

Exercise walk-through

4.8

Vectors

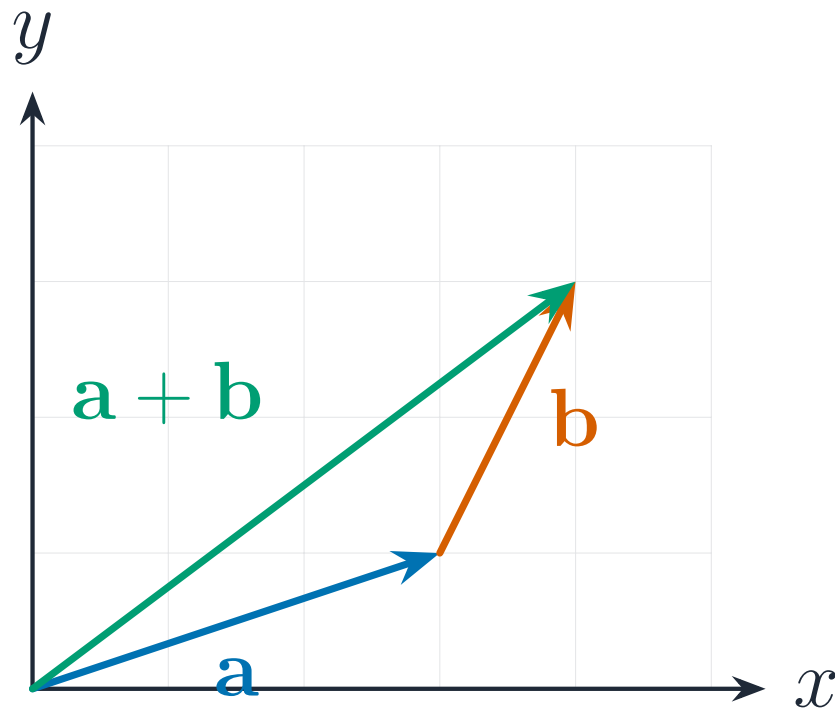
AP Precalculus

Vectors

A **vector** has **magnitude** and **direction**, written $\langle a, b \rangle$:

$$|\vec{v}| = \sqrt{a^2 + b^2}, \quad \theta = \arctan \frac{b}{a}.$$

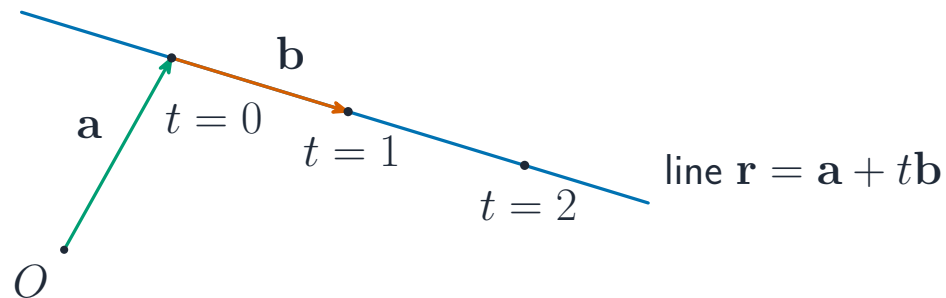
Add **component-wise**; a **scalar** multiple $k\vec{v}$ scales the length (and flips it if $k < 0$).



Vector-valued functions

A vector-valued function

$\vec{p}(t) = \langle x(t), y(t) \rangle$ is a **position vector** for each t – the same idea as a parametric function, written as one object.



A line: start at $\vec{a}$, then slide t lots of the direction $\vec{b}$ – $\vec{p}(t) = \vec{a} + t\vec{b}$.

Exercises 2.1-2.3

2.1 State the magnitude of $\langle a, b \rangle$. [1]

2.2 Add $\langle 1, 2 \rangle + \langle 3, 4 \rangle$. [1]

2.3 Find the magnitude of $\langle 3, 4 \rangle$. [2]

Exercises 2.1-2.3

2.1 State the magnitude of $\langle a, b \rangle$. [1]

2.1

- $\sqrt{a^2 + b^2}$

2.2 Add $\langle 1, 2 \rangle + \langle 3, 4 \rangle$. [1]

2.2

- $\langle 4, 6 \rangle$

2.3 Find the magnitude of $\langle 3, 4 \rangle$. [2]

2.3

- $\sqrt{3^2 + 4^2} = \sqrt{25} = 5$

Exercises 3.1·3.2

3.1 The magnitude of $\langle a, b \rangle$ is

[1]

☐

A $a + b$

B $\sqrt{a^2 + b^2}$

C $a^2 + b^2$

D a/b

☐

3.2 $\langle 2, 1 \rangle + \langle 3, 5 \rangle$ equals

[1]

A $\langle 5, 6 \rangle$

B $\langle 6, 5 \rangle$

C $\langle 5, 5 \rangle$

D $\langle 6, 6 \rangle$

Exercises 3.1·3.2

3.1 The magnitude of $\langle a, b \rangle$ is

[1]

☐

A $a + b$

B $\sqrt{a^2 + b^2}$

C $a^2 + b^2$

D a/b

3.1 B

- $\sqrt{a^2 + b^2}$.

3.2 $\langle 2, 1 \rangle + \langle 3, 5 \rangle$ equals

[1]

☐

A $\langle 5, 6 \rangle$

B $\langle 6, 5 \rangle$

C $\langle 5, 5 \rangle$

D $\langle 6, 6 \rangle$

3.2 A

- $\langle 5, 6 \rangle$.

Exercise 3.3 (a)

3.3 $\vec{v} = \langle 6, 8 \rangle$.

(a) Find the magnitude.

[1]

Exercise 3.3 (a)

3.3 $\vec{v} = \langle 6, 8 \rangle$.

(a) Find the magnitude.

[1]

(a)

- $\sqrt{36 + 64} = 10$

Exercise 3.3 (b)

3.3 $\vec{v} = \langle 6, 8 \rangle$.

(b) Find $2\vec{v}$.

[1]

Exercise 3.3 (b)

3.3 $\vec{v} = \langle 6, 8 \rangle$.

(b) Find $2\vec{v}$.

[1]

(b)

- $\langle 12, 16 \rangle$

Exercise 3.3 (c)

3.3 $\vec{v} = \langle 6, 8 \rangle$.

(c) Find $\vec{v} + \langle 1, 0 \rangle$.

[1]

Exercise 3.3 (c)

3.3 $\vec{v} = \langle 6, 8 \rangle$.

(c) Find $\vec{v} + \langle 1, 0 \rangle$.

[1]

(c)

- $\langle 7, 8 \rangle$