Geometric sequences nth term worksheet

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Last updated23 November 2016Designed for my bottom set Year 11 group. This sheet explores the more formal notation of Geometric Sequences but progresses very slowly through the questions, breaking them down into different sections for working out with a gradual removal of support.Creative Commons "Sharealike"Select overall rating(no rating)Your rating is required to reflect your happiness.Write a reviewUpdate existing reviewIt's good to leave some feedback.Something went wrong, please try again later.good slides to summarise variable acceleration and how we move from velocity to acceleration and displacement by integration and differentiationEmpty reply does not make any sense for the end userEmpty reply does not make any sense for the end userEmpty reply does not make any sense for the end userThank you for sharing, its great for my Year 10 class to practice.Empty reply does not make any sense for the end userEmpty reply does not make any sense for the end userReport this resourceto let us know if it violates our terms and conditions. Our customer service team will review your report and will be in touch. Last updated1 September 2016New in KS4 last year, lesson with differentiated questions and answers on geometric sequences that I used for my high ability year 10 class.Creative Commons "Sharealike"Select overall rating(no rating)Your rating is required to reflect your happiness.Write a reviewUpdate existing reviewIt's good to leave some feedback.Something went wrong, please try again later.Great thanks for sharingEmpty reply does not make any sense for the end userEmpty reply does not make any sense for the end userEmpty reply does not make any sense for the end userGood presentation. Thanks for sharingEmpty reply does not make any sense for the end userEmpty reply does not make any sense for the end userReport this resourceto let us know if it violates our terms and conditions. Our customer service team will review your report and will be in touch. GCSE 4 - 5KS3AQAEdexcelOCRWJECAQA November 2022Edexcel November 2022OCR November 2022WJEC November 2022Foundation Level 4-5 GCSE KS3 Linear sequences (or arithmetic progressions) are sequences that increase or decrease by the same amount between each term. Want a way to express any term in a concise mathematical way? This can be done using the n^{th} term formula. This is a rule that gives you the value of any term in the sequence in the form, an+b, Where a and b are numbers to be determined. Example: Find the n^{th} term for the following sequence, 3, \, 7, \,11, \,15, \,19, \, ... Step 1: Find the Common Difference (a) The common difference is the amount the sequence increases (or decreases) each time. a=4, because a is always the difference between each term. Step 2: Determine if you need to Add or Subtract anything (b) To work out b, consider the sequence formed by putting n=1, 2, 3, 4, 5 into 4n: 4, 8, 12, 16, 20 What's the difference between these terms and our actual sequence? They're all too big by 1. So, to make our original sequence, we must subtract 1 from 4n. Step 3: Write the formula in the correct form (an+b) Thus, our n^{th} term formula is 4n-1. Level 4-5GCSEKS3 Level 4-5 GCSE KS3 Another type of sequence is a geometric sequence or geometric progression. In a geometric sequence, you multiply each term by a common ratio to get to the next term. For example, is a geometric progression where to get get to the next term you have to multiply the previous term by the common ratio. Therefore to find the next two terms of this sequence we have to multiply the preceding term by 3, so 40.5\times 3=121.5 and 121.5\times 3 =364.5 Level 4-5GCSEKS3 You may be asked about geometric sequences involving surds. For example, is a geometric progression where the common ratio is not a rational number. The method of finding the next two terms of this sequence is the same as before, multiply the preceding term by \sqrt{3}, so 9\sqrt{3}\times 3=27 and 27\times \sqrt{3} = 27\sqrt{3} Level 4-5GCSEKS3 There are other types of sequences you should be familiar with: Triangular Numbers Triangular numbers are numbers that can be represented as an equilateral triangle of dots. The n^{th} term is \dfrac{n(n+1)}{2}, giving 1, 3, 6, 10, 15, 21, ... Square Numbers These sequences are made up of square numbers so the n^{th} term is n^2, giving 1, 4, 9, 16, 25, 36, 49, ... Cubic Numbers These sequences are made up of cubic numbers so the n^{th} term is n^3, giving 1, 8, 27, 64, 125, 216, ... The Fibonacci Numbers The first few terms of the Fibonacci sequence are: 1, 1, 2, 3, 5, 8, 13, 21, ... This is a famous sequence that you need to recognise. The rule is the previous 2 terms are added together in the sequence to get the next term. Level 4-5GCSEKS3 Level 4-5 GCSE KS3 Find the n^{th} term formula for the sequence -2, 5, 12, 19, 26. [2 marks] The first step is to find the common difference between each term. Hence we can write the n^{th} term as, 7n+b To work out b, consider the sequence formed by putting n=1, 2, 3, 4, 5 into u_n=7n: 7, 14, 21, 28, 35 The difference between these numbers and our sequence is we need to subtract 9 from each term. Thus, our n^{th} term is 7n-9. Level 4-5GCSEKS3 The first five terms of a sequence are: -3, 1, 5, 9, 13 Determine if 1143 is part of this sequence. [3 marks] Step 1: First we must find the n^{th} term of the sequence of the sequence as before, this gives 4n-7. Step 2: Next we need to write the n^{th} term as an euqation equal to 1143 and solve for n If n solves to give an integer, then 1143 is part of the sequence. \begin{aligned} 4n-7&=1143 \\ 4n & = 1150 \\ n&= 287.5\end{aligned} As 287.5 is not an integer, 1143 must not be part of the sequence. Level 4-5GCSEKS3 The sum of two consecutive terms in a sequence given by the n^{th} term, 3n+8 is 109. Find the values of these two terms. [4 marks] In this case we have to first set up an equation, setting the first term as n and the second as n+1, such that, \begin{aligned} 3n+8+3(n+1)+8 & = 109 \\ 3n + 8 + 3n + 3 + 8 & = 109 \\ 6n +19 &= 109 \\ 6n &= 90 \\ n &=15 \end{aligned} Hence, it is the 15th and 16th terms we are looking for which are, 3(15)+8 = 53 and 3(16) +8 = 56 Level 4-5 GCSE KS3 Example Questions a) To find the 12^{th} term of this sequence, we will substitute n=12 into the formula given. 4(12)+1=49 So, the 12^{th} term is 49 b) Every term in this sequence is generated when an integer value of n is substituted into 4n+1 Hence if we set 77 to equal 4n+1, we can determine its position in the sequence, 4n+1=77 making n the subject by subtracting 1 then dividing by 4, n=\dfrac{77-1}{4}=19 Hence 77 is the 19^{th} term in the sequence. a) To generate the first 5 terms of this sequence, we will substitute n=1, 2, 3, 4, 5 into the formula given. \begin{aligned}1 &=5(1)-4 =1 \\ 2 &=5(2)-4 =6 \\ 3 & =5(3)-4=11 \\ 4 &=5(4)-4=16 \\ 5 &=5(5)-4=21 \end{aligned} So, the first 5 terms are 1, 6, 11, 16, and 21 b) Every term in this sequence is generated when an integer value of n is substituted into 5n-4. If we set 108 to equal 5n-4, we can determine if it is a part of the sequence or not. If the value of n is a whole number then it is part of the sequence, hence 5n-4=108 making n the subject by adding 4 then dividing by 5, n=\dfrac{112}{5}=22.4 As there is no "22.4^{th}" position in the sequence, it must the case that 108 is not a term in this sequence. We are told it is an arithmetic progression and so must have n^{th} formula: an+b. To find a, we must inspect the difference between each term which is 5, hence a=5. Then, to find b, let's consider the sequence generated by 5n: 5,\,\,10,\,\,15,\,\,20,\,\,25 Every term is this sequence is bigger than the corresponding terms in the original sequence by 8. So, to get to the original sequence, we will have to subtract 8 from every term in this sequence. In other words, the n^{th} term formula for our sequence in question is 5n-8 Related Topics Worksheet and Example Questions Drill Questions You May Also Like... 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Geometric Sequences This video looks at identifying geometric sequences as well as finding the nth term of a geometric sequence. Example: Given a1 = 5, r = 2, what is the 6th term? Given a1 = 11, r = -3, what is a8? Show Video Lesson Geometric Sequences: A Formula For The nth Term. This video shows how derive the formula to find the 'n-th' term of a geometric sequence by considering an example. The formula is then used to find another term of the sequence. Show Video Lesson Finding The nth Term Of A Geometric Sequence How to find any term of a geometric sequence? Example: 5, 10, 20, 40, ... Show Video Lesson Find The Formula For A Geometric Sequence Given Terms This video explains how to find the formula for the nth term of a given geometric sequence given three terms of the sequence. Example: Given the information about the geometric sequence, determine the formula for the nth term. a0 = 5, a1 = 40/9, a3 = 320/81, ... Show Video Lesson Try the free Mathway calculator and problem solver below to practice various math topics. Try the given examples, or type in your own problem and check your answer with the step-by-step explanations. We welcome your feedback, comments and questions about this site or page. Please submit your feedback or enquiries via our Feedback page.

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