

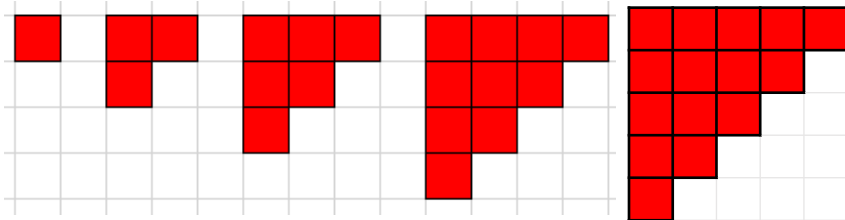
Summer Term Maths Year 10

Explore triangle numbers and Fibonacci numbers

Day 2

Week 12

1 Here is a number pattern.



1 2 3 4 5

- Draw the next pattern in the sequence.
- How many red squares are needed in pattern number 5. **15**
- How many red squares are needed in pattern number 6? **21**
- How did you work out your answer to part (c)? **Added 6 on to 15.**
- Describe the pattern. **Each pattern you add one extra square on.**

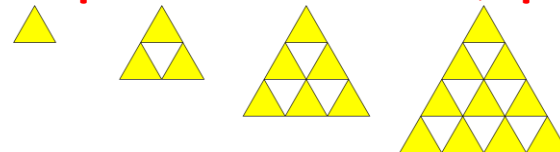
2 Here is a sequence

1, 1, 2, 3, 5, 8, 13, 21,

- What are the next 3 numbers in the sequence? **34, 55, 89**
- Explain how you got your answers. **Added the two previous numbers together.**
- What is the first number above 150 in the sequence? **233**
- What is the name given to this type of sequence? **Fibonacci**

3

Does this sequence show triangular numbers? Explain your answer. **No, the sequence is 1, 4, 9, 16 (squares)**



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4

Here is another sequence

3, 3, 6, 9, 15, 24, 39, 63,

a) What are the next 3 numbers in the sequence? **102, 165, 267**

b) Explain how you got your answers.

Added the previous two terms together.

c) Explain why this sequence is an example of a Fibonacci sequence.

As a Fibonacci sequence is when you add the previous two terms to make the next number in the sequence.

d) Sajid says all the numbers in the sequence will be divisible by 3. Is Sajid correct? **Yes**

5

True or false? **True**

Triangular numbers follow the pattern
odd, odd, even, even.

6

The following formula can be used to find the n th triangular number.

$$\frac{n(n+1)}{2}$$

a) Work out the 10th triangular number. **55**

b) Work out the 12th triangular number. **78**

c) Is 276 a triangular number? Explain how you know. **Yes, as $23 \times 24 \div 2 = 276$**

d) Prove that the sum of two consecutive triangular numbers is a square number.

$$\frac{(n-1)n}{2} + \frac{n(n+1)}{2} = \frac{n^2 - n + n^2 + n}{2} = \frac{2n^2}{2} = n^2$$