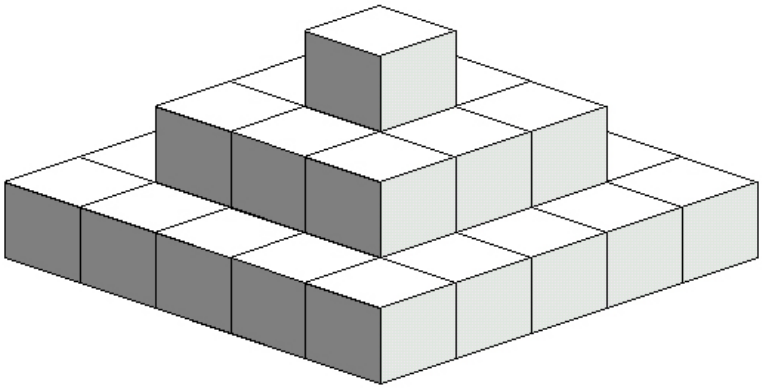
Ziggurat formula

This task is about using equations to work out attributes of a ziggurat shape.



This shape is called a ziggurat and is three blocks high ($n = 3$). Each block is 1 metre high.

Here is a rule for the number of blocks in a ziggurat that is n blocks high:

$$b_n = \frac{4n^3 - n}{3}$$

n is the height of the ziggurat.
b_n is the number of blocks in a ziggurat that is n blocks high.

a) How many blocks are there in a ziggurat that is

i) 3 blocks high? _____

ii) 12 blocks high? _____

Each face on a block in the ziggurat has an area of 1 m^2. This formula gives the total surface area for ziggurats of different heights:

$a_n = 8n^2 - 4n + 1$

n is the height of the ziggurat.
a_n is the total surface area (in m^2) of a ziggurat that is n blocks high.

b) What is the total surface area of a ziggurat that is

i) 3 metres high? _____ m^2

ii) 10 metres high? _____ m^2

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