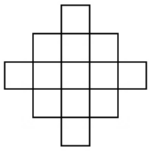
Squares and matches

This task is about rules for spatial patterns.

Shape 1

Shape 2



Shape 3

Petra made these shapes out of matches.
The rule for the number of **squares** can be written as an equation like this:

$$s_n = 2n^2 - 2n + 1$$

where n represents the shape number,
and s_n represents the number of squares in shape n.

a) How many **squares** will there be in

i) shape 6? _____

ii) shape 10? _____

The rule for the number of **matches** in a shape can be written in words as:

- **Square the shape number.**
- **Multiply this amount by 4.**

b) Use this rule to work out how many **matches** would be needed to make

i) shape 5? _____

ii) shape 20? _____

c) Write the rule for the number of **matches** as an equation.

Use n to represent the shape number, and
Use t_n torepresent the number of matches in shape n.

Complete this equation for the number of **matches** needed for shape n.

$t_n =$ _____

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