



# Circle Theorems: The Essential Rules You Need

KS4 MATHEMATICS

GEOMETRY

Ages 13-16

 4 min read

## What Are Circle Theorems?

**Circle theorems** are special rules about angles and lines in circles. They help mathematicians and engineers understand how circles work and solve tricky geometry problems. Think of them like the rules of a game — once you know them, you can predict what happens.

Think of it like learning the rules of football. Once you know what's allowed and what isn't, you can understand every match you watch.

## The Angle at the Centre Theorem

One of the most important rules is that **the angle at the centre of a circle is twice the angle at the circumference** (the edge). If you draw two lines from the centre to the edge, and two lines from the edge to the edge, the centre angle is always double the edge angle.

## Angles in the Same Segment

**Angles in the same segment are equal.** A segment is the space between a chord (a straight line inside the circle) and the curved edge. Any angle you draw from that segment will be the same size.

Think of it like seats in a cinema. If you sit in the same row, you all see the screen at exactly the same angle.

## The Tangent and Radius Rule

A **tangent** is a straight line that touches the circle at exactly one point. Here's the rule: **a radius and a tangent are always at right angles (90 degrees)** where they meet. This is super useful in engineering and design.

## Angles in a Semicircle

**Any angle in a semicircle is a right angle.** If you draw a diameter (a line across the whole circle) and then connect its ends to any point on the circle, you always get a **90-degree angle**. This works every single time, no matter where that point is.

Think of it like a pizza cut in half. Any point on the crust forms a perfect right angle with the two ends of the cut.

## Opposite Angles in a Cyclic Quadrilateral

A **cyclic quadrilateral** is a four-sided shape where all corners touch the circle.

Here's the rule: **opposite angles always add up to 180 degrees**. This is one of the most powerful theorems in geometry.

## Why Do These Theorems Matter?

Circle theorems aren't just abstract maths — they're used in architecture, engineering, astronomy, and design. Understanding them helps you solve complex problems and proves you truly understand how circles work mathematically.