# **Algebra 2B Unit Test Guide**

## Finite Geometric Series Unit Test

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| **Item** | **Lesson Coverage** | **Objective** | **Mathematical Practice Standard** | **Lesson Page** | **Assessment Item** |
| 1 | Lesson 2: From Sequences Come Series | In this section, you will create a geometric series in summation notation from a geometric sequence.  | Model with mathematics.  | p. 1-6 | Write the sigma notation for the geometric series from the following finite geometric sequence: 100, 80, 64.Correct answer: $\sum\_{n=1}^{3}100(0.8)^{n-1}$[Finite Geometric Series Unit Test Item #1 - GeoGebra](https://www.geogebra.org/calculator/rq5avptw) |
| 2 | Lesson 2: From Sequences Come Series | In this section, you will create a geometric series from a verbal description.  | Model with mathematics.  | p. 7-11 | A water tank is initially empty. Suppose 6 liters of water are added to the tank, and the amount of water triples every hour for 5 hours. If you create a geometric series model, what is the first term?The first term is \_.Correct answer: 6[Finite Geometric Series Unit Test Item #2 - GeoGebra](https://www.geogebra.org/calculator/h9jhgrju) |
| 3 | Lesson 2: From Sequences Come Series | In this section, you will manually sum the first n terms of a geometric sequence.  | Model with mathematics.  | p. 12-16 | A machine can lift a weight of 10 kg on the first day. The weight it can lift increases by 20 percent each day. How much weight can the machine lift on the fifth day? Round your answer to two decimal places.The machine can lift \_ kg.Correct answer: 20.74 |
| 4 | Lesson 3: The Sum of a Finite Geometric Series | In this lesson, you will derive the formula for the sum of a finite geometric series.  | Model with mathematics.  | p. 1-7 | Which of the following is the sum of the first five terms of the geometric series whose first term is *a* and that has a common ration of $2r$?Correct answer: $S\_{5}=\frac{a-32ar^{5}}{(1-2r)}$[Finite Geometric Series Unit Test Item #4 - GeoGebra](https://www.geogebra.org/calculator/u3wd9fe3) |
| 5 | Lesson 3: The Sum of a Finite Geometric Series | In this section, you will calculate the sum of a finite geometric series when given a geometric sequence.  | Model with mathematics.  | p. 8-12 | A car dealer sold 100 cars in his first year and plans to increase his sales by 10 percent each year for the next 5 years. How many cars will he have sold at the end of his fifth year?Correct answer: 610[Finite Geometric Series Unit Test Item #5 - GeoGebra](https://www.geogebra.org/calculator/dk4jcgjm) |
| 6 | Lesson 3: The Sum of a Finite Geometric Series | In this section, you will calculate the sum of a finite geometric series when given a verbal description.  | Model with mathematics.  | p. 13-17 | What is the sum of the first seven terms of a series whose first term is 2 and has a common ratio of 4?Correct answer: 10,922[Finite Geometric Series Unit Test Item #6 - GeoGebra](https://www.geogebra.org/calculator/dawuegue) |
| 7 | Lesson 4: Sigma Notation | In this section, you will express the formula for the sum of a finite geometric series in sigma notation.  | Model with mathematics.  | p. 1-5 | Write the geometric series with the common ratio 3, initial value 10, and 100 terms in sigma notation.Correct answer: $\sum\_{n=1}^{100}10(3)^{n-1}$ |
| 8 | Lesson 4: Sigma Notation | In this section, you will express the sum of the first n terms of the related series in sigma notation when given a sequence. | Model with mathematics.  | p. 6-10 | Write a geometric series using the following sequence that sums the first 100 terms in sigma notation: $4, -\frac{4}{3}, \frac{4}{9}, …$.Correct answer: $\sum\_{n=1}^{100}\left(4\right)(-\frac{1}{3})^{n-1}$[Finite Geometric Series Unit Test Item #8 - GeoGebra](https://www.geogebra.org/calculator/hfm5pt6d) |
| 9 | Lesson 4: Sigma Notation | In this section, you will write the series represented by a sum given in sigma notation. | Model with mathematics.  | p. 11-15 | Write the series represented by $\sum\_{n=1}^{6}(8)(\frac{1}{2})^{n-1}$.Correct answers: $8+4+2+1+\frac{1}{2}+\frac{1}{4}$[Finite Geometric Series Unit Test Item #9 - GeoGebra](https://www.geogebra.org/calculator/mfny8ckk) |
| 10 | Lesson 5: Saving Money | In this section, you will adapt the formula for the sum of a finite geometric series to express the future value of an annuity. | Model with mathematics.  | p. 1-6 | An annuity account earns biannual payments and has an annual interest rate of 5 percent. What value of *r* must be substituted into the formula to calculate the future value of the annuity? Round the value to the nearest thousandth.Correct answer: 0.025[Finite Geometric Series Unit Test Item #10 - GeoGebra](https://www.geogebra.org/calculator/xvetbzun) |
| 11 | Lesson 5: Saving Money | In this section, you will calculate the future values of annuities in the context of saving money. | Model with mathematics.  | p. 7-11 | You decide you want to buy a house in 5 years and need to have a down payment of $75,000. A high yield money market account has an annual interest rate of 7 percent. Which calculation would you use to determine if a monthly deposit of $300.00 would be enough to reach your goal?Correct answer: $FV=300\frac{\left(1+.00583\right)^{60}-1}{.00583}$[Finite Geometric Series Unit Test Item #11 - GeoGebra](https://www.geogebra.org/calculator/sbahg284) |
| 12 | Lesson 6: Spending Money | In this section, you will explain how the formula for the future value of an annuity can be adapted for large purchases that require regular payments.  | Model with mathematics.  | p. 1-7 | What would the *n* value be for an annuity that has weekly payments for two years? There are 52 weeks in a year.Correct answer: 104[Finite Geometric Series Unit Test Item #12 - GeoGebra](https://www.geogebra.org/calculator/t4yewcft) |
| 13 | Lesson 6: Spending Money | In this section, you will calculate the payment plan to determine the present value of an annuity.  | Model with mathematics.  | p. 8-14 | Sadeeq wants to save for a down payment on a house and plans to deposit $700 every month into an annuity for the next 7 years. If the annuity interest rate is 5 percent per year, what is the present value of the annuity? Round your answer to the nearest hundredth.The present value of the savings plan is $\_.Correct answer: 49,526.28[Finite Geometric Series Unit Test Item #13 - GeoGebra](https://www.geogebra.org/calculator/hfyqtff8) |
| 14 | Lesson 3: The Sum of a Finite Geometric Series | In this section, you will calculate the sum of a finite geometric series when given a verbal description.  | Model with mathematics.  | p. 13-17 | In 1–2 sentences, explain what the sum of a finite geometric series represents.Correct answer: Student answers should explain that the sum of a finite geometric series is the total of all the term values added together for a series with a common ratio. |
| 15 | Lesson 5: Saving Money | In this section, you will adapt the formula for the sum of a finite geometric series to express the future value of an annuity. | Model with mathematics.  | p. 1-6 | In 1–2 sentences, explain why the future value of an account that earns monthly payments of $25 at a variable annual interest rate for 36 months cannot be calculated by using the formula for the future value of an annuity.Correct answer: Student answers should express that the future value of an annuity can be calculated only for accounts that receive the same payment amount and constant interest rate over the given period. Since this account has a variable interest rate, its future value cannot be calculated using the formula $FV=P\frac{(1+r)^{n}-1}{r}$. |
| 16 | Lesson 6: Spending Money | In this section, you will explain how the formula for the future value of an annuity can be adapted for large purchases that require regular payments.  | Model with mathematics.  | p. 1-7 | In 3–5 sentences, explain how the future value of an annuity formula can be used to calculate the monthly payment of a loan.Correct answer: Student answers should explain that if you know the interest rate, total loan amount, and number of payments, you can find the monthly payment of a loan. Substitute the loan amount for the future value of the annuity, substitute the APR divided by 12 for the *r* variable, and substitute the number of payments for the *n* variable into the equation $FVA=A∙\frac{(1+r)^{n}-1}{r}$. Solve by simplifying the fraction on the right side of the equation, and then dividing the FVA value by the simplified fraction value. |