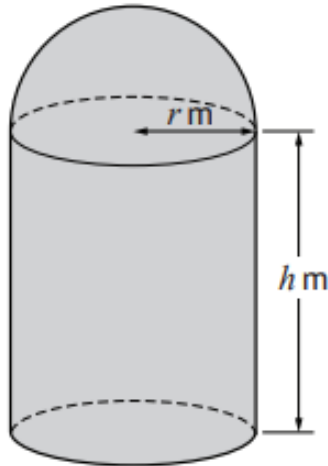


Specimen P2 Q8

8. A design for a new grain container is in the shape of a cylinder with a hemispherical roof and a flat circular base. The radius of the cylinder is r metres, and the height is h metres.

The volume of the cylindrical part of the container needs to be 100 cubic metres.



- (a) Given that the curved surface area of a hemisphere of radius r is $2\pi r^2$ show that the surface area of metal needed to build the grain container is given by:

$$A = \frac{200}{r} + 3\pi r^2 \text{ square metres}$$

- (b) Determine the value of r which minimises the amount of metal needed to build the container.

Answers

- (a) Proof
(b) $r = 2.20m$