MATHEMATICS · GRADES 10-12

Vector magnitude

Difficulty level: Advanced

Mathematics: Grades 10-12

This document was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

Overview of the concept

This is how you find the size of a movement, like how far a drone actually travelled or how fast a boat is really going, when the direction alone does not tell you. A vector carries both size and direction, but sometimes you only need the size, how far, how fast, or how strong. The magnitude is that size on its own, stripped of the direction. That is how you answer the plain question of how far or how fast, when the direction is a separate matter.



Rule

Vector magnitude: the magnitude of a vector (x, y) is $\sqrt{x^2+y^2}$.

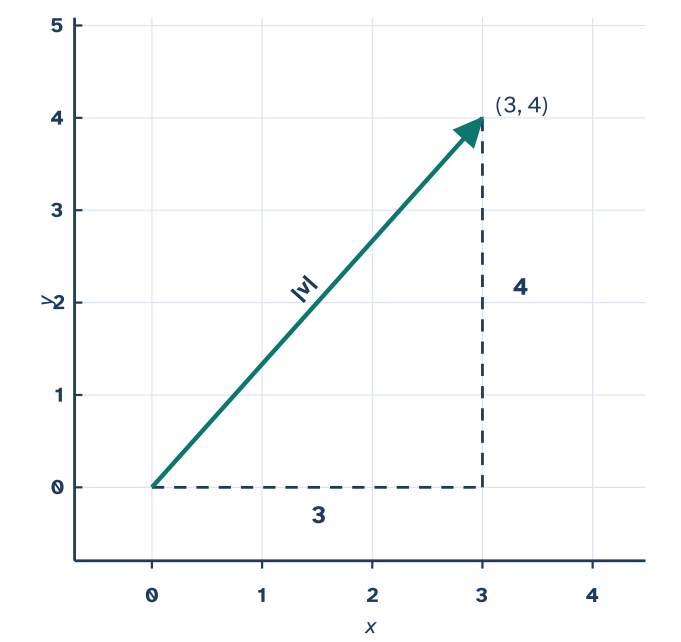
It is the size of the vector on its own, without the direction.

© 2026 Brett Robbins. All Rights Reserved.

Worked examples

EXAMPLE 1

Q Find the magnitude of (3, 4).



SOLUTION

Magnitude = $\sqrt{x^2+y^2}$

$\sqrt{9+16} = \sqrt{25}$

Magnitude = 5

© 2026 Brett Robbins. All Rights Reserved.

EXAMPLE 2

Q Find the magnitude of (6, 8).

SOLUTION

$\sqrt{36+64} = \sqrt{100}$

Magnitude = 10

Note: (6, 8) is just (3, 4) doubled, so its magnitude doubled too.

Practice questions

1. Find the magnitude of (5, 12).

Understand It with Pulse | Flag a mistake

2. Find the magnitude of (0, 7).

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

3 The vector (8, 15) is doubled to (16, 30). What is the magnitude of the doubled vector?

Understand It with Pulse | Flag a mistake

4 A vector (3, y) has magnitude 5 and y is positive. What is y?

Understand It with Pulse | Flag a mistake

5 The vector (9, 12) is halved to (4.5, 6). What is the magnitude of the halved vector?

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

6 Find the magnitude of $(0, 0)$.

Understand It with Pulse | Flag a mistake

7 Which vector has magnitude 5?

A $(3, 4)$

B $(5, 5)$

C $(1, 5)$

D $(4, 4)$

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

8 A vector's size is called its magnitude. What is another word for it?

- **A** Direction
- **B** Length
- **C** Speed
- **D** Position

Understand It with Pulse | Flag a mistake

9 Find the magnitude of (3, 3), to two decimal places.

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

10

Which vector has the greatest magnitude?

A (20, 21)

B (15, 20)

C (9, 12)

D (5, 12)

Understand It with Pulse

Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

ANSWER KEY

1. 13

2. 7

3. 34

4. 4

5. 7.5

6. 0

7. (3, 4)

8. Length

9. 4.24

10. (20, 21)

© 2026 Brett Robbins. All Rights Reserved.