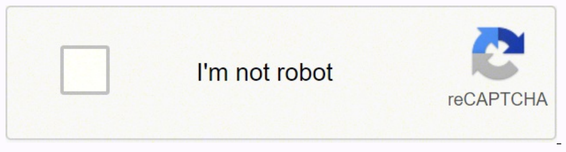

Next

How do you find the first term and common ratio of a geometric sequence

How to find the first term and common ratio if given that sum of first and third term is 20 and sum of fourth and sixth term is 540? Relevant page 2. Geometric Progressions What I've done so far Trial and error, and reading over your examples. XHow to find the first term and common ratio if given that sum of first and third term is 20 and sum of fourth and sixth term is 540?Relevant page 2. Geometric Progressions What I've done so far Trial and error, and reading over your examples. Hello Alicia I'll get you started and hope you can go from there. As you know, the terms in an arithmetic progression go: `a, ar, ar^2, ar^3, ...` From the question, you know that `a + ar^2 = 20` Next, factorise the LHS. Now write the sum of the 4th and 6th terms and factorise. You should be able to recognise something. Then divide the second answer by the first. Out will pop your answer. Good luck XHello Alicia I'll get you started and hope you can go from there. As you know, the terms in an arithmetic progression go: `a, ar, ar^2, ar^3, ...` From the question, you know that `a + ar^2 = 20` Next, factorise the LHS. Now write the sum of the 4th and 6th terms and factorise. You should be able to recognise something. Then divide the second answer by the first. Out will pop your answer. Good luck Do you mean `a(1+r^2) = 20`? The 4th terms is `ar^3` and the 6th is `ar^5`, so `ar^3 + ar^5 = 540` ?? Where to go from there? XDo you mean `a(1+r^2) = 20`? The 4th terms is `ar^3` and the 6th is `ar^5`, so `ar^3 + ar^5 = 540` ?? Where to go from there? You need to factor your last expression, then divide the second line by the first. XYou need to factor your last expression, then divide the second line by the first. `ar^3(1+r^2) = 540` Do it mean this? `(ar^3(1+r^2))/(a(1+r^2)) = 540/20` Then `r^3 = 27` `r = 3` I got it! Putting that back in the first line gives me: `a(1+3^2) = 10a = 20` So `a=2`. So first term is `2` and common ratio is `3`. Plugging in to check: The terms will be: `2, 6, 18, 54, 162, 486, ...` Sum of first and 3rd is `2 + 18 = 20` (OK) Sum of 4th and 6th terms: `54 + 486 = 540` Thank you so much Regards Alicia X`ar^3(1+r^2) = 540` Do it mean this? `(ar^3(1+r^2))/(a(1+r^2)) = 540/20` Then `r^3 = 27` `r = 3` I got it! Putting that back in the first line gives me: `a(1+3^2) = 10a = 20` So `a=2`. So first term is `2` and common ratio is `3`. Plugging in to check: The terms will be: `2, 6, 18, 54, 162, 486, ...` Sum of first and 3rd is `2 + 18 = 20` (OK) Sum of 4th and 6th terms: `54 + 486 = 540` Thank you so much Regards AliciaYou need to be logged in to reply. Series [Solved!] 56, 55, 52, 45 ... ... Find the nth term the above series. Generating numbers with mean and variance [Solved!] how to generate numbers with given mean and variance in binomial theorem? top A geometric sequence is an ordered set of numbers in which each term is a fixed multiple of the number that comes before it. Geometric sequences use multiplication to find each subsequent term. Each term gets multiplied by a common ratio, resulting in the next term in the sequence. In the geometric sequence shown below, the common ratio is 2. In other words, each term is multiplied by 2. The resulting product is the next term in the sequence.\(1,2,4,8,16,32,64…\)Finding Terms in Geometric Sequences Sample QuestionsHow do you find a term in a geometric sequence when given a formula?The formula \(a_n=a_1r^{(n-1)}\) is used to identify any number in a given geometric sequence. In this formula, \(n\) stands for the number in the sequence that needs to be identified. \(a_1\) stands for the first term in the sequence, and \(r\) stands for the common ratio. Consider how this formula applies to the following geometric sequence:\(2,10,50,250…\)In this geometric sequence, the common ratio, or \(r\), equals \(5\). As the sequence progresses, each term is multiplied by \(5\). Use the formula given to identify the \(6^{th}\) term in this sequence.Since the variable \(n\) stands for the number in the sequence that needs to be identified, replace \(n\) with \(6\) in the formula. The variable \(a_1\) stands for the first term in the sequence, which is \(2\). The variable r represents the common ratio, so replace \(r\) with \(5\) in the formula:\(n=6\) \(a_1=2\) \(r=5\)From here, rewrite the formula and substitute the variables with the numbers they represent:\(a_6=(2)(5)^{(6-1)}\)Now that the variables are replaced with their corresponding values, solve the equation using the Order of Operations.\(a_6=(2)(5)^{(5)}\)First, simplify the exponents. Since \(6-1=5\), we can rewrite the equation using the exponent \(5\).\(a_6=(10)(3{,}125)\)Next, simplify the exponent \(5^5\). \(5^5=5×5×5×5×5\), which equals \(3{,}125\). Rewrite the equation using \(3{,}125\).\(a_6=31{,}250\)From here, multiply \(10×3{,}125\) to get the final answer. Since \(10×3{,}125=31{,}250\), the \(6^{th}\) term in the geometric sequence is \(31{,}250\).How do you find a term in a geometric sequence without a formula?A missing term in a geometric sequence can be found without using a formula. Analyze the pattern and consider the common ratio to identify the missing term. Consider the following geometric sequence:\(10,30,90,270,\) _____ \(,2{,}430…\)First, analyze the pattern to identify the common ratio. Start with the first term, \(10\). \(10\) multiplied by what number results in a product of \(30\)? The correct answer is \(3\), so the common ratio is \(3\). Check the rest of the terms using this common ratio. \(30×3=90\) and \(90×3=270\).Next, multiply \(270\) by \(3\) to get the missing term in the geometric sequence. Since \(270×3=810\), the missing term is \(810\).\(10,30,90,270,\mathbf{810},2{,}430…\)Check your work by multiplying \(810\) by \(3\). If correct, the product should be the subsequent term in the sequence, \(2{,}450\). Since \(810×3=2{,}430\), the answer is correct.Finding Terms in Geometric Sequences Sample Questions Here are a few sample questions going over how to find terms in geometric sequences. Question #1: Find the missing term in the geometric sequence without using a formula.\(3,15,75,375,\) _____ \(,9{,}375…\) Show Answer Answer:To identify the missing term without a formula, analyze the pattern to find the common ratio. Start with the first term, \(3\). \(3\) multiplied by what number results in a product of the next term, \(15\)? The correct answer is \(5\), so the common ratio is \(5\). Check the rest of the terms in the sequence: \(15×5=75\) and \(75×5=375\). Next, multiply \(375\) by \(5\) to find the missing term in the sequence. Since \(375×5=1{,}875\), the missing term in the geometric sequence is \(1{,}875\). Check your work by multiplying \(1{,}875\) by \(5\). If correct, the product should be the subsequent term in the sequence, \(9{,}375\). Since \(1{,}875×5=9,375\), answer \(B\) is correct.\(3,15,75,375,\mathbf{1{,}875},9{,}375…\) Hide Answer Question #2: Use the formula \(a_n=a_1r^{(n-1)}\) to identify the \(8^{th}\) term in the sequence shown:\(1,6,36,216,1{,}296…\) Show Answer Answer:First, identify the values of the variables used in the equation. Since n stands for the number in the sequence that needs to be identified, replace \(n\) with \(8\) in the formula. The variable \(a_1\) stands for the first term in the sequence, which is \(1\). The variable \(r\) represents the common ratio. In this case, the common ratio is \(6\). Each term is multiplied by \(6\), resulting in the subsequent term in the sequence. Replace \(r\) with \(6\) in the formula.\(n=8\) \(a_1=1\) \(r=6\)From here, rewrite the formula \(a_n=a_1r^{(n-1)}\) and substitute the variables with the numbers they represent:\(a_8=(1)(6)^{(8-1)}\)Now that the variables are replaced with their corresponding values, solve the equation using the Order of Operations.\(a_8=(1)(6)^{(7)}\)First, simplify the exponents. Since \(8-1=7\), we can rewrite the equation using the exponent \(7\).\(a_8=(1)(279{,}936)\)Next, simplify the exponent \(6^7\). \(6^7=6×6×6×6×6×6×6\), which equals \(279{,}936\). Rewrite the equation using \(279{,}936\).\(a_8=279{,}936\)From here, multiply \(1×279{,}936\) to get the final answer. Since \(1×279{,}936=279{,}936\), the \(6^{th}\) term in the geometric sequence is \(279{,}936\). Therefore, \(A\) is the correct answer. Hide Answer Question #3: Use the formula \(a_n=a_1r^{(n-1)}\) to identify the \(15^{th}\) term in the sequence shown:\(7,21,63,189,567…\) Show Answer Answer:First, identify the values of the variables used in the equation. Since n stands for the number in the sequence that needs to be identified, replace \(n\) with \(15\) in the formula. The variable \(a_1\) stands for the first term in the sequence, which is \(7\). The variable \(r\) represents the common ratio. In this case, the common ratio is \(3\). Each term is multiplied by \(3\), resulting in the subsequent term in the sequence. Replace \(r\) with \(3\) in the formula.\(n=15\) \(a_1=7\) \(r=3\)From here, rewrite the formula \(a_n = a_1r^{(n-1)}\) and substitute the variables with the numbers they represent:\(a_{15}=(7)(3)^{(15-1)}\)Now that the variables are replaced with their corresponding values, solve the equation using the Order of Operations.\(a_{15}=(7)(3)^{(14)}\)First, simplify the exponents. Since \(15-1=14\), we can rewrite the equation using the exponent \(14\).\(a_{15}=(7)(4{,}782{,}969)\)Next, simplify the exponent \(3^{14}\). \(3^{14}=3×3×3×3×3×3×3×3×3×3×3×3×3×3\) \(×3×3×3×3×3×3×3\), which equals \(4{,}782{,}969\). Rewrite the equation using \(4{,}782{,}969\).\(a_{15}=33{,}480{,}783\)From here, multiply \(7×4{,}782{,}969\) to get the final answer. Since \(7×4{,}782{,}969=33{,}480{,}783\), the \(15^{th}\) term in the geometric sequence is \(33{,}480{,}783\). Therefore, \(D\) is the correct answer. Hide Answer Question #4: Kelsey opened a bank account in January and deposited \($5\). Each month, she plans to double the amount deposited in the previous month. Based on this information, how much money will Kelsey deposit in October? Show Answer Answer:To figure out how much money Kelsey plans to deposit, use the sequences formula. First, identify the values of the variables used in the equation. October will be Kelsey's tenth deposit, so we are finding the tenth term in the geometric sequence. Since n stands for the number in the sequence that needs to be identified, replace \(n\) with \(10\) in the formula. The variable \(a_1\) stands for the first term in the sequence. Kelsey's first deposit was in January when she opened her bank account with \($5\). Therefore, the first term in the sequence is \(5\). Each month, Kelsey plans to double the amount of money she deposits. Each term gets doubled, or multiplied by \(2\), resulting in the subsequent term in the sequence. Based on this information, the common ratio in this sequence is \(2\). Therefore, replace \(r\) with \(2\) in the formula.\(n=10\) \(a_1=5\) \(r=2\)From here, rewrite the formula \(a_n = a_1r^{(n-1)}\) and substitute the variables with the numbers they represent:\(a_{10}=(5)(2)^{(10-1)}\)Now that the variables are replaced with their corresponding values, solve the equation using the Order of Operations.\(a_{10}=(5)(2)^{(9)}\)First, simplify the exponents. Since \(10-1=9\), we can rewrite the equation using the exponent \(9\).\(a_{15}=(512)\)Next, simplify the exponent \(3^{9}\). \(2^{2}=2×2×2×2×2×2×2×2×2\), which equals \(512\). Rewrite the equation using \(512\).\(a_{10}=2{,}560\)From here, multiply \(5×512\) to get the final answer. Since \(5×512=2{,}560\), the \(10^{th}\) term in the geometric sequence is \(2{,}560\). Kelsey plans to deposit \($2{,}560\) to her bank account in October. Therefore, \(D\) is the correct answer. Hide Answer Question #5: Ken is researching the reproduction of a species of bacteria. Based on his research, the bacteria triples in amount every 24 hours. Ken keeps a log of the bacteria count in his laboratory, but the bacteria count on day 4 of his research is missing. Assuming the bacteria tripled each day as predicted, identify the bacteria count on day 4 without using the geometric formula:\(8,24,72,\) _____ \(,648…\) Show Answer Answer:To identify the missing term without a formula, analyze the pattern to find the common ratio. Start with the first term, \(8\). \(8\) multiplied by what number results in a product of the next term, \(24\)? The correct answer is \(3\), so the common ratio is \(3\). Check the rest of the terms in the sequence: \(24×3=72\). Next, multiply \(72\) by \(3\) to get the missing term in the sequence. Since \(72×3=216\), the missing term in the geometric sequence is \(216\). Check your work by multiplying \(216\) by \(3\). If correct, the product should be the subsequent term in the sequence, \(648\). Since \(216×3=648\), answer \(C\) is correct. The bacteria count on day \(4\) of Ken's experiment was \(216\).\(8,24,72,\mathbf{216},648…\) Hide AnswerReturn to Math Sample Questions by Mometrix Test Preparation | Last Updated: March 3, 2022

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