11 Rakti makes open-topped cylindrical planters out of thin sheets of galvanised steel.
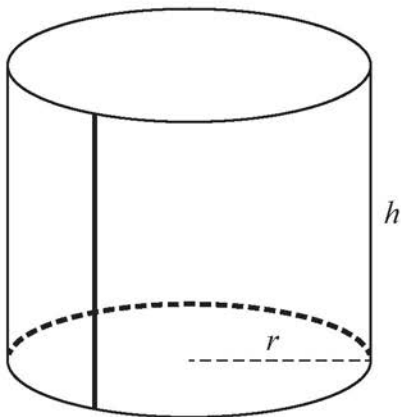
She bends a rectangle of steel to make an open cylinder and welds the joint. She then welds this cylinder to the circumference of a circular base.

The planter must have a capacity of $8000\,\text{cm}^3$

Welding is time consuming, so Rakti wants the total length of weld to be a minimum.

Calculate the radius, r, and height, h, of a planter which requires the minimum total length of weld.

Fully justify your answers, giving them to an appropriate degree of accuracy.

[9 marks]