Your notes

GCSE Maths: revision notes

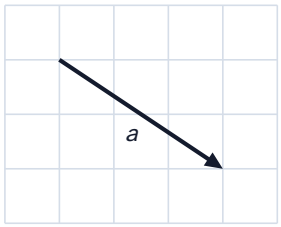
Vectors

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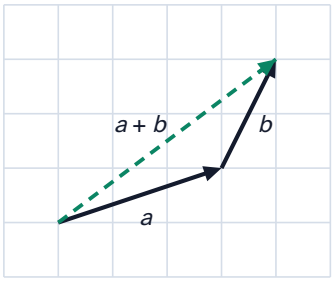
Column vectors

- A **vector** has a size and a direction. A **column vector** shows the movement across (top number) and up (bottom number).
- In these notes, a **column vector** is written across the page as (3, 2), meaning 3 right and 2 up. In the exam it is written with the 3 above the 2.
- Negative numbers mean left or down: (–4, 1) means 4 left and 1 up.
- **Vectors** are printed in bold (a), written with an arrow over two letters (from A to B), or underlined when handwritten.



Adding, subtracting and multiplying

- Add or subtract the top numbers, then the bottom numbers: (3, 2) + (1, –5) = (4, –3).
- Multiplying by a number (a **scalar**) multiplies both parts: 3 × (2, –1) = (6, –3). The result is parallel to the original **vector**.
- –a has the same length as a but points the opposite way.



Vector routes (Higher)

- To get from one point to another, follow a route along **vectors** you know: AC = AB + BC.
- If AB = a, then BA = –a. If M is the midpoint of AB, then AM = ½a.

Vector proofs (Higher)

- Two **vectors** are parallel if one is a multiple of the other: 6a + 3b = 3(2a + b), so it is parallel to 2a + b and three times as long.
- If AB and BC are parallel and share the point B, then A, B and C lie on one straight line (they are **collinear**).

Key terms

Vector	A quantity with both size and direction.
Scalar	A quantity with size only, such as a number.
Column vector	A vector written as a movement across and up.
Magnitude	The length (size) of a vector.
Parallel vectors	Vectors where one is a multiple of the other.
Collinear	Lying on the same straight line.
Resultant	The single vector that has the same effect as two or more vectors added together.

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. What does the column vector (3, –2) mean?
2. Work out (3, 2) + (1, –5).
3. Work out 3 × (2, –1).
4. Work out (5, 1) – (2, 4).
5. What is the difference between a vector and a scalar?
6. If AB = a, what is BA?

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7. Which vector is parallel to (2, 3)?
8. M is the midpoint of AB, and AB = a. What is AM? (Higher)

Answers

1. 3 right and 2 down
2. (4, –3)
3. (6, –3)
4. (3, –3)
5. A vector has a direction as well as a size
6. –a
7. (4, 6)
8. ½a

What to do next

Practise 12 questions on this topic

Try 4 exam questions, with mark schemes

Read the lesson, one step at a time

Free revision for GCSE and KS3 at lycolearn.co.uk. Some notes are for one exam board only, and say so in brackets.

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