

Calculus

The math of change and accumulation

WHAT IS IT?

Calculus asks two questions: how fast is something changing right now, and how much has built up in total? The first is differentiation, the second is integration, and the two are linked.



THE BIG IDEAS

- 1 A derivative is a rate of change: the slope of a curve at one point.
- 2 An integral adds up many tiny pieces, such as the area under a curve.
- 3 A limit asks what value something gets closer and closer to.
- 4 The fundamental theorem links the two: differentiating and integrating undo each other.

YOU SEE IT WHEN ...

A car's speed worked out from its position

A tank filling at a changing rate

Finding the best value, like the biggest area for a fence

WORDS YOU WILL MEET

Limit

the value a quantity approaches

Derivative

the rate of change, or slope at a point

Integral

the total built up, such as area under a curve

Rate of change

how fast one quantity changes compared with another

Tangent line

a line that just touches a curve at one point

Optimization

finding a largest or smallest value

GOOD TO KNOW FIRST

Algebra, functions and graphs, and trigonometry.

IN YOUR COURSE YOU WILL ...

- Limits and continuity
- Integrals and area
- Derivative rules and what they tell you
- Applications: motion, growth and optimization

Start tip: Sketch the curve first and ask where it rises, falls or flattens.