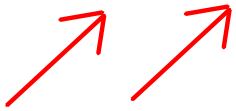
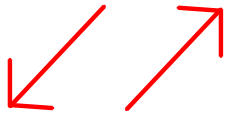
Equal Vectors:

___* Two vectors are equal iff they have the same magnitude (length) and direction.



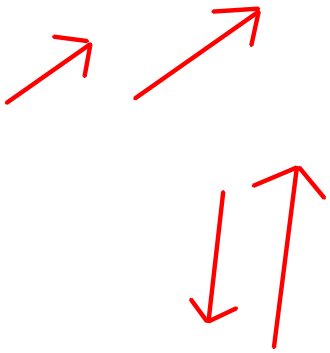
Equal Vectors



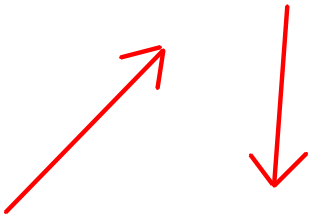
Not Equal Vectors

Parallel Vectors:

___* Two vectors are parallel iff they have the same or opposite directions.



Parallel Vectors



Not Parallel Vectors

Resultant:

____* The sum of two vectors that have been added together.

* Add the corresponding components (x- and y-values).

$\vec{a} = \langle x_1, y_1 \rangle$ and $\vec{b} = \langle x_2, y_2 \rangle$

$\vec{a} + \vec{b} = \langle x_1 + x_2, y_1 + y_2 \rangle$

$\vec{b} + \vec{a} = \langle x_2 + x_1, y_2 + y_1 \rangle$

Vectors can be used to describe translations.

Example 1: A (-3, -1) and B (-1, -2). What are the image points under the translation $\vec{v} = \langle 4, 3 \rangle$.

$A + \vec{v} = \langle -3+4, -1+3 \rangle = \langle 1, 2 \rangle$

$B + \vec{v} = \langle -1+4, -2+3 \rangle = \langle 3, 1 \rangle$

Example 2: Find the magnitude and direction of each resultant for the given vectors.

$\vec{A}$ = <5,0> $\vec{B}$ = <0,12>

$\vec{A}+\vec{B} = \langle 5+0, 0+12 \rangle$

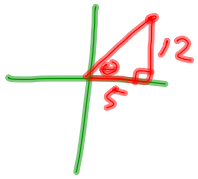
$= \langle 5, 12 \rangle$

$||\vec{AB}|| = \sqrt{(5)^2+(12)^2}$

$= \sqrt{25+144}$

$= \sqrt{169}$

$||\vec{AB}|| = 13$



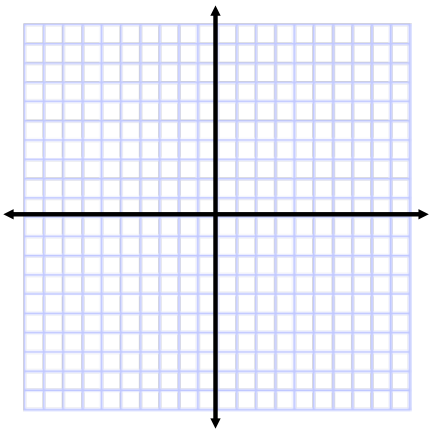
$\tan\theta = \frac{12}{5}$

$\theta = \tan^{-1}\frac{12}{5}$

$\theta \approx 67.38°$

Example 3: Graph the image of the figure under a translation by the given vectors.

$\triangle$ ABC with vertices A(3,6), B(3,-7), C(-6,1); K = <0,-6>



Scalar Multiplication:

___* When a vector is multiplied by a positive scalar (scale factor).

* Each component (x- and y-values) will be multiplied by the scalar value.

Example: A = <4,-8> Find 5A.