

31. (a) A geometric series has first term a and common ratio r . Write down the n th term and prove that the sum of the first n terms is given by

$$S_n = \frac{a(1-r^n)}{1-r}.$$

Given that $|r| < 1$, write down the sum to infinity of the series. [5]

- (b) The sum of the first term and the second term of a geometric series is equal to twice the sum of the second term and the third term of the series.

(i) Given that the common ratio of the series is positive, find the value of the common ratio. [4]

(ii) The sum to infinity of the series is 12. Find, correct to two decimal places, the sum of the first eight terms of the series. [4]

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$$S_n = \frac{a(1-r^n)}{1-r}.$$

Given that $|r| < 1$, write down the sum to infinity of the series. [4]

- (b) The sum to infinity of a geometric series with first term a and common ratio r is 10. The sum to infinity of a second geometric series with first term a and common ratio $2r$ is 15.

(i) Find the value of r . [4]

(ii) Find the sum of the first four terms of the first series, giving your answer correct to two decimal places. [3]

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33. A geometric series has first term a and common ratio r . The fifth term of the geometric series is 135 and the eighth term is 5.

(a) Show that $r = \frac{1}{3}$ and find the value a . [5]

(b) Find the sum to infinity of the series. [2]

Jan 2008

34. A geometric series has first term a and common ratio r . The sum of the first two terms of the geometric series is 7.2. The sum to infinity of the series is 20. Given that r is positive, find the values of r and a . [6]

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