| | | | Leave |
|----|---|-----|-------|
| 2. | The fourth term of a geometric series is 10 and the seventh term of the series is 80 | b | blank |
| 4. | The fourth term of a geometric series is 10 and the seventh term of the series is 80. | | |
| | For this series, find | | |
| | 2 01 0110 001100, 1110 | | |
| | (a) the common ratio, | | |
| | | (2) | |
| | | | |
| | (b) the first term, | | |
| | | (2) | |
| | | | |
| | (c) the sum of the first 20 terms, giving your answer to the nearest whole number. | (2) | |
| | | (2) | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| 1 | |
|--|-----|
| 6. A geometric series has first term 5 and common ratio $\frac{4}{5}$. | |
| Calculate | |
| (a) the 20th term of the series, to 3 decimal places, | |
| (") "" - " - " " - " " - " " - " " - " " - " " - " " - " " - " " - " " - " " - " " - " " - " " - " " - " " - " " - " " - " " " - " - " - " | (2) |
| (b) the sum to infinity of the series. | |
| (b) the sam to minity of the series. | (2) |
| Given that the sum to k terms of the series is greater than 24.95, | |
| | |
| (c) show that $k > \frac{\log 0.002}{\log 0.8}$, | (4) |
| | (4) |
| (d) find the smallest possible value of k . | (1) |
| | (1) |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

| Question 6 continued | Leave |
|----------------------|-------|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |



| 9. | The first three terms of a geometric series are $(k + 4)$, k and $(2k - 15)$ respectively, whe k is a positive constant. | |
|----|---|----|
| | (a) Show that $k^2 - 7k - 60 = 0$. | |
| | | 4) |
| | | -/ |
| | (b) Hence show that $k = 12$. | |
| | | 2) |
| | (c) Find the common ratio of this series. | |
| | | 2) |
| | | |
| | (d) Find the sum to infinity of this series. | 2) |
| | | 2) |
| | | _ |
| | | _ |
| | | _ |
| | | |
| | | |
| | | _ |
| | | - |
| | | _ |
| | | _ |
| | | |
| | | |
| | | _ |
| | | - |
| | | _ |
| | | _ |
| | | _ |
| | | |
| | | |
| | | - |
| | | _ |
| | | _ |
| | | _ |
| | | |
| | | |
| | | - |
| | | - |
| | | _ |
| | | _ |
| | | |
| | | _ |
| | | _ |



| | | b. |
|----|--|----|
| 5. | The third term of a geometric sequence is 324 and the sixth term is 96 | |
| | (a) Show that the common ratio of the sequence is $\frac{2}{3}$ | |
| | (a) Show that the common ratio of the sequence is $\frac{1}{3}$ | |
| | (h) Find the first term of the sequence | |
| | (b) Find the first term of the sequence. (2) | |
| | | |
| | (c) Find the sum of the first 15 terms of the sequence. (3) | |
| | | |
| | (d) Find the sum to infinity of the sequence. | |
| | (2) | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| Question 5 continued | | blan |
|----------------------|-----------------|------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | Q5 |
| | (Total 9 marks) | |



Leave blank

| 6. | A car was purchased for £18000 on 1st January. On 1st January each following year, the value of the car is 80% of its value on 1st January in the previous year. | James |
|----|---|-------|
| | (a) Show that the value of the car exactly 3 years after it was purchased is £9216. (1) | |
| | The value of the car falls below £1000 for the first time n years after it was purchased. | |
| | (b) Find the value of <i>n</i> . (3) | |
| | An insurance company has a scheme to cover the maintenance of the car. The cost is £200 for the first year, and for every following year the cost increases by 12% so that for the 3rd year the cost of the scheme is £250.88 | |
| | (c) Find the cost of the scheme for the 5th year, giving your answer to the nearest penny. (2) | |
| | (d) Find the total cost of the insurance scheme for the first 15 years. (3) | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |



| Question 6 continued | blank |
|-----------------------------------|-------|
| Question 0 continue | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |



| Leave | |
|-------|--|
| blank | |

| 9. | The adult | population | of a town | is 25 | 000 at | the en | d of | Year | 1 |
|----|-----------|------------|-----------|-------|--------|--------|------|------|---|
|----|-----------|------------|-----------|-------|--------|--------|------|------|---|

A model predicts that the adult population of the town will increase by 3% each year, forming a geometric sequence.

(a) Show that the predicted adult population at the end of Year 2 is 25750.

(1)

(b) Write down the common ratio of the geometric sequence.

(1)

The model predicts that Year N will be the first year in which the adult population of the town exceeds $40\,000$.

(c) Show that

$$(N-1)\log 1.03 > \log 1.6$$

(3)

(d) Find the value of *N*.

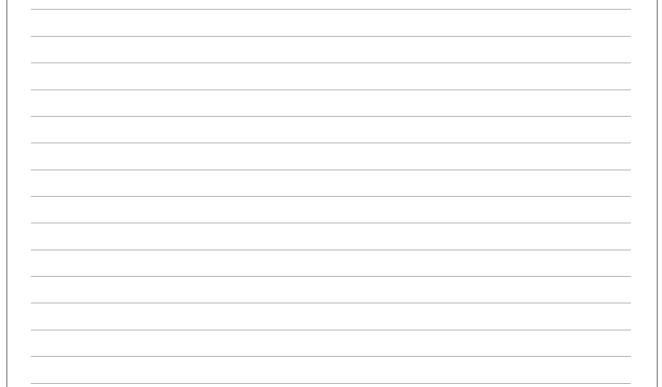
(2)

At the end of each year, each member of the adult population of the town will give £1 to a charity fund.

Assuming the population model,

(e) find the total amount that will be given to the charity fund for the 10 years from the end of Year 1 to the end of Year 10, giving your answer to the nearest £1000.

(3)





| | blank |
|----------------------|--------|
| Question 9 continued | Olalik |
| Question y continued | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

