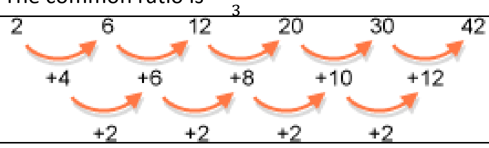
Sequences

Linear Sequence	A number pattern with a **common difference**.	2, 5, 8, 11… is a linear sequence
Term	**Each value** in a sequence is called a term.	In the sequence 2, 5, 8, 11…, 8 is the third term of the sequence.
Term-to-term rule	A rule which allows you to **find the next term** in a sequence if you **know the previous term**.	First term is 2. Term-to-term rule is 'add 3' Sequence is: 2, 5, 8, 11…
nth term	A rule which allows you to **calculate the term** that is in the **nth position** of the sequence. Also known as the 'position-to-term' rule. **n** refers to the **position** of a term in a sequence.	nth term is $3n - 1$ The 100th term is $3 \times 100 - 1 = 299$
Finding the nth term of a linear sequence	1. Find the **difference**. 2. **Multiply that by n.** 3. Substitute $n = 1$ to **find out what number you need to add or subtract to get the first number in the sequence**.	Find the nth term of: 3, 7, 11, 15… 1. Difference is +4 2. Start with $4n$ 3. $4 \times 1 = 4$, so we need to subtract 1 to get 3. nth term = $4n - 1$
Fibonacci type sequences	A sequence where the next number is found by **adding up the previous two terms**	The Fibonacci sequence is: $1,1,2,3,5,8,13,21,34 \ldots$ An example of a Fibonacci-type sequence is: $4, 7, 11, 18, 29 \ldots$
Geometric Sequence	A sequence of numbers where each term is found by **multiplying the previous one** by a number called the **common ratio, r**.	An example of a geometric sequence is: $2, 10, 50, 250 \ldots$ The common ratio is 5 Another example of a geometric sequence is: $81, -27, 9, -3, 1 \ldots$ The common ratio is $-\frac{1}{3}$
Quadratic Sequence	A sequence of numbers where the **second difference is constant**. A quadratic sequence will have a n^2 term.	
nth term of a geometric sequence	$\boldsymbol{ar^{n-1}}$ where a is the first term and r is the common ratio	The nth term of $2, 10, 50, 250$ …. Is $2 \times 5^{n-1}$
nth term of a quadratic sequence	1. Find the first and second differences. 2. Halve the second difference and multiply this by n^2. 3. Substitute $n = 1,2,3,4$ … into your expression so far. 4. Subtract this set of numbers from the corresponding terms in the sequence from the question. 5. Find the nth term of this set of numbers. 6. Combine the nth terms to find the overall nth term of the quadratic sequence. Substitute values in to check your nth term works for the sequence.	Find the nth term of: 4, 7, 14, 25, 40.. Answer: Second difference = +4 → nth term = $2n^2$ Sequence: 4, 7, 14, 25, 40 $2n^2$ 2, 8, 18, 32, 50 Difference: 2, -1, -4, -7, -10 Nth term of this set of numbers is $-3n + 5$ Overall nth term: $2n^2 - 3n + 5$
Triangular numbers	The sequence which comes from a pattern of dots that form a triangle. $1, 3, 6, 10, 15, 21 \ldots$