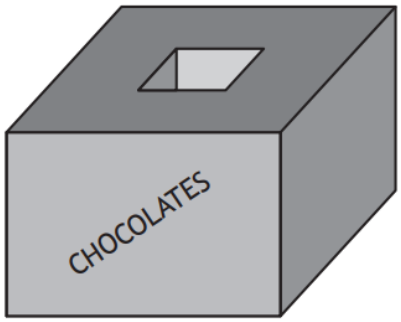
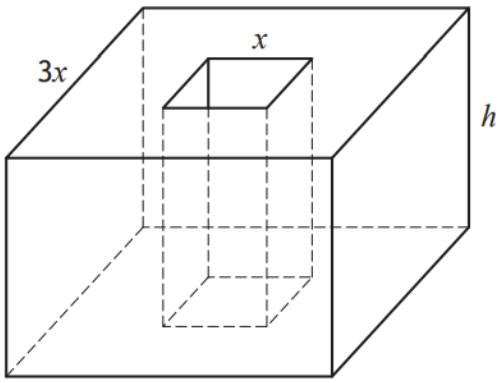
Higher Maths
SQA 2019 Paper 2
Question 11

A manufacturer of chocolates is launching a new product in novelty shaped cardboard boxes.



The box is a cuboid with a cuboid shaped tunnel through it.

- The height of the box is h centimetres
- The top of the box is a square of side $3x$ centimetres
- The end of the tunnel is a square of side x centimetres
- The volume of the box is $2000\,\text{cm}^3$



(a) Show that the total surface area, A cm^2, of the box is given by

$$A = 16x^2 + \frac{4000}{x}.$$ **3**

(b) To minimise the cost of production, the surface area, A, of the box should be as small as possible.

Find the minimum value of A. **6**

Answers: (a) Obtain $A(x, h)$, eliminate h and simplify to required form. (b) 1200