

COLA CAN



An aluminium can contains 330 ml of cola.

If the can's diameter is 6 cm what is the can's height?

If instead the can's height was 10 cm what would the can's diameter have to be?

Which of these two cans uses the least aluminium?

If you could choose any diameter which dimensions for the can would use the least amount of aluminium to hold 330 ml of cola?

Help

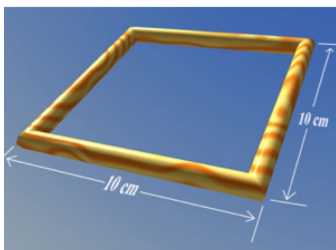
Here is some guidance for students who need extra help.

You need to know that a millilitre is one cubic centimetre then work through the following steps:

1. Check that you can calculate the volume of a cylinder.
2. If the diameter is 6 cm, you need to know how to calculate the base area of the can.
3. If you know the base area you can find a height which will give you the volume (330 ml in this example)
4. Now start with a height (10 cm) and work your way back to a base area for a given volume, then find a radius for that base area, and then find a diameter for the can.
5. Think what makes up the surface area, it has to be the aluminium. So you have to make the surface area as small as possible.
6. The top and base of the can are circles but how do you calculate the curved surface area?

Extension

See <https://aiminghigh.aimssec.ac.za/years-10-12-woodwork/>



This stand is made from cylindrical wooden dowel of diameter 1 cm joined at the corners with 45 degree mitres.

The external dimensions of the stand are 10 cm by 10 cm.

What are the volume and surface area of the stand?

The sketch below shows how I marked out the dowel before cutting it. What length of dowel do I need to make this stand?



Find a formula linking the volume, radius and external edge measurement of the stand.