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**Sequences and Series 2 - Edexcel Past Exam Questions**

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1. A geometric series has first term  $a = 360$  and common ratio  $r = \frac{7}{8}$ .

Giving your answers to 3 significant figures where appropriate, find

- (a) the 20th term of the series, (2)
- (b) the sum of the first 20 terms of the series, (2)
- (c) the sum to infinity of the series. (2)

**Jan 12 Q1**

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2. A geometric series is  $a + ar + ar^2 + \dots$

- (a) Prove that the sum of the first  $n$  terms of this series is given by

$$S_n = \frac{a(1-r^n)}{1-r} \quad (4)$$

The third and fifth terms of a geometric series are 5.4 and 1.944 respectively and all the terms in the series are positive.

For this series find,

- (b) the common ratio, (2)
- (c) the first term, (2)
- (d) the sum to infinity. (3)

**June 12 Q9**

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3. The first three terms of a geometric series are

$$18, 12 \text{ and } p$$

respectively, where  $p$  is a constant.

Find

- (a) the value of the common ratio of the series, (1)  
(b) the value of  $p$ , (1)  
(c) the sum of the first 15 terms of the series, giving your answer to 3 decimal places. (2)

**June 13 Q1**

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4. The first three terms of a geometric series are  $4p$ ,  $(3p + 15)$  and  $(5p + 20)$  respectively, where  $p$  is a **positive** constant.

- (a) Show that  $11p^2 - 10p - 225 = 0$ . (4)  
(b) Hence show that  $p = 5$ . (2)  
(c) Find the common ratio of this series. (2)  
(d) Find the sum of the first ten terms of the series, giving your answer to the nearest integer. (3)

**June 13(R) Q5**

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5. The first term of a geometric series is 20 and the common ratio is  $\frac{7}{8}$ . The sum to infinity of the series is  $S_\infty$ .

- (a) Find the value of  $S_\infty$ . (2)

The sum to  $N$  terms of the series is  $S_N$ .

- (b) Find, to 1 decimal place, the value of  $S_{12}$ . (2)

- (c) Find the smallest value of  $N$ , for which  $S_\infty - S_N < 0.5$ . (4)

**June 14 Q6**

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6. A geometric series has first term  $a$ , where  $a \neq 0$ , and common ratio  $r$ .  
The sum to infinity of this series is 6 times the first term of the series.

(a) Show that  $r = \frac{5}{6}$ . (2)

Given that the fourth term of this series is 62.5,

(b) find the value of  $a$ , (2)

- (c) find the difference between the sum to infinity and the sum of the first 30 terms, giving your answer to 3 significant figures. (4)

**June 14(R) Q2**

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7. (i) All the terms of a geometric series are positive. The sum of the first two terms is 34 and the sum to infinity is 162.

Find

(a) the common ratio, (4)

(b) the first term. (2)

- (ii) A different geometric series has a first term of 42 and a common ratio of  $\frac{6}{7}$ .

Find the smallest value of  $n$  for which the sum of the first  $n$  terms of the series exceeds 290. (4)

**June 15 Q5**

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8. A geometric series has first term  $a$  and common ratio  $r = \frac{3}{4}$ .

The sum of the first 4 terms of this series is 175.

(a) Show that  $a = 64$ . (2)

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

- (c) Find the difference between the 9th and 10th terms of the series.  
Give your answer to 3 decimal places. (3)

**June 16 Q1**

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9. The first three terms of a geometric sequence are

$$7k - 5, \quad 5k - 7, \quad 2k + 10$$

where  $k$  is a constant.

(a) Show that  $11k^2 - 130k + 99 = 0$  (4)

Given that  $k$  is not an integer,

(b) show that  $k = \frac{9}{11}$  (2)

For this value of  $k$ ,

- (c) (i) evaluate the fourth term of the sequence, giving your answer as an exact fraction,  
(ii) evaluate the sum of the first ten terms of the sequence. (6)

**June 17 Q9**

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