Pure 25 – Geometric Sequences/Series

Please **complete** this homework by _____. Start it early. If you can't do a question you will then have time to ask your teacher for help or go to a drop in session.

Section 1 – Work through Benchmark 4 targets.

Section 2 – Consolidation of this week's topic. Please complete all questions.

1. For the geometric sequence 2, 6, 18,……..

   a) state the value of the common ratio. (1)

   b) write down the next two terms. (1)

   c) find the thirteenth term. (1)

2. A geometric sequence has first term 8 and common ratio 2.

   a) Write down the first 4 terms. (1)

   b) Find an expression for the n^{th} term. (1)

   c) Find the sum of the first 12 terms. (2)

3. For the geometric sequence 12 , 3, $\frac{3}{4}$,……,

   a) state the value of the common ratio. (1)

   b) Write down the 4^{th} term. (1)

   c) Calculate the **exact** value of the sum to infinity. (2)

4. The first three terms of a geometric sequence are 8, – 4, 2 ……

   a) State the value of the common ratio. (1)

   b) Find the sixth term. (1)

   c) Calculate the sum to infinity. (2)

5. 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, (3)

b) the first term, (2)

c) the sum to infinity. (2)

6. The **second** and **fourth** terms of a geometric series are 7.2 and 5.832 respectively.

The common ratio of the series is positive.

For this series, find

a) the common ratio, (2)

b) the first term, (2)

c) the sum of the first 50 terms, giving your answer to 3 decimal places. (2)

d) the difference between the sum to infinity and the sum of the first 50 terms, giving your answer to 3 decimal places. (2)

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

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

Mr King will be paid a salary of £35 000 in the year 2005. Mr King's contract promises a 4% increase in salary every year, the first increase being given in 2006, so that his annual salaries form a geometric sequence.

b) Find, to the nearest £100, Mr King's salary in the year 2008. (2)

Mr King will receive a salary each year from 2005 until he retires at the end of 2024.

c) Find, to the nearest £1000, the total amount of salary he will receive in the period from 2005 until he retires at the end of 2024. (4)

Total: 40 marks