Vectors: Dot & Cross Product

Magnitude, angle and area in 3D

1

$$\mathbf{a} \cdot \mathbf{b} = |\mathbf{a}||\mathbf{b}| \cos\theta$$

Dot product (a number)
Zero when the vectors are perpendicular

2

$$|\mathbf{a} \times \mathbf{b}| = |\mathbf{a}||\mathbf{b}| \sin\theta$$

Cross product magnitude
Equals the area of the parallelogram on a and b

3

$$\mathbf{a} \cdot \mathbf{b} = a_1b_1 + a_2b_2 + a_3b_3$$

Dot product in components
Multiply matching components and add

4

$$|\mathbf{a}| = \sqrt{(a_1^2 + a_2^2 + a_3^2)}$$

Magnitude of a vector
Unit vector = a / |a|

Two tests

Parallel vectors: a × b = 0.

Perpendicular vectors: a · b = 0.

Quick example

a = (1, 2, 2) and b = (2, 0, 1)

a · b = 2 + 0 + 2 = 4

|a| = √(1 + 4 + 4) = 3

Think you've got it? Test yourself.

Scan for a free Class 12 Maths quiz.

thepractiseground.in

Free for every class. Print and display it anywhere.