



Finding the Volume of a Cylinder Explained

KS4 MATHEMATICS

Ages 11-14 ⌚ 3 min read

What is a Cylinder?

A **cylinder** is a 3D shape with two flat circular bases at the top and bottom, connected by a curved side. Think of a can of beans, a tin of paint, or a roll of paper towels — these are all cylinders in real life.

To find how much space is inside a cylinder (its **volume**), we need to multiply two things: the area of the circular base and the height of the cylinder.

The Formula

The formula for the volume of a cylinder is:

$$\text{Volume} = \pi \times r^2 \times h$$

Let's break this down:

π (pi) is a special number that equals approximately **3.14**. It's used whenever we work with circles.

r stands for the **radius** — the distance from the centre of the circular base to its edge.

r^2 means we multiply the radius by itself (this is called **squaring**).

h stands for the **height** of the cylinder — how tall it is.

Think of it like stacking coins. The area of one coin's face ($\pi \times r^2$) tells you how much space one coin takes up. When you stack them up to a certain height, you multiply that by how many you have. A cylinder works the same way — we're stacking invisible circular slices from bottom to top!

Working Through an Example

Imagine a cylinder with a radius of **3 cm** and a height of **10 cm**.

Step 1: Calculate r^2 . This is **$3 \times 3 = 9$** .

Step 2: Multiply by π . This is $9 \times 3.14 = 28.26$ (this is the area of the base).

Step 3: Multiply by the height. This is $28.26 \times 10 = 282.6 \text{ cm}^3$.

So the volume is **282.6 cubic centimetres**.

Why Does This Matter?

Understanding cylinder volume is useful in real life. Engineers use it to design pipes and tanks, manufacturers use it to work out how much a container can hold, and scientists use it in hundreds of calculations. It's a fundamental **geometry** skill that builds your maths toolkit.