WRAPPING PRESENTS WITH MATHS

We can use maths to make sure we wrap presents efficiently, using as little wrapping paper as possible.

Task 1

One way to wrap a cuboid shaped present is featured below (let's call this method 1).

Write a **formula for the area of the rectangular piece** of wrapping paper that you would need to cut to wrap the present below, so there is no overlap (apart from the grey bits that don't get used).

We can call the depth of the present 'd'
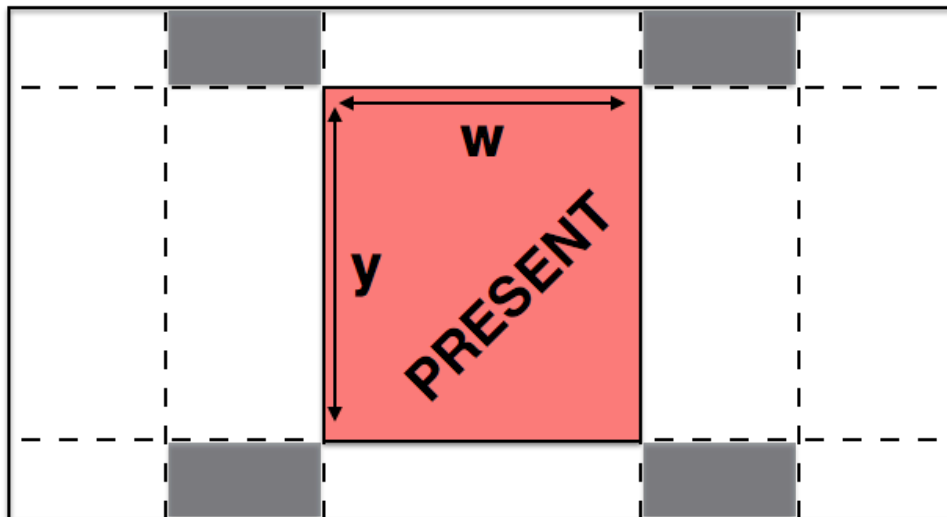
Not to scale

Task 2

An alternative way (let's call this method 2) to wrap a cuboid shaped present is featured below.

Write a **formula for the area of the square piece** of wrapping paper that you would need to cut to wrap the present below, so there is no overlap (apart from the grey bits that don't get used).

We can call the depth of the present 'd'

w

PRESENT

y
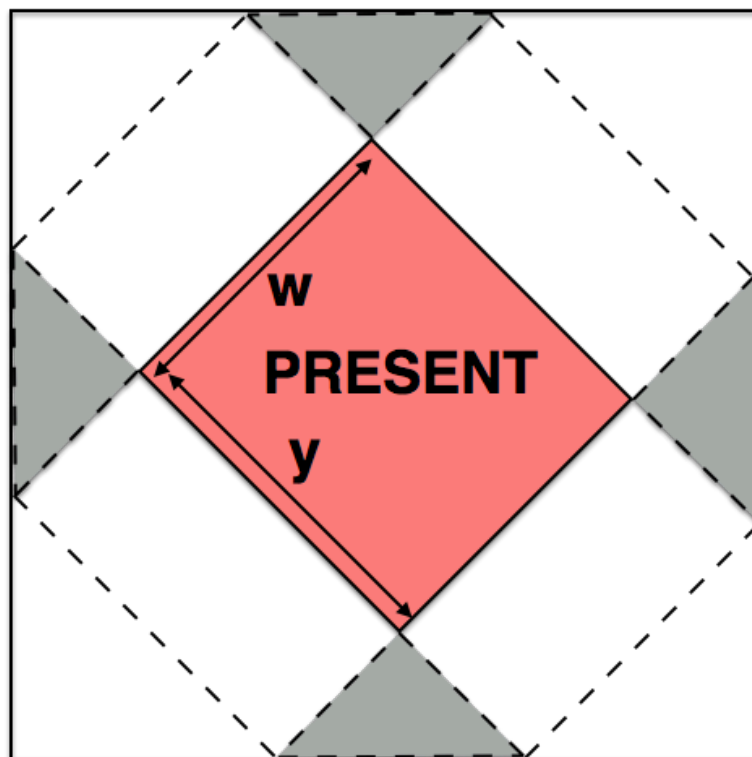
Not to scale

Task 3

Some cuboid shapes are more efficient than others – they use up less wrapping paper for same amount of volume.

Zoe is making a cuboid block of marzipan to give as a Christmas present to her mum who loves marzipan. She wants to wrap it with wrapping method 1.

She wants to mould the **108cm³** of marzipan into the cuboid that would minimise the area of the wrapping paper that she would need to cut out.

a) Assuming the width of the block is fixed to **6cm**, show that we can solve the equation below to find the depth of the cuboid Zoe needs:

$$2d^3 + 6d - 108 = 0$$

b) The equation above has only one real solution, and it's an integer. Find the dimensions of the cuboid Zoe needs to make.

c) Could she cut a smaller area of wrapping paper if she makes a cuboid and wraps it with method 2?