

4.8 Vectors

Name: _____ Class: _____ Date: _____

Total: 9 marks

KEY WORDS magnitude 大小 • vector 向量

Objective

Build the skills to answer exam questions on **vectors**.**You must be able to:**

- find the **magnitude** 大小 of a **vector** 向量 $\langle a, b \rangle$
- add vectors and multiply by a scalar

1 Worked examples

Study these first. Each one shows the method for a question type used later.

■ Vectors

A vector $\langle a, b \rangle$ has **magnitude** $\sqrt{a^2 + b^2}$ and a direction.

- add componentwise: $\langle a, b \rangle + \langle c, d \rangle = \langle a + c, b + d \rangle$;
- scalar multiple: $k\langle a, b \rangle = \langle ka, kb \rangle$.

■ Example

 $\langle 3, 4 \rangle$ has magnitude $\sqrt{9 + 16} = 5$.

2 Practice

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]

3 Exam-style questions

3.1 The magnitude of $\langle a, b \rangle$ is [1]

- | | |
|---|---|
| A | B |
| C | D |
- 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 | B |
| C | D |
- A** $\langle 5, 6 \rangle$
B $\langle 6, 5 \rangle$
C $\langle 5, 5 \rangle$
D $\langle 6, 6 \rangle$

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

(a) Find the magnitude. [1]

(b) Find $2\vec{v}$. [1]

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