# Foundation Check In - 6.06 Sequences

1. Write down the first five terms of the sequence generated by .
2. Find the next two numbers in this sequence.

3, 9, 27, 81, ……, ……

1. Which of the following *n*th term formulae describe descending sequences?

    

1. Write the formula for the *n*th term of this sequence.

2, 8, 14, 20, ……

1. Write down the first five terms of the sequence generated by .
2. Jack says that 83 is in the sequence with *n*th term 7*n* – 1. Show that he is correct.
3. Two sequences have *n*th terms  and  respectively. Which sequence will pass 100 for the smallest value of *n*? Explain your answer.
4. Explain in words how to continue this sequence.

4, 4, 8, 12, 20, 32, ……

1. The sequence with *n*th term  has second term 19.

Work out the value of *c*.

1. The diagram below shows a sequence with squares and dots labelled Pattern A.

|  |  |  |
| --- | --- | --- |
| **Pattern A** | | |
|  |  |  |

The number of dots in Pattern B is described by the *n*th term . Patterns A and B share a term with an equal number of dots which is in the same position in both sequences. Work out which term in Patterns A and B has the same number of dots and state the number of dots.

**Extension**

Martin thinks that the sum of any two consecutive triangular numbers is always a square number. Investigate whether he is correct.

## Answers

1. 15, 11, 7, 3, -1
2. 243, 729
3. ,  and 
4. 
5. -1, 0, 3, 8, 15
6. If 83 is in the sequence, solving  would give a whole number (integer) value of *n*.





** so 83 is the 12th term of the sequence.

1. When , . When , . So  passes 100 sooner.
2. To get the next number in the sequence you need to add the two previous terms.

So the next term would be .

1. When , 



so 

1. Equating and solving  and  gives . The 21st term has 44 dots.

**Extension**

Yes he is correct. The triangular numbers are: 1, 3, 6, 10, 15, 21, 28, 35, …..







 and so on.

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| **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |  | **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AO1 | 1 | Generate an arithmetic sequence from a formula for the *n*th term |  |  |  |  | AO1 | 1 | Generate an arithmetic sequence from a formula for the *n*th term |  |  |  |
| AO1 | 2 | Recognise simple geometric progressions |  |  |  |  | AO1 | 2 | Recognise simple geometric progressions |  |  |  |
| AO1 | 3 | Identify descending sequences |  |  |  |  | AO1 | 3 | Identify descending sequences |  |  |  |
| AO1 | 4 | Find a formula for the *n*th term of an arithmetic sequence |  |  |  |  | AO1 | 4 | Find a formula for the *n*th term of an arithmetic sequence |  |  |  |
| AO1 | 5 | Generate a quadratic sequence from a formula for the *n*th term |  |  |  |  | AO1 | 5 | Generate a quadratic sequence from a formula for the *n*th term |  |  |  |
| AO2 | 6 | Use a formula for the *n*th term to locate the position of a term in a sequence |  |  |  |  | AO2 | 6 | Use a formula for the *n*th term to locate the position of a term in a sequence |  |  |  |
| AO2 | 7 | Use a formula for the *n*th term to locate the position of a term in a sequence |  |  |  |  | AO2 | 7 | Use a formula for the *n*th term to locate the position of a term in a sequence |  |  |  |
| AO2 | 8 | Recognise and describe Fibonacci sequences |  |  |  |  | AO2 | 8 | Recognise and describe Fibonacci sequences |  |  |  |
| AO3 | 9 | Solve a problem involving the *n*th term formula of a quadratic sequence |  |  |  |  | AO3 | 9 | Solve a problem involving the *n*th term formula of a quadratic sequence |  |  |  |
| AO3 | 10 | Solve a problem by finding and using a formula for the *n*th term to locate the position and value of a term |  |  |  |  | AO3 | 10 | Solve a problem by finding and using a formula for the *n*th term to locate the position and value of a term |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
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