


# Fectorau

*Vectors*



 @mathemateg

 /adolygumathemateg

# Fectorau / Vectors

Mae **factor** yn disgrifio safle pwynt mewn plân.  
A **vector** describes the position of a point in a plane.

$i$  yw'r factor uned yng nghyfeiriad yr echelin- $x$ .  
 $j$  yw'r factor uned yng nghyfeiriad yr echelin- $y$ .

$i$  is the unit vector in the direction of the  $x$ -axis.  
 $j$  is the unit vector in the direction of the  $y$ -axis.

## Enghraifft / Example

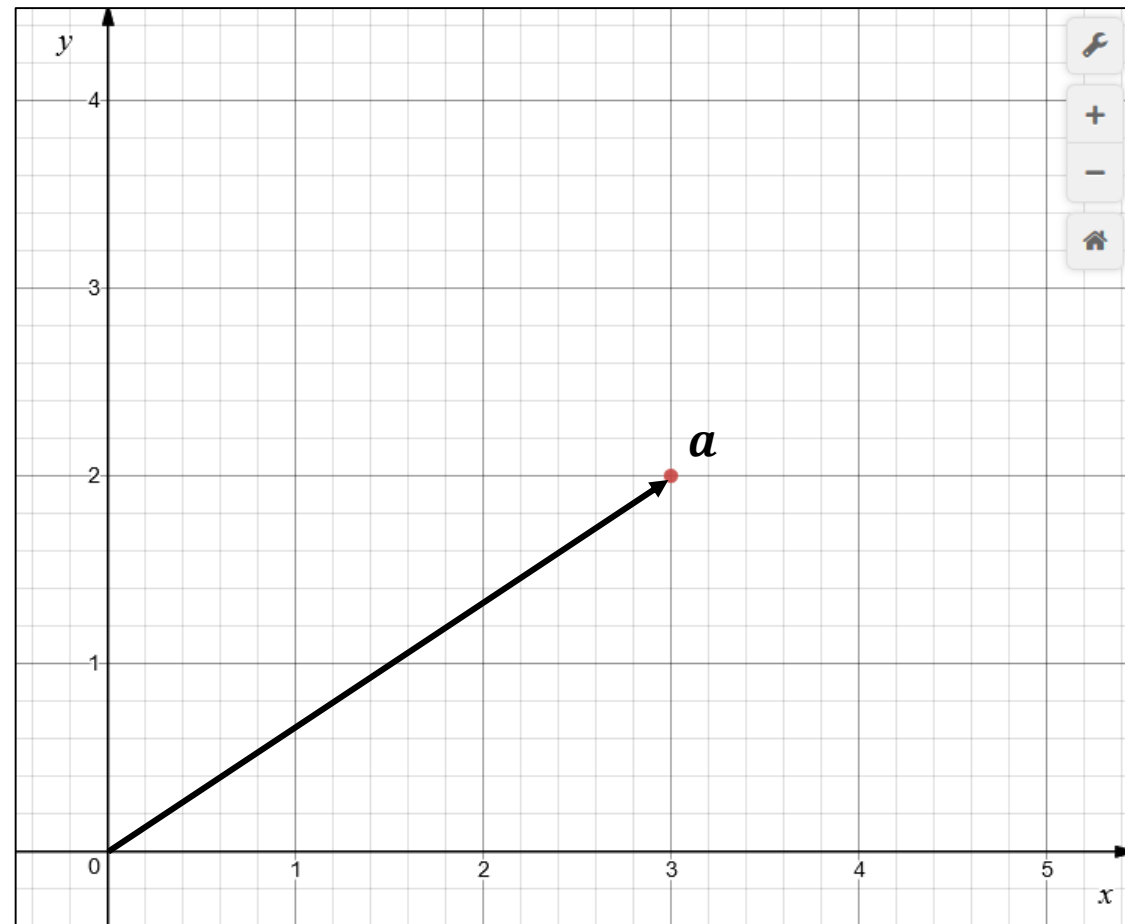
$$a = 3i + 2j$$

Ar gyfrifiadur, **print trwm**.

Ar bapur, tanlinellu.

On a computer, **in bold**.

Written, underlined.



[www.desmos.com/calculator](http://www.desmos.com/calculator)

# Cyfrifo efo fectorau / Calculating with vectors

## Enghraifft / Example

Os yw / If  $a = 5i + 3j$ ,  $b = 6i - 5j$  yna / then

$$a + b = 11i - 2j$$

$$a - b = -i + 8j$$

$$2a = 10i + 6j$$

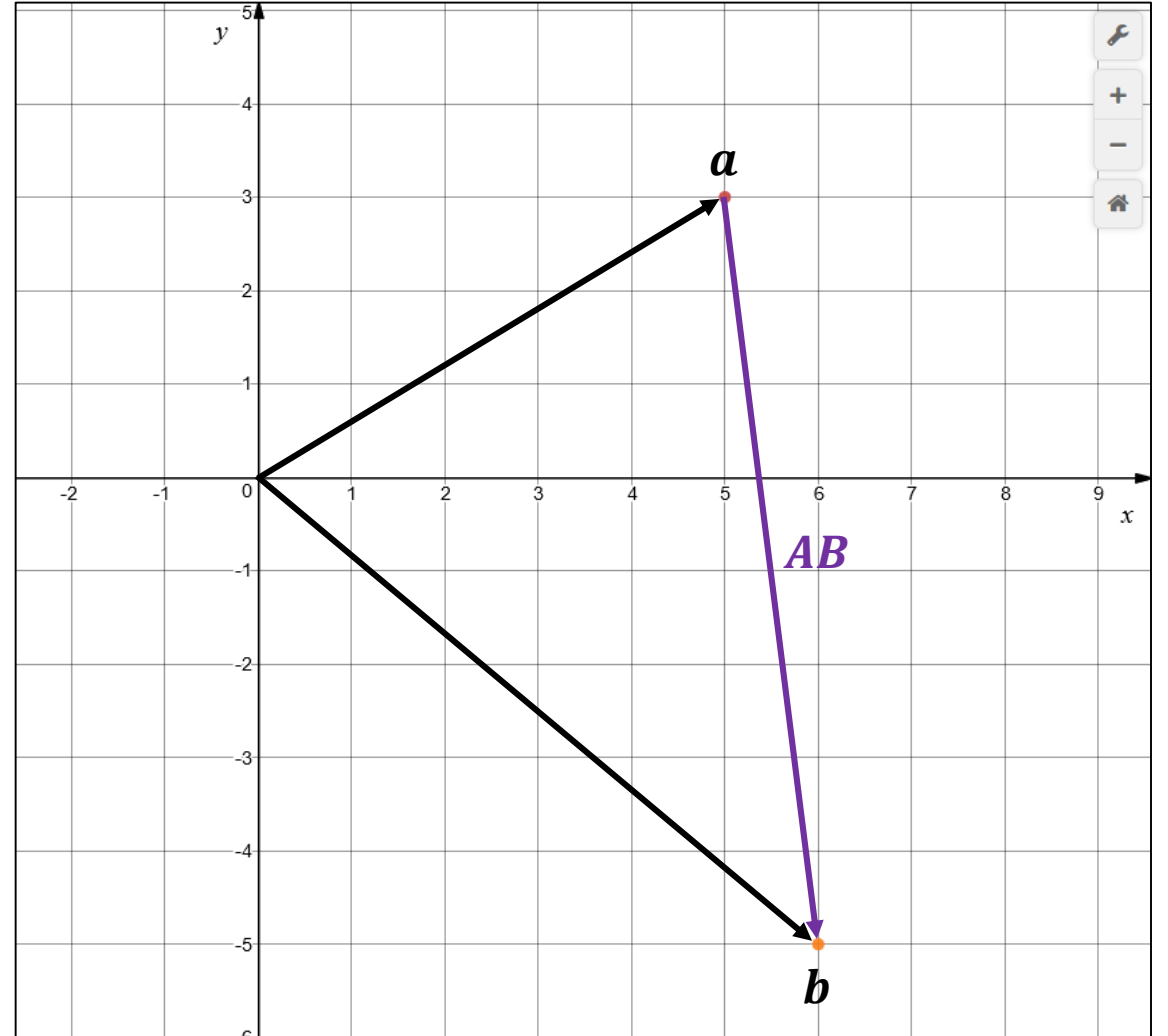
Y fector  $AB$ , neu  $\overrightarrow{AB}$ , yw'r fector sy'n mynd â ni o  $a$  i  $b$ . / The vector  $AB$ , or  $\overrightarrow{AB}$ , is the vector that takes us from  $a$  to  $b$ .

$$AB = -a + b$$

Uchod / Above,

$$AB = -5i - 3j + 6i - 5j$$

$$AB = i - 8j$$



# Maint fector / Magnitude of a vector

**Maint fector** yw'r pellter o'r tarddbwynt at y fector. / The **magnitude of a vector** is the distance from the origin to the vector.

$$|\mathbf{a}| = \sqrt{x^2 + y^2}$$

ble mae / where  $\mathbf{a} = xi + yj$ .

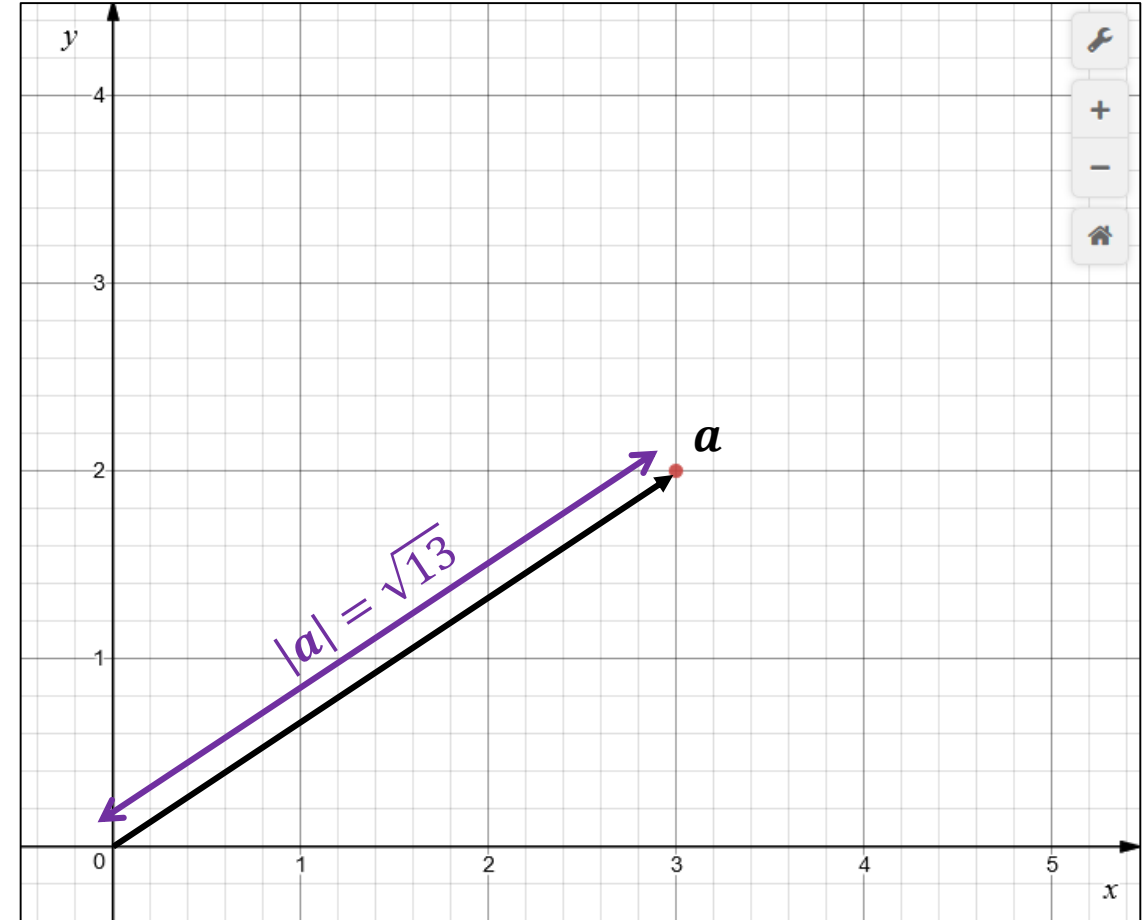
## Enghraifft / Example

Os yw / If  $\mathbf{a} = 3i + 2j$  yna / then

$$|\mathbf{a}| = \sqrt{3^2 + 2^2}$$

$$|\mathbf{a}| = \sqrt{13}$$

Fersiwn o Theorem Pythagoras. / A version of Pythagoras' Theorem.



## Fectorau paralel / *Parallel vectors*

Mae dau fector  $\mathbf{a}$  a  $\mathbf{b}$  yn **baralel** os yw  $\mathbf{a} = \alpha\mathbf{b}$  ar gyfer rhyw rif  $\alpha \neq 0$ .

*Two vectors  $\mathbf{a}$  and  $\mathbf{b}$  are **parallel** if  $\mathbf{a} = \alpha\mathbf{b}$  for some number  $\alpha \neq 0$ .*

### **Enghraifft / Example**

Mae'r ddau fector  $\mathbf{a} = 12\mathbf{i} - 21\mathbf{j}$  a  $\mathbf{b} = 4\mathbf{i} - 7\mathbf{j}$  yn baralel gan fod  $\mathbf{a} = 3\mathbf{b}$ .

*The two vectors  $\mathbf{a} = 12\mathbf{i} - 21\mathbf{j}$  and  $\mathbf{b} = 4\mathbf{i} - 7\mathbf{j}$  are parallel because  $\mathbf{a} = 3\mathbf{b}$ .*

# Hafaliad fector $AB$ / Vector equation of $AB$

Ar gyfer unrhyw ddau fector  $a$  a  $b$ , mae'r hafaliad fector

$$\mathbf{a} + \lambda(-\mathbf{a} + \mathbf{b})$$

yn cynrychioli pwynt cyffredinol ar y llinell sy'n cysylltu  $a$  efo  $b$ .

For any two vectors  $a$  and  $b$ , the vector equation

$$\mathbf{a} + \lambda(-\mathbf{a} + \mathbf{b})$$

represents a general point on the line connecting  $a$  to  $b$ .

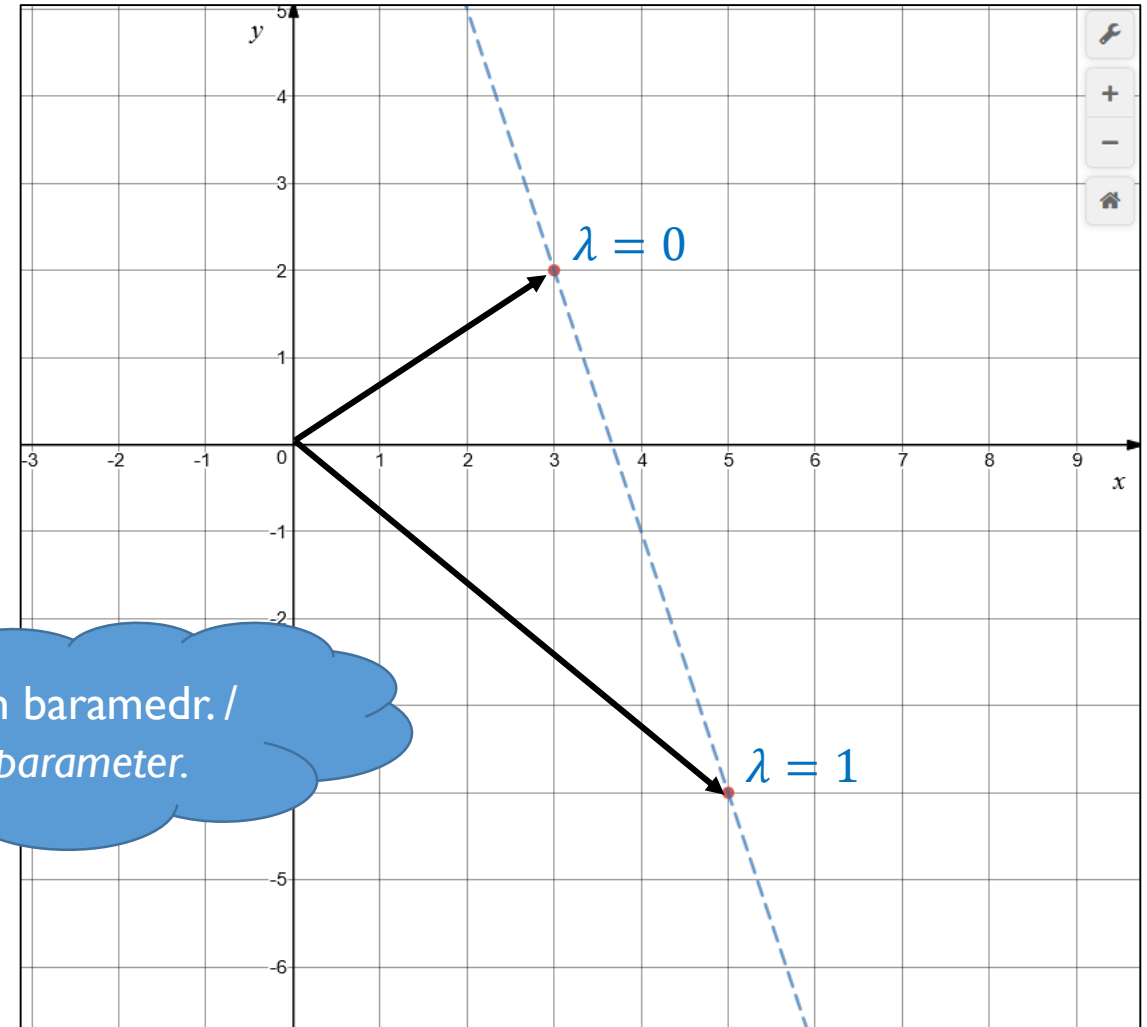
## Enghraifft / Example

$$\mathbf{a} = 3\mathbf{i} + 2\mathbf{j}, \mathbf{b} = 5\mathbf{i} - 4\mathbf{j}$$

Hafaliad fector / Vector equation

$$\begin{aligned} & 3\mathbf{i} + 2\mathbf{j} + \lambda(-3\mathbf{i} - 2\mathbf{j} + 5\mathbf{i} - 4\mathbf{j}) \\ &= 3\mathbf{i} + 2\mathbf{j} + \lambda(2\mathbf{i} - 6\mathbf{j}) \\ &= (3 + 2\lambda)\mathbf{i} + (2 - 6\lambda)\mathbf{j} \end{aligned}$$

Mae  $\lambda$  yn baramedr. /  
 $\lambda$  is a parameter.



# Fectorau / Vectors

Cwblhau DAE Cwestiwn 18. / *Complete SAMs Question 18.*

Cwblhau ymarferion o'r gwrslyfr. / *Complete exercises from the book.*