmatrix} -1 \\ 1 \end{bmatrix}$$

$$-\vec{v} = \begin{bmatrix} 1 \\ -1 \end{bmatrix}$$

$$\vec{u} + \vec{v} = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

$$\vec{u} - \vec{v} = \begin{bmatrix} 3 \\ -1 \end{bmatrix}$$



③

scalar multiples :

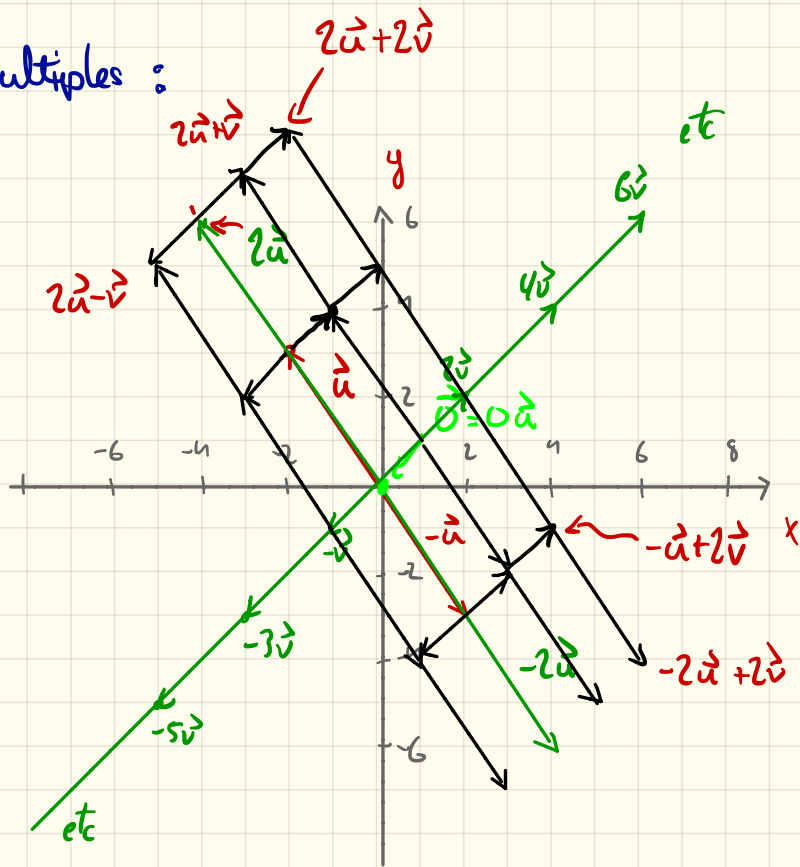
$$\vec{v} = [1, 1]$$

$$2\vec{v} = [2, 2]$$

$$-\vec{v} = [-1, -1]$$

etc.

$$\vec{u} + \vec{v} = [-1, 4]$$



$$\vec{u} = [-2, 3]$$

$$-\vec{u} = [2, -3]$$

$$2\vec{u} = [-4, 6]$$

$$-2\vec{u} = [4, -6]$$

$$\frac{1}{2}\vec{u} = [-1, \frac{3}{2}]$$

$$3\vec{u} = [-6, 9]$$

$$0 \cdot \vec{u} = [0, 0]$$

=  
 $\vec{0}$