Sequences

Keywords:	Arithmetic / nth term / Geometric / Term / Quadratic / Iterate					
Definition / Description:	Arithmetic – a sequence where terms are found by adding or subtracting an equal amount.	Nth term – The general rule of a number sequence.	Geometric - A sequence in which you find each term by multiplying the previous term by a fixed value.	Term – a part of an equation, expression or sequence.	Quadratic – A sequence where the difference increases or decrease by an equal amount each time	Iterate - a quantity arrived at by iteration.
Knowledge points:	Nth term of a linear sequence	Finding terms in a sequence	Nth term of a Quadratic sequence	Geometric Progression	Sequences by iteration	
Knowledge point examples:	n: 1 2 3 4 2 5 8 11… +3 +3 +3 *3n - 1* The nth term of a linear sequence is always of the form An ± b, where: *A*, is the difference between each term and the next term. *b* is the difference between the first term and *A*. n: 0 1 2 3 4 13 11 9 7 5 +2 -2 -2 -2 *13 – 2n* In a descending sequence we find the zero term to discover what we are taking *A*n way from.	From the sequence 5, 12, 19, 26, 33… work out the 50th term. The nth term of this sequence is 7n – 2 Find the 50th term by substituting n=50 into the rule, 7n − 2 = 7 × 50 − 2 = 350 −2 = 348.	Find the nth term in the sequence: 5, 9, 15, 23… Term 5 9 15 23 1st Diff. 4 6 8 2nd Diff 2 2 The second differences are constant (2) so the sequence is quadratic and the coefficient of n^2 is 1. So the nth term includes $1n^2$. To find the remainder of the nth term, we subtract $1n^2$ from our sequence and find the nth erm of the linear sequence left over: 5 9 15 23 - - - - 1 4 9 16 4 5 6 7… The nth term of this sequence is n + 3. *Nth term of quadratic sequence* $= n^2 + n + 3$	Geometric progression is a sequence of non-zero numbers where each term after the first is found by multiplying the previous one by a number. Find the next two terms of the sequence 3 6 12 24… x 2 x 2 x 2 The term to term rule here is x2 therefore the next two terms are 24 x 2 = 48 48 x 2 = 96	Find the first four iterations of the iterative formula $x_{n+1} = 3x_n - 2$ with $x_1 = 2$. $x_2 = 3x_1 - 2$ $= 3 \times 2 - 2 = 4$ $x_3 = 3x_2 - 2$ $= 3 \times 4 - 2 = 10$ $x_4 = 3x_3 - 2$ $= 3 \times 10 - 2 = 28$ $x_5 = 3x_4 - 2$ $= 3 \times 28 - 2 = 82$	
Linked Knowledge	Notation and manipulation / Functions / Multiples, Primes, Factors / Index Numbers					