
CORE MATHEMATICS 2**CHAPTER 7 – GEOMETRIC SEQUENCES AND SERIES****EXTRA PRACTICE**

1. The first term of a geometric series is 5 and the common ratio is 1.2. Find for this series
- (a) the 16th term, giving your answer to the nearest integer,
 - (b) the sum of the first 30 terms, giving your answer to the nearest integer.
 - (c) Give a reason why this series has no sum to infinity.
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2. The second and fifth terms of a geometric series are 9 and 1.125 respectively.

For this series find

- (a) the value of the common ratio,
 - (b) the first term,
 - (c) the sum to infinity.
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3. A geometric series has first term 1200. Its sum to infinity is 960.

- (a) Show that the common ratio of the series is $-\frac{1}{4}$.
 - (b) Find, to 3 decimal places, the difference between the ninth and tenth terms of the series.
 - (c) Write down an expression for the sum of the first n terms of the series.
Given that n is odd,
 - (d) prove that the sum of the first n terms of the series is $960(1 + 0.25^n)$.
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4. A sequence is defined by the recurrence relation

$$u_{n+1} = \frac{1}{3} u_n, \quad n > 0, \quad u_1 = 1.$$

- a Write down the first four terms of the sequence.

- b Evaluate $\sum_{r=1}^{\infty} u_r$.
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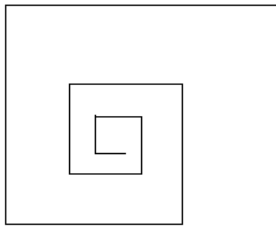
5. All the terms of a geometric series are positive. The sum of the first and second terms of the series is 10.8 and the sum of the third and fourth terms of the series is 43.2

- a Find the first term and common ratio of the series.
 - b Find the sum of the first 16 terms of the series.
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6. Evaluate $\sum_{r=3}^{10} 3^r$.

7. The first three terms of a geometric series are $(k + 10)$, k and $(k - 6)$ respectively.
- Find the value of the constant k .
 - Find the sum to infinity of the series.
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8.



A student programs a computer to draw a series of straight lines with each line beginning at the end of the previous one and at right angles to it. The first line is 4 mm long and thereafter each line is 25% longer than the previous one, so that a spiral is formed as shown above.

- Find the length, in mm, of the eighth straight line drawn by the program.
 - Find the total length of the spiral, in metres, when 20 straight lines have been drawn.
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9. A geometric series has common ratio r and the n th term of the series is denoted by u_n . Given that $u_1 = 64$ and that $u_3 - u_2 = 20$,
- show that $16r^2 - 16r - 5 = 0$,
 - find the two possible values of r ,
 - find the fourth term of the series corresponding to each possible value of r .
 - Taking the value of r such that the series converges, find the sum to infinity of the series.
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10. The common ratio of a geometric series is 1.5 and the third term of the series is 18.
- Find the first term of the series.
 - Find the sum of the first six terms of the series.
 - Find the smallest value of k such that the k th term of the series is greater than 8000.
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11. An internet site has 3600 subscribers at the start of a promotional campaign. In a model of the results of the campaign, it is assumed that the site will gain 200 new subscribers in the first week and that in subsequent weeks the number of new subscribers will be 15% greater each week.
- Show that, according to this model, the site will gain 304 new subscribers in the fourth week of the campaign.
 - Find the total number of subscribers to the site predicted by the model after ten weeks of the campaign, assuming that no subscriptions are cancelled in this period.
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