The figurate numbers

The Natural numbers

and

their geometrical representations
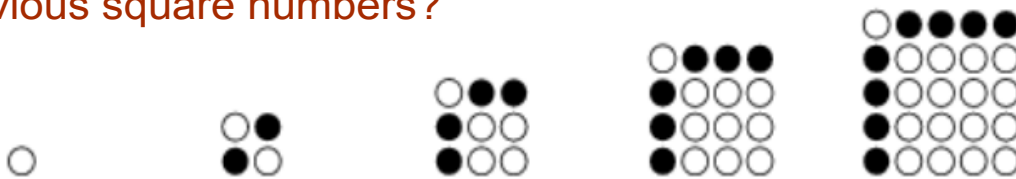
Teachers'
notes

notes

The Square numbers

Which numbers are rapresented here? add others..

for n=0, 1, ... they are 0, 1, 4, 9, 16, 25, 36, 49, ...
in the relationship:
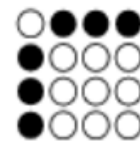$S_n = n^2$

The Square numbers

but how is it possible to create a new square number from the previous square numbers?

observe this representation and try to explain it!

...pe is called gnomon.......

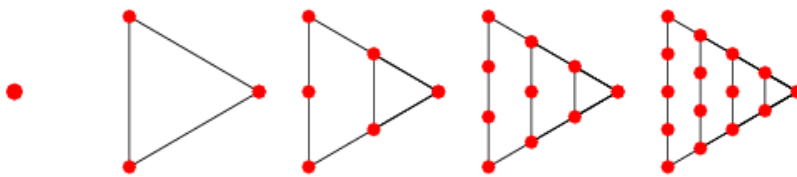which kind of operation can you do to compose the square number "16"?

and the way to calculate
a "n" square number:

$$(n+1)^2 = n^2 + 2n + 1$$

The triangular numbers

Which numbers are rapresented here? add others..

The triangular numbers are: 1, 3, 6, 10, 15, 21, ...

The triangular numbers

how is possible to obtain these numbers from the natural numbers?

you can do:
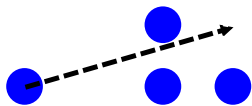1, 1+2, 1+2+3, 1+2+3+4,......

or like Mathematicians write:

$$\sum_{k=1}^{n} k$$

More formally, a triangular number is a number obtained by adding all positive integers less than or equal to a given positive integer n.

Square numbers and triangular numbers

Are there some special relationship beetwen square numbers and triangular numbers ?

how two triangular numbers build a square number:

therefore 4=

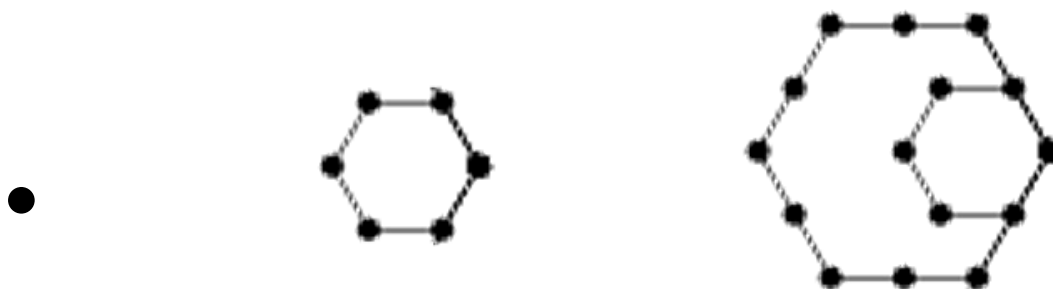the next combination...:

The rule is....:
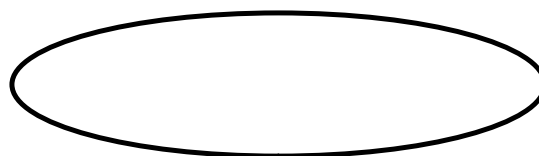
Other figurate numbers

A figurate number, also known as a figural number, is a number that can be represented by a regular geometrical arrangement of equally spaced points.

If the arrangement forms a regular polygon, the number is called a polygonal number.

The polygonal numbers
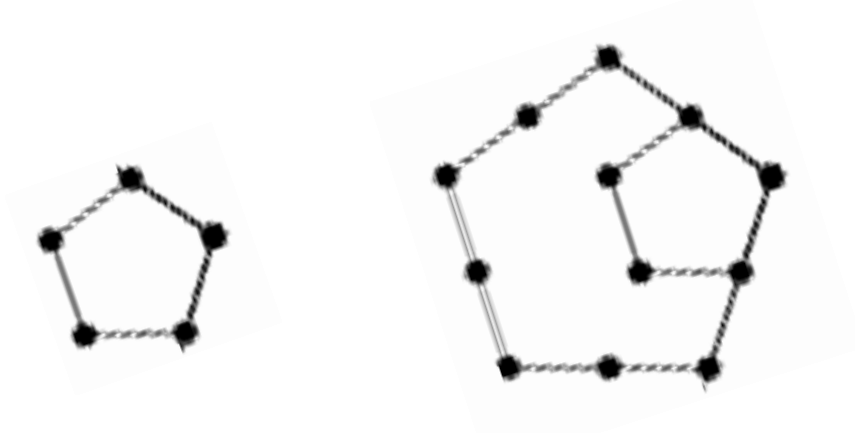
How can you call
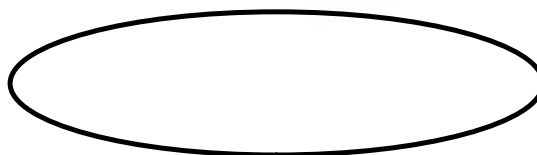these numbers ?

Add other two numbers ....

The polygonal numbers

How can you call
these numbers ?

Add other two numbers ....

The even numbers

Which geometric representation could the even numbers have?

●
●

this is 2....   4   6   ......

Therefore we can call
them: .... numbers
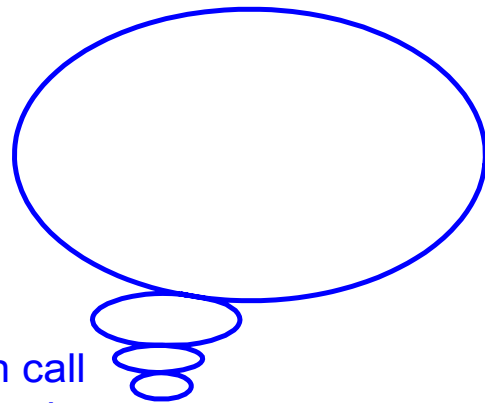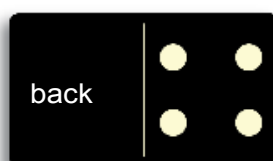
Teachers' notes

Subject   Arithmetic

Topic   The natural numbers

Title   The figurate numbers

Years	10 -12
Prior knowledge	Operations with the natural numbers
Skills	• to be able to try the elements of a sequence • to be able to find the rule of the numeric sequence

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In the pages there are some rectangles with the solutions to the questions.

You can read them with a click on the active area.

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