Mathematics

Interesting Quadratic Patterns

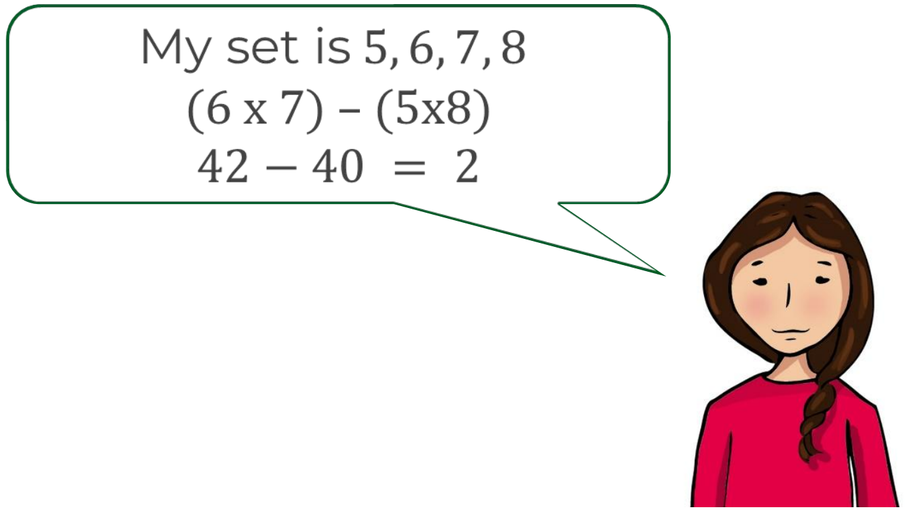
Mrs Buckmire

Try this

Pick four consecutive numbers. Multiply the largest and the smallest and subtract from the product of the remaining two numbers.

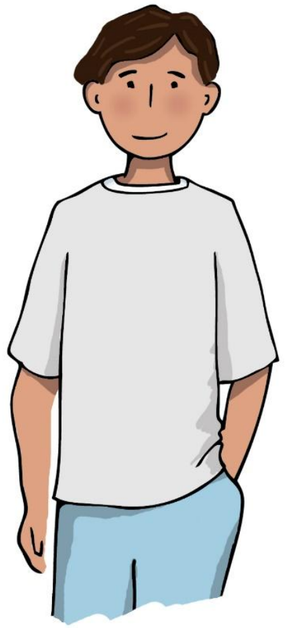
Try some different sets of numbers.

What do you notice?



Independent task

Antoni is exploring the following pattern.



$1 \times 4 + 5 =$

$2 \times 5 + 6 =$

$5 \times 8 + 9 =$

$10 \times 13 + 14 =$

a) Work out each value.

b) Give 3 more calculations that follow this pattern.

c) What do you notice?

d) Let the lowest number be n, for this pattern, what values in terms of n do the other 2 numbers take?

e) Write out the nth term of this pattern.

f) Prove that by following this pattern you will always get an answer with a certain property.

Explore

Look at the following sets numbers.

Pick a set and generate some more examples. What do you notice?

Can you explain and generalise any patterns you spot?

Can you design your own set of calculations that follow a similar pattern?

$1 \times 3 + 2 \times 3 =$

$2 \times 4 + 2 \times 4 =$

$5 \times 7 + 2 \times 7 =$

$10 \times 12 + 2 \times 12 =$

$3^2 - 1^2 =$

$4^2 - 2^2 =$

$6^2 - 4^2 =$

$10^2 - 8^2 =$