Natural Number Sequences

Natural Numbers

What are natural numbers?

0, 1 , 2, 3, 4, 5, 6, 7, 8, 9 etc

Sequences

What is a **sequence**?

A **sequence** is an ordered list of numbers, and each of these numbers are called a *term*.

Ex. What is the sequence of odd natural numbers?

1, 3, 5, 7, 9, 11, 13...

What is the second term in this sequence? 3

Rank

The position of each term is called the **rank** of that sequence.

ex. What is the sequence of the even natural numbers?

0, 2, 4, 6, 8, 10 etc

Let's put this into a table:

Number	Rank
0	1
2	2
4	3
6	4

Notice how the rank is different from the number!

Rules/Patterns

All the sequences that we look at will have a predictable **pattern**, which we will call the **rule.**

The number that we will always start with - will be 0 or 1

Rule of Natural Numbers

The rule for the sequence of natural numbers is t = n.

t = the term and n = the natural number we put into the rule

What does this mean?

Let's start with n = 0   n = 1
How do we solve for t?   How do we solve for t?

t = n   t = n
t =   t =

Example 2: Rule of Even Numbers

Rule : t = (2)(n)

Let's start with n = 0

Sequence: {   }

Example 3: Rule of Odd Numbers

t = (2)(n) + 1

Start with n = 0

Sequence: {   }

Example 4

Which term **t** has a rank **r** of 3 in the sequence given by the rule:

$$t = 3r + 1$$

Example 5

State the rule of the sequence of perfect squares 0, 1, 4, 9, 16, 25... where we start with n = 0.

Classwork

1. Rule : $t = n + 3$
   Give the first four terms of the sequence that starts with $n = 0$
2. Rule: $t = 3n - 1$
   Give the first four terms of the sequence that starts with $n = 1$
3. State the rule of the sequence of odd numbers 1, 3, 5, 7… where we start with $n = 1$
4. Rule: $t = r^3 - 1$
   What term t, has a rank r of 5?
5. Rule: $t = 4r$
   What is the rank r of the term $t = 20$?