A geometric sequence has first term 80 and common ratio $\frac{1}{3}$.

(a) For this sequence calculate

    (i) the 7th term   **2**

    (ii) the sum to infinity of the associated geometric series.   **2**

The first term of this geometric sequence is equal to the first term of an arithmetic sequence.

The sum of the first five terms of this arithmetic sequence is 240.

(b) Find the common difference of this sequence.   **2**

Let S_n represent the sum to n terms of this arithmetic sequence.

(c) Find the values of n for which $S_n = 144$.   **3**

Answers:

(a)   (i) $\frac{80}{729}$

        (ii)   120

(b)   −16

(c) $n = 2, n = 9$