Quadratic sequences questions maths genie answers

November 21, 2019 corbetmaths Find the nth term of the following sequences: arrow_back Back to the square sequences A selection of the best quality videos, from the best on the web, to help teach and learn this topic. Contents Corbett Maths Maths Genie Hegarty Maths Other videos These videos are made by Corbett Maths. Visit its excellent website for more videos, manual exercises, exam questions, 5-a-day, and more! Square Sequences - Version 1 Square Sequences - Version 2 Square Sequences - Version 3 Maths Genie keyboard_arrow_up Back to Top These videos are made by Maths Genie. Be sure to visit its website for high quality GCSE resources and a review level. The Nth Term of Quadratic Se sequences Hegarty Maths keyboard_arrow_up Back to Top These videos are made by award-winning Hegarty Maths. Be sure to visit his website for lessons, videos and ratings Find the nth time of a square sequence Other videos keyboard_arrow_up Back to the top a selection of other fine videos on these topics on the web. These are the resources that we have pulled together from Maths Genie to help you review GCSE Mathematics. QUESTIONS 01 Algebraic Fractions Pdf -- Download02 Bounds Pdf -- Download04 Completing The Square Pdf -- Download05 Compound and Inverse Functions Pdf -- Download06 Congruent Triangles Pdf -- Download07 Cubic And Reciprocal Graphs Pdf -- Download08 Cumulative Frequency Pdf -- Download09 Direct and Inverse Proportion Pdf -- Download10 Extension Negative Scale Factor Pdf -- Download11 Pdf Error Ranges -- Download12 Extension Triple Brackets Pdf -- Download13 Factoring Harder Questions Pdf -- Download14 Finding the area of any triangle Pdf -- Download15 Fractional and Negaticle Indices Pdf -- Download16 Histograms Pdf -- Download17 Iteration Pdf -- Download18 Parallel and Perpendicular Lines Pdf -- Download21 Probability Equation Questions Pdf -- Download22 Proof Of Circle Theorem Pdf -- Download24 Quadratic Formula Pdf -- Download25 Square Inequalities pdf -- Download26 Quadratic Sequences Pdf -- Download27 Square Simultaneous Rations Pdf -- Download28 Ratio Factor Problems Pdf -- Download 29 Rearranging Harder Formula Pdf -- Download30 Recurring Decimals to Fractions Pdf -- Download31 Repeated Percentage Change Pdf -- Download32 Similar Shapes Area and Volume Pdf -- Download33 Similar Forms Pdf -- Download35 The Cosinus Rule Pdf -- Download36 Equation of a Pdf Line -- Download37 Gradient From one Pdf line -- Download38 Regulation of the counting product Pdf -- Download39 The Self Rule Pdf -- Download41 Trag and Exponential Graphs Pdf -- Download42 Trigonometry Soh Cah Toa Pdf -- Download43 Vectors Proof Questions Pdf -- Download44 Vectors Pdf -- Download45 Velocity Time Graphs Pdf -- Download46 Venn Charts Since the questions Pdf Download47 Venn Diagrame Pdf -- Download ANSWERS 01 Algebric Fractions Answers Pdf -- Download03 Box Plots Pdf -- Download05 Compound And Verse Functions Resents Pdf -- -- Congruent Triangles Answers Pdf -- Download07 Cubic and Reciprocal Graphics Answers Pdf -- Download08 Cumulative Frequency Answers Pdf -- Download09 Direct and Inverse Proportion Answers Pdf -- Download10 Extension Negative Scale Factor Answers Pdf -- Download12 Extending Triple Brackets Answers Pdf -- Download15 Fractional and Negatione Indexes Answers Pdf -- Download16 Histograms Answers Pdf -- Download17 Iteration Answers Pdf -- Download18 Parallel and Perpendicular Lines Answers Pdf -- Download19 Lines Perpendicular Answers Pdf -- Download21 Probability Equation Questions Answers Pdf -- Download22 Proof of Circle Theorems Answers Pdf -- Download23 Proof Answers Pdf -- Download24 Quadratic Formula Answers Pdf -- Download25 Quadratic Inequalities Answers Pdf -- Download26 Quadratic Sequences Answers Pdf -- Download28 Ratio Factor Problems Answers Pdf -- Download30 Recurring Decimals to Fractions Answers Pdf -- Download31 RepeatedCent Change Answers Pdf -- Download33 Similar Forms Responses pdf -- Download34 Deaf Years pdf -- download35 The Cosine Rule Answers pdf -- Download36 Equation of a line answers pdf -- Download37 Gradient of a Line Answers pdf -- Download38 The Product Rule of Counting Answers pdf -- Download39 The Sine Rule Answers pdf -- download40 Transforming graphic answers pdf -- Download41 Trig and Exponential Graphic Answers Pdf -- Download43 Vectors Proof Questions Answers Pdf -- Download44 Vectors Answers Pdf -- Download45 Velocity Time Graphs Answers Pdf -- Download46 Venn Charts Since Questions Answers Pdf -- Download47 Venn Charts Answers Pdf -- Download All content beyond this point is only for the higher level. Example: Find the n^{th} term formula of the following square sequence. 2, 9, 18, 29, 42. Step 1: Find the difference between each term and find the second difference (i.e. differences between differences); To do this, we will first find the differences between the terms in the sequence. We can see that, unlike a linear sequence, the differences are not the same. However, if we then look at the differences between these differences, we will see the second differences are the same. We now know that the term formula n^{th} is \textcolor{red}{a}n^2+\textcolor{blue}{b}n+\textcolor{limegreen}{c}. To find the value \textcolor{red}{a} we find the second difference, which is 2, and divide it by 2. Therefore \textcolor{red}{a=1}. Step 2: Decrease \textcolor{red}{a}n^2 from the original sequence. We still need to find \textcolor{blue}{b} and \textcolor{limegreen}{c}. To do this, we replace the n values from 1 to 5 in \textcolor{red}{a}n^2 and write the results below the original sequence, as shown. u_n = original sequence. If you look closely at u_n - n^2 you will notice that it is a linear sequence whose term n^{th} will give us the missing letters of the square term n^{th} that we want. Step 3: Find the new n^{th} term Linear. The term n^{th} for this linear sequence is Step 4: Write the final term n^{th} for the full square sequence. This formula is exactly the last part of the n^{th} square term formula that we set out to find in the first place. Therefore, we get our final n{th} term to be, n ^ 2 +4n-3. Example: Find the n^{th} term formula of the following square sequence. 4, 15, 32, 55, 84 Step 1: Find the difference between each term and find the second difference (i.e. differences between differences); We will first find the differences between the terms in the sequence. To find the value of a we find the second difference, which is 6, and divide this by 2. Therefore, a = 3. Step 2: Drop \textcolor{red}{3}n^2 We still need to find \textcolor{blue}{b} and \textcolor{limegreen}{c}. To do this we replace the values of 3n^2 from 1 to 5 in this, and we write the results below the original sequence as shown. u_n = original sequence Here, we subtracted our values for 3n^2 from the actual sequence to form a linear sequence, the term n^{th} will give us the missing letters of the square term n^{th} that we want. Step 3: Find the term n^{th} of the new sequence. The term n^{th} for this linear sequence is u_n=2n-1. Step 4: Write the final term n^{th} for the full square sequence. This formula is exactly the last part of the n^{th} square term formula that we set out to find in the first place. Therefore, we get our final n ^ {th} term to be, u_n = 3n ^ 2 + 2n-1. Each time you need to find the n^{th} term formula for a square sequence, the method is the same. To find \textcolor{red}{a}n^2+\textcolor{blue}{b}n++textcolor{green}c, the steps are: Find the difference between each term and find the second difference (i.e. differences between differences); Verify that the second difference is the same, and then halve that number to obtain \textcolor{red}{a}; Write the terms of the sequence again, then replace the first few n values in a^2 and write the results below the original sequence. Subtract the elements of the second row from the items above them in the first row. Treat these differences as a sequence and find the n^{th} term of that linear sequence. Finally, combine \textcolor{red}{a}n^2 that you found in step 2 with \textcolor{blue}{b}n+\textcolor{green}{c} that you found in step 5 and took the square term formula n^{th}. To generate the first 5 terms of this sequence, we will replace n=1, 2, 3, 4, 5 in the given formula. \begin{aligned}n=1 \text{ gives } &(1)^2+6(1)-10=-3 \=2 \text{ gives } &(2)^2+2)-10=6 \\ n=3\text{ gives } &(3)^2+6(6)63)-10=17 \\ n=4 \text{ gives } &(4)^2+6(4)-10=30 \\ n=5 \text{ gives } &(5)^2+6(5)-10=45\end{aligned} Hence the first five terms of the sequence are , -3, 6, 17, 30, 45 a) To generate the first 4 terms of this sequence, we will replace n=1, 2, 3, 4 in the given formula. \start{aligned}n=1 gives } &(1)^2-2 =-1 \\ n=2 \text{ gives } &(2)^2 =4 \\ n=3 \text{ gives } &(3)^2-2=7 \\ n=4 n=4 gives } &(4)^2-2=14 \end{aligned} b) Each term in this sequence is generated when an integer value of n is replaced in n^2-2 if we set 287 to equal n^2-2, we can determine its position in sequence, n^2-2=287 by doing n subject, n=\sqrt{287+2}=17 Therefore, 287 is the term 17^{th} in the sequence. Each term in this sequence is generated when an integer value of n is replaced in (n-1)^2 Thus, if we set 49 to equal (n-1)^2, we can determine its position in the sequence, \begi{aligned}(n-1)^2&=49 \\ n-1 &=pm\sqrt{49} \\ n&=1 +7 = 8\end{aligned} Therefore 49 is the term 8^{th} in the sequence, since n can only be positive integers. Thus, the formula of the term n^{th} will take the form an^2+bn+c where a, b and c are numbers to be determined. First, we need to find the differences between the terms in the sequences, and then we need to find the difference between the differences. Doing so, we find, The second difference is the same, so it was expected, therefore one is half of the second difference and so a = 1 Now we need to find b and c by comparing the values generated by a sequence of n ^ 2, to the original sequence. \begin{aligned} u_n &= 9 , 20, 33, 48, 65 \\ n^2 &= 1, 4, 9, 16, 25 \\ u_n - n^2 &= 8, 16, 24, 32, 40\end{aligned} The difference, is a linear sequence whose term formula n^{th} is exactly bn+c, so the difference is 8, so the term n^{th} must be 8n+c where c=0 therefore , we get the term formula n^{th} of the square to be , n^2+8n So the formula of the term n^{th} will take the form an^2+bn+c where a, b and c are numbers to be determined. First, we need to find the differences between the terms in the sequences, and then we need to find the difference between the differences. Doing so, we find, The second difference is the same, so it was expected, therefore one is half of the second difference and so a = 2 Now we need to find b and c by comparing the values generated by a sequence of 2n ^ 2, to the original sequence. \begin{aligned}u_n & = 0, 1, 6, 15, 28 \\ 2n^2 & = 2, 8, 18, 32, 50 \\u_n-2n^2 & = -2, -7, -12, -17, -22\end{aligned} Difference, is a linear sequence whose term formula n^{th} is exactly bn+c, so the difference is -5, so the term n^{th} must be -5n+c. Then, for n=1, we receive -5n=-5, while the first term is not -5, but -2. To go from -5 to -2 we have to add 3, so we have to have that c=3, and so the term n^{th} is -5n+3 Therefore, combining this with the first term in the squares that we found earlier, we get n^{th} the square term formula to be 2n^2-5n+3 Try a review book on this topic. Topic.