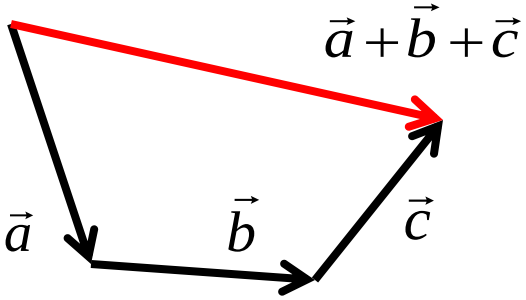
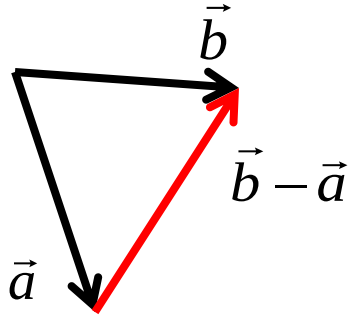
Vectors

Vectors are ***directed line segments***, they have magnitude (length) and direction

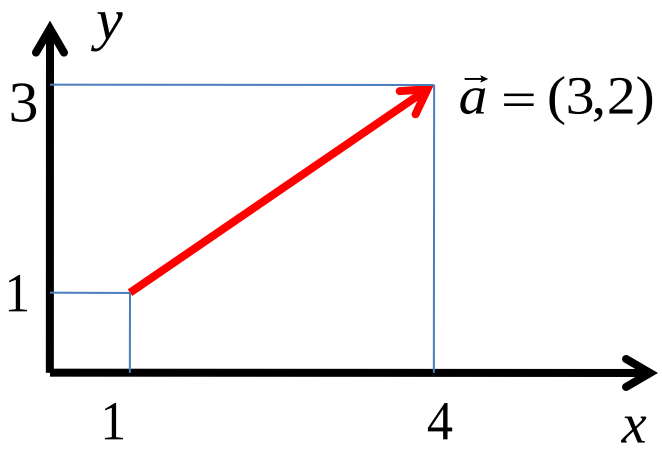
Vectors can be added:



and subtracted:



If there is a coordinate system, a vector can be expressed as a set of ***components*** along X and Y axes in 2D, or along X,Y,Z in 3D:



$+,-$ operations are done for each component :

if $\vec{a}=(a_x,a_y)$ and $\vec{b}=(b_x,b_y)$,

$\vec{a}+\vec{b}=(a_x+b_x,a_y+b_y)$

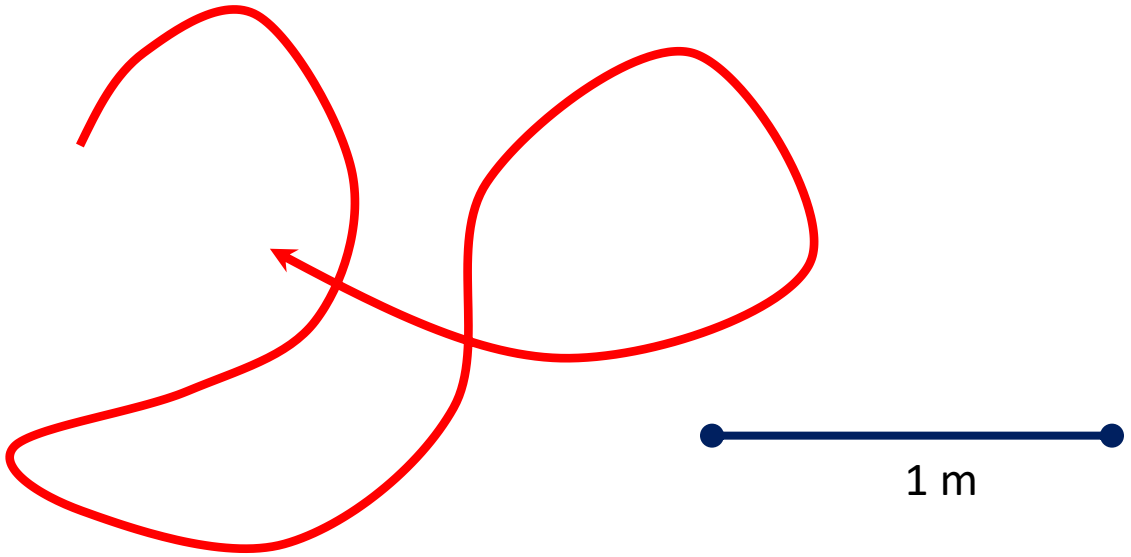
$\vec{a}-\vec{b}=(a_x-b_x,a_y-b_y)$

To find *magnitude* of a vector, use Pythagorean Theorem : $|\vec{a}|=\sqrt{a_x^2+a_y^2}$

Homework

Problem 1

The picture shows the path of an ant that it covered in 1 minute. Find its average speed. You will need to come up with a creative way to measure the distance travelled. Please describe it. Use anything you want.



Problem 2. Find the result of operations with vectors. Use graphical method (with pencil and rulers)

Since you will need to redraw vectors while preserving their directions, you can use the “sliding ruler” trick shown on the right.