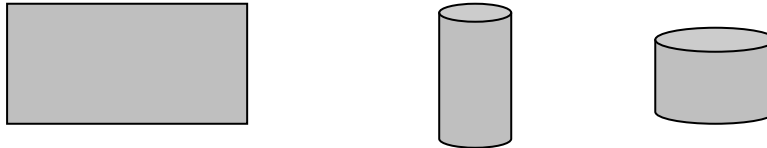


Can 2 identical rectangles make cylinders with different volumes?

Investigation Brief

A cinema owner gets a quote for new popcorn buckets from 2 companies that make cardboard containers. Both quotes come back the same but the first company has used the popcorn bucket template (rectangles of cardboard 50cm x 30 cm) to make tall cylinders and the second company has used the same template to make shorter but wider buckets.



The snack bar manager said “Well it’s the same price, but we will need to make a lot more popcorn if we go with the second company.”

The owner of the cinema said “No, it will be the same because the rectangles that make the cylinders have the same area.”

What advice would you give the cinema owner?

Create a model that supports your position, include the calculations you have done to find the surface area and volumes of the containers.

Resources

- card
- scissors
- ruler
- tape
- popcorn!

Prompts and Suggestions

How will you find out the volume of the two containers? Can you think of a way to do this using numbers only and not by filling them?

What impact would there be in having the same sized circular base on the two cylinders have on the volume of the short one?

Is a donut a cylinder?
What about a lighthouse?

When you are selling things, such as popcorn, the packaging can influence your customer’s decision. Think about whether a tall cylinder or a short wide cylinder would be more favoured by customers, and which one makes better business sense.

Extensions

Investigate the packaging for popcorn at the local cinema and at the grocery store. What are the advantages/disadvantages of cylinder packaging vs cuboid packaging (bags)? Have a go at revolutionising popcorn packaging – how would you create a container that meets the needs of both the customer and the seller?

Links and images


An interesting way to remember the volume of a cylinder: PIZZA

Volume of a Cylinder

Just multiply the area of the circle by the height of the cylinder:

- Area of the circle: $\pi \times r^2$
- Height: h
- Volume = Area \times Height = $\pi \times r^2 \times h$

There is an easy way to remember:



Imagine you just cooked a **PIZZA**.

The radius is "z", and the thickness "a" is the same everywhere ... what is the volume?

Answer: **pi \times z \times z \times a**

(we would normally write "pi" as π , and $z \times z$ as z^2 , but you get the idea!)

accessed from : <http://www.mathsisfun.com/geometry/cylinder.html>