

35. (a) A geometric series has first term a and common ratio r . Prove that the sum of the first n terms is given by

$$S_n = \frac{a(1-r^n)}{1-r} \quad [3]$$

- (b) Find the sum of the first eighteen terms of the geometric series

$$10 + 9 + 8.1 + \dots$$

Give your answer correct to the nearest whole number.

[3]

- (c) The second term of another geometric series is -4 . The sum to infinity of the series is 9.

- (i) Show that r , the common ratio of the series, satisfies the equation

$$9r^2 - 9r - 4 = 0.$$

- (ii) Find the value of r , giving a reason for your answer.

[6]

Jan 2009

36. (a) The ninth and tenth terms of a geometric series are 36 and 108 respectively. Find the seventh term of the geometric series. [3]

- (b) Another geometric series has first term a and common ratio r . The second term of this geometric series is 9 and the sum to infinity of the series is 48.

- (i) Show that r satisfies the equation

$$16r^2 - 16r + 3 = 0.$$

- (ii) Find the two possible values for r and the corresponding values of a .

[6]

June 2009

37. (a) A geometric series has first term a and common ratio r . Prove that the sum of the first n terms is given by

$$S_n = \frac{a(1-r^n)}{1-r} \quad [3]$$

- (b) The common ratio of a geometric series is positive. The sum of the first four terms of the series is 73.8. The sum to infinity of the series is 125. Find the common ratio and the first term of the geometric series.

Jan 2010

38. (a) Find the sum to infinity of the geometric series

$$40 - 24 + 14.4 - \dots$$

[3]

- (b) Another geometric series has first term a and common ratio r . The fourth term of this geometric series is 8. The sum of the third, fourth and fifth terms of the series is 28.

- (i) Show that r satisfies the equation

$$2r^2 - 5r + 2 = 0.$$

- (ii) Given that $|r| < 1$, find the value of r and the corresponding value of a .

[6]

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