



Understanding Cylinders: Real Life and Formulas

Discover what cylinders are, their real-life uses, and how to calculate their surface area and volume, essential topics in grade 9 math.



by Greenfield Library

What is a Cylinder?

Definition

A cylinder is a 3D shape with two identical circular bases connected by a curved surface.

Parts of Cylinder

- Radius (r): Distance from center to edge of base
- Height (h): Distance between the two bases

Real-Life Uses of Cylinders

Containers

Cylinders are common in cans and bottles for storing liquids and food.

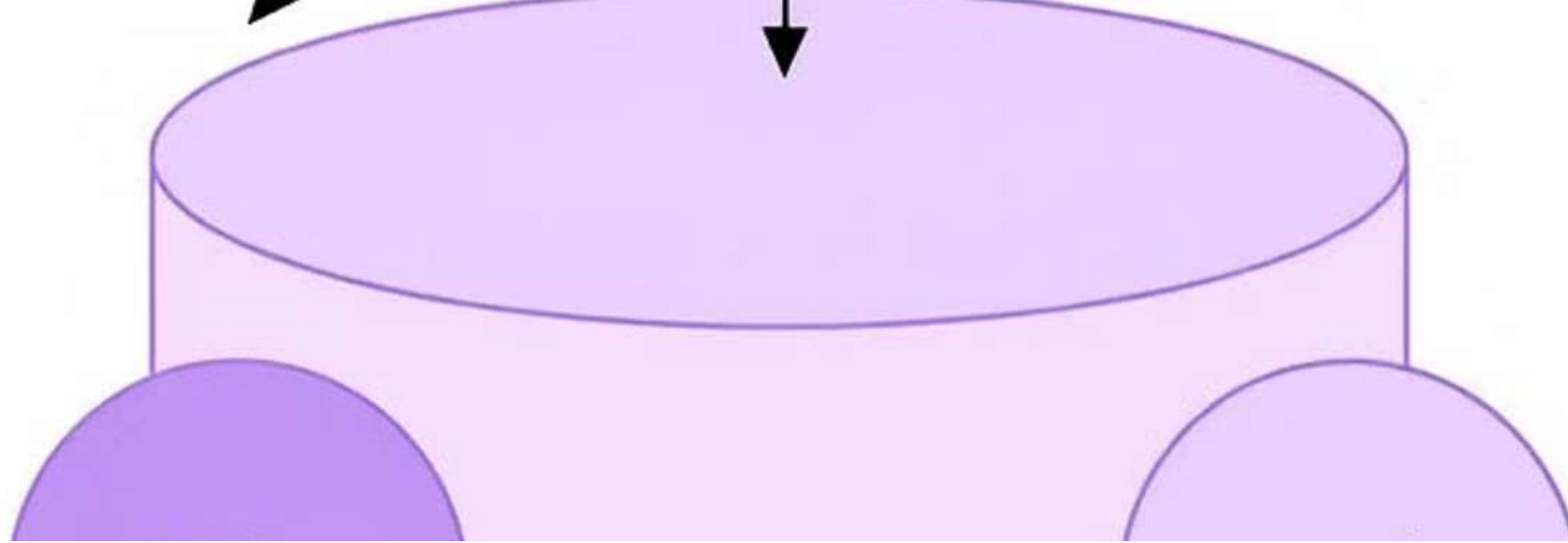
Engineering

Hydraulic cylinders help machines move by using fluid power inside the shape.

Construction

Pipes carry water and gas, using the cylinder's shape for strength and flow.





Formula for Surface Area of a Cylinder

Curved Surface Area
(CSA)

$$CSA = 2\pi rh$$

Total Surface Area (TSA)

$$TSA = 2\pi r(h + r)$$

π (Pi)

Approximately 3.1416, relates
diameter to circumference of a
circle

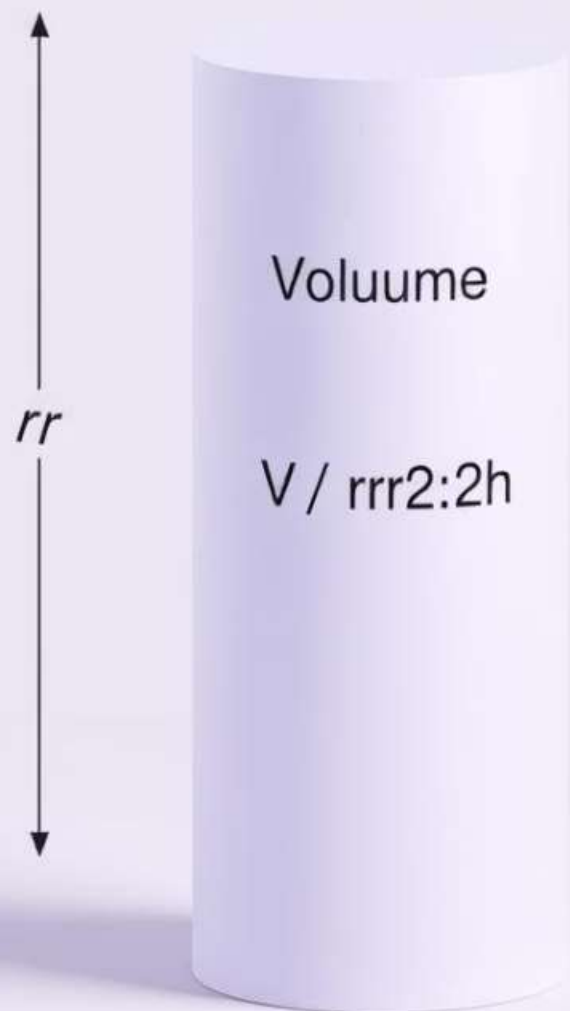
Explaining Surface Area

Bases

Two circular bases with area πr^2 each

Curved Surface

A rectangle when unfolded, height = h , width = circumference ($2\pi r$)



Formula for Volume of a Cylinder

1

Formula

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

2

Meaning

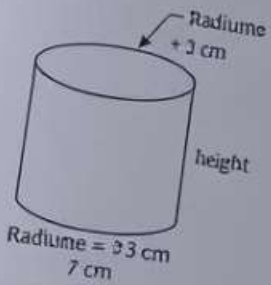
Volume measures the space inside the cylinder

3

Units

Expressed in cubic units like cm^3 or m^3

Calculating Cylinder Volume: Example



$$\text{Volume} = \pi r^2 h = 3.1416 \times 3^2 \times 7 = 197.92 \text{ cm}^3$$

1

Step 1

Identify radius $r = 3 \text{ cm}$ and height $h = 7 \text{ cm}$

2

Step 2

Apply formula: $\text{Volume} = \pi \times 3^2 \times 7$

3

Step 3

Calculate: $\text{Volume} \approx 3.1416 \times 9 \times 7 = 197.92 \text{ cm}^3$

Importance of Cylinder Calculations

Practical Design

Helps in designing containers and pipes fitting precise dimensions

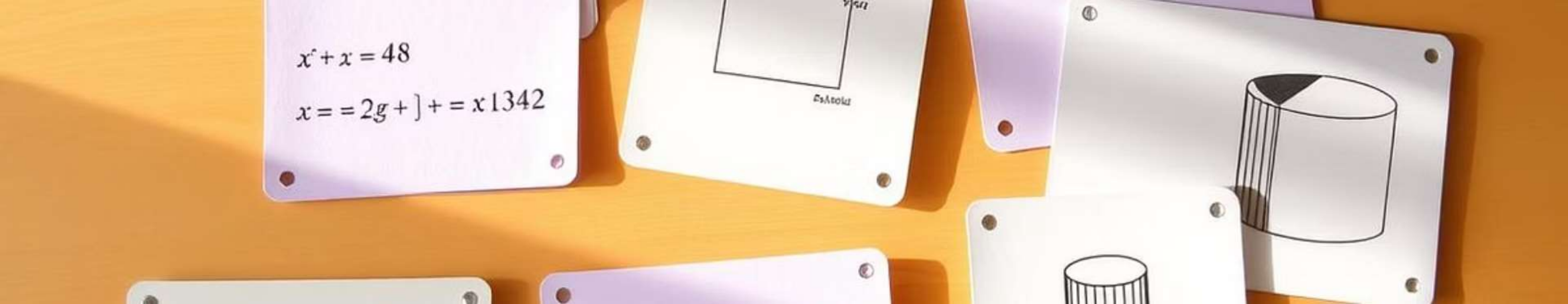
Resource Estimation

Calculates materials needed like paint for surface or volume inside

Real-World Applications

Used in manufacturing, packaging, and architecture industries



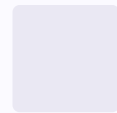


Tips for Remembering Cylinder Formulas



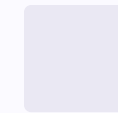
Visualize the Shape

Imagine unfolding to see curved surface as rectangle



Pi is Key

Always include π when dealing with circles



Practice Examples

Try problems involving real objects like cans or tanks

Summary and Next Steps

What You Learned

- Definition and parts of a cylinder
- Real-life examples of cylinders
- Surface area and volume formulas

Next Steps

- Practice problems on cylinder calculations
- Explore related shapes like cones and spheres
- Apply concepts in science and engineering projects