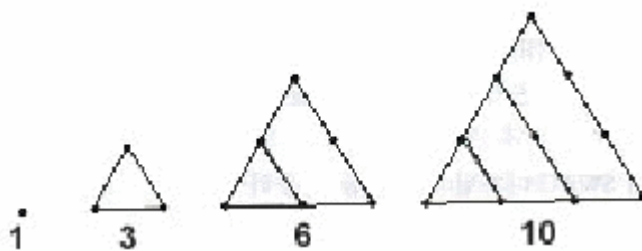


## Number Sequences and Shapes

Number sequences and certain shapes are closely intertwined. Consider the number sequence

1, 3, 6, 10...

The  $n$ th term of this number sequence is  $\frac{1}{2}n(n+1)$ . We can picture the number sequences as triangles made up of dots.

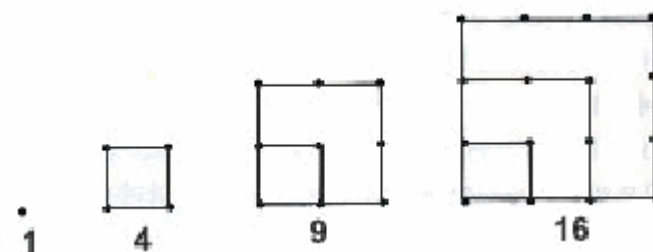


The  $n$ th triangle number is the number of dots in the  $n$ th triangle.

Similarly, consider the number sequence

1, 4, 9, 16...

The  $n$ th term of this sequence is  $n^2$ . We can picture this number sequence as squares made up of dots.

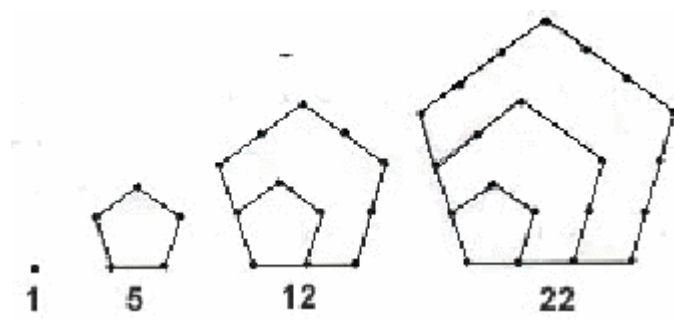


The  $n$ th square number is the number of dots in the  $n$ th square.

Similarly, consider the number sequence

1, 5, 12, 22

The  $n$ th term of this sequence is  $\frac{n}{2}(3n-1)$ . We can picture this number sequence as pentagons made up of dots.



The  $n$ th term of this sequences is the number of dots in the  $n$ th pentagon.