

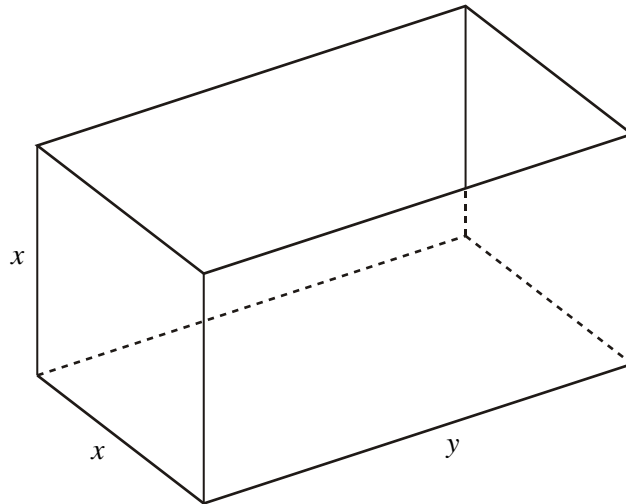
## Year 11-12 Summer Bridging Work

### Starter

Simplify fully:

$$(x \div (y \div z)) \div ((x \div y) \div z)$$

Example



The diagram above shows an open-topped water tank, in the shape of a cuboid, which is made of sheet metal. The base of the tank is a rectangle  $x$  metres by  $y$  metres. The height of the tank is  $x$  metres.

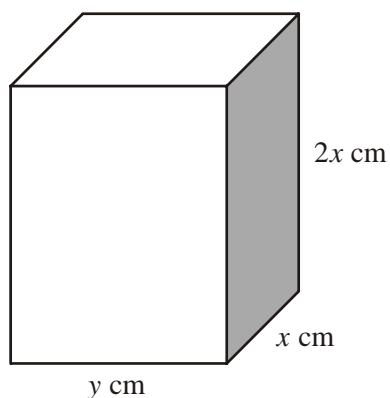
The capacity of the tank is  $100 \text{ m}^3$ .

Show that the area  $A \text{ m}^2$  of the sheet metal used to make the tank is given by

$$A = \frac{300}{x} + 2x^2$$

1. Work out a formula for the surface area of the tank in terms of  $x$  and  $y$ .
2. Work out the volume of the cuboid in terms of  $x$  and  $y$ .
3. Rearrange the volume of the cuboid to get  $y$  in terms of  $x$ .
4. Substitute this  $y$  into the formula for the area

Silver question



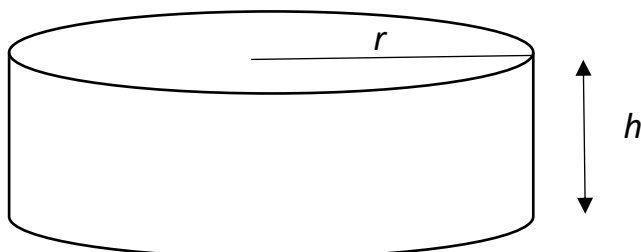
The diagram above shows a solid brick in the shape of a cuboid measuring  $2x$  cm by  $x$  cm by  $y$  cm.

The total surface area of the brick is  $600 \text{ cm}^2$ .

Show that the volume,  $V \text{ cm}^3$ , of the brick is given by

$$V = 200x - \frac{4x^3}{3}.$$

Gold question



A container made from thin metal is in the shape of a right circular cylinder with height  $h$  cm and base radius  $r$  cm. The container has no lid. When full of water, the container holds  $500 \text{ cm}^3$  of water.

(a) Show that the exterior surface area,  $A \text{ cm}^2$ , of the container is given by

$$A = \pi r^2 + \frac{1000}{r}$$