

- 4 The first term of an arithmetic progression is a and the common difference is -4 . The first term of a geometric progression is $5a$ and the common ratio is $-\frac{1}{4}$. The sum to infinity of the geometric progression is equal to the sum of the first eight terms of the arithmetic progression.

(a) Find the value of a .

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The k th term of the arithmetic progression is zero.

(b) Find the value of k .

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- 6** The first three terms of an arithmetic progression are $\frac{p^2}{6}$, $2p - 6$ and p .

(a) Given that the common difference of the progression is not zero, find the value of p . [3]

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(b) Using this value, find the sum to infinity of the geometric progression with first two terms $\frac{p^2}{6}$ and $2p - 6$. [2]

Handwriting practice lines (dotted lines on a solid background).

9 The first term of a progression is $\cos \theta$, where $0 < \theta < \frac{1}{2}\pi$.

(a) For the case where the progression is geometric, the sum to infinity is $\frac{1}{\cos \theta}$.

(i) Show that the second term is $\cos \theta \sin^2 \theta$. [3]

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(ii) Find the sum of the first 12 terms when $\theta = \frac{1}{3}\pi$, giving your answer correct to 4 significant figures. [2]

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- 8 (a) An arithmetic progression is such that its first term is 6 and its tenth term is 19.5 .

Find the sum of the first 100 terms of this arithmetic progression.

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- (b) A geometric progression $a_1, a_2, a_3, \dots$ is such that $a_1 = 24$ and the common ratio is $\frac{1}{2}$.

The sum to infinity of this geometric progression is denoted by S . The sum to infinity of the even-numbered terms (i.e. $a_2, a_4, a_6, \dots$) is denoted by S_E .

Find the values of S and S_E .

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- 4 The first term of a geometric progression and the first term of an arithmetic progression are both equal to a .

The third term of the geometric progression is equal to the second term of the arithmetic progression.

The fifth term of the geometric progression is equal to the sixth term of the arithmetic progression.

Given that the terms are all positive and not all equal, find the sum of the first twenty terms of the arithmetic progression in terms of a . [6]

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- (a) Find the sum to infinity of the progression.

[3]

[illegible]

The second term of the geometric progression is equal to the second term of an arithmetic progression.

The third term of the geometric progression is equal to the fifth term of the same arithmetic progression.

(b) Find the sum of the first 21 terms of the arithmetic progression. [6]

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- Find the value of $S_{77} - G_{10}$.

[5]

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- 8 The first, second and third terms of an arithmetic progression are a , $\frac{3}{2}a$ and b respectively, where a and b are positive constants. The first, second and third terms of a geometric progression are a , 18 and $b + 3$ respectively.

(a) Find the values of a and b .

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(b) Find the sum of the first 20 terms of the arithmetic progression.

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- 4** The circumference round the trunk of a large tree is measured and found to be 5.00 m. After one year the circumference is measured again and found to be 5.02 m.

- (a) Given that the circumferences at yearly intervals form an arithmetic progression, find the circumference 20 years after the first measurement. [2]

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- (b) Given instead that the circumferences at yearly intervals form a geometric progression, find the circumference 20 years after the first measurement. [3]

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- (a) For the case where the progression is geometric and the sum to infinity is 264, find the value of a . [5]

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