| **Question** | **Scheme** | **Marks** |
| --- | --- | --- |
| **1(a)** |  or  or  | M1 |
|  \* | A1\* |
|  |  | **(2)** |
| **1(b)** |  | M1 |
| A1 cao |
|  |  | **(2)** |
| **1(c)** |   | M1 |
|  | dM1 |
|  | A1 cao |
|  |  | **(3)** |
|  |  | **(7 marks)** |
| **2(a)** | Uses , to obtain 28.5 | M1 A1 |
|  |  | **(2)** |
| **2(b)** | Uses , or to obtain 2680 | M1 A1 |
|  |  | **(2)** |
| **2(c)** | Uses , to obtain 2880  | M1 A1 cao |
|  |  | **(2)** |
|  |  | **(6 marks)** |
| **3(a)** |  | M1 |
|  | A1\* |
|  |  | **(2)** |
| **3(b)** |  | M1 |
|  | A1 |
|  |  | **(2)** |
| **3(c)** |  | M1 |
|  | M1 A1ft |
|  | **awrt** 2.73 | A1 |
|  |  | **(4)** |
|  |  | **(8 marks)** |
| **4(a)** | \* | Or Or 120000, 126000, 132300, 138915Or *a* = 120000 and  | B1 |
|  |  |  | **(1)** |
| **4(b)** |  | Allow *n* or *n* – 1 and “>”, “<”, or “=” etc. | M1 |
|  | Takes logs correctlyAllow *n* or *n* – 1 and “>”, “<”, or “=” etc. | M1 |
| e.g.  | Allow *n* or *n* – 1 and “>”, “<”, or “=” etc. Allow or awrt 1.67 for 5/3.  | A1 |
| 2024 | M1: Identifies a calendar year using their value of *n* or *n* – 1 | M1 A1 |
|  |  |  | **(5)** |
| **4(c)** |  | M1: Correct sum formula with *n* = 10, 11 or 12 | M1 A1 |
|  | A1: Correct numerical expression with *n* = 11 |  |
|  | Cao (Allow 1704814.00) | A1 |
|  |  | **(3)** |
|  |  | **(9 marks)** |
| **5(a)** |  (could be implied from later working in either (a) or (b)). | B1 |
|  | M1 |
|  | Correct answer from no working, except for special case below gains all three marks. | A1 |
|  |  | **(3)** |
| **5(b)** |   | M1 |
|   | A1 ft |
|  |  | **(2)** |
| **5(c)** | Applies  correctly using both their *a* and their  Eg.  | M1 |
| So,  | A1 |
|  |  | **(2)** |
|  |  | **(7 marks)** |
| **6(a)** | {}  |  |
|  | Attempt to eliminate *a*.  | M1 |
|  |  | A1 |
|  |  | **(2)** |
| **6(b)** |   | M1 |
|   | 256 | A1 |
|  |  | **(2)** |
| **6(c)** |    | Applies  correctly using both their *a* **and** their  | M1 |
| So,  |  | A1 cao |
|  |  | **(2)** |
| **6(d)** |  | Applies  with their *a* and *r*  and “uses” 1000 at any point in their working. (Allow with = or < ). | M1 |
|  | Attempt to isolate from  formula.(Allow with = or > ). | M1 |
|  | Uses the power law of logarithms correctly. (Allow with = or > ).  | M1 |
|  |  | A1 **cso** |
|  |  | **(4)** |
|  |  | **(10 marks)** |
| **7(a)** |   | B1 |
| (So *r* = )  or  or equivalent | M1 |
| See  | M1 |
|  \* | A1cso \* |
|  |  | **(4)** |
| **7(b)** |  so *k* = | M1 |
|  *k* = 9/11 only\* (after rejecting 11) | A1\* |
| **N.B. Special case *k* = 9/11 can be verified in (b) (1 mark only)**   |  |
|  |  | **(2)** |
| **7(c)** |   | B1 |
|  so  *r* = | B1 |
|  1. Fourth term =
 | M1A1 |
| 1. = = 152520
 | M1A1 |
|  |  | **(6)** |
|  |  | **(12 marks)** |
| **8(a)** |   **and**  | M1 |
|   | M1 |
|    | dM1 |
| And so result  \* | A1 |
|  |  | **(4)** |
| **8(b)** | Divides one term by other (either way) to give  then square roots to give *r* =  | **Or:** ( *Method 2)* Finds geometric mean i.e 3.24 and divides one term by 3.24 or 3.24 by one term | M1 |
| , *r* = 0.6 (ignore – 0.6) | *r* = 0.6 (ignore – 0.6) | A1 |
|  |  | **(2)**  |
| **8(c)** | Uses  or , to give  *a =*   | M1 |
| *a =* 15 | A1ft |
|  |  | **(2)** |
| **8(d)** |  Uses  , to obtain 37.5 | M1 A1 A1 |
|  |  | **(3)**  |
|  |  | **(11 marks)** |

|  |  |  |  |  |  |
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|  | **Source paper** | **Question number** | **New spec references** | **Question description** | **New AOs** |
| 1 | C2 2016 | 1 | 4.5 | Sequences and series | 1.1b and 2.1 |
| 2 | C2 Jan 2012 | 1 | 4.5 | Geometric sequences and series | 1.1b |
| 3 | C2 June 2014R | 2 | 4.5 | Geometric sequences and series | 1.1b |
| 4 | C2 Jan 2013 | 3 | 4.5, 6.3 and 6.5 | Geometric sequences and series | 1.1b, 2.2a and 2.4 |
| 5 | C2 Jan 2011 | 3 | 4.5 | Geometric sequences and series | 1.1b |
| 6 | C2 2011 | 6 | 4.5 | Geometric sequences and series | 1.1b, 2.2a |
| 7 | C2 2017 | 9 | 4.5 | Geometric sequence | 1.1b, 2.1, 2.2a |
| 8 | C2 2012 | 9 | 4.5 | Geometric sequences and series | 2.1, 1.1b |