15. A sequence of numbers a_1, a_2, a_3, … is defined by

$$a_{n+1} = k - \frac{3k}{a_n} \qquad n \in \mathbb{Z}^+$$

where k is a constant.

The sequence is periodic of order 3

Given that $a_2 = 2$

(a) show that $k^2 + k - 12 = 0$

(3)

Given that $a_1 \neq a_2$

(b) find the value of $\sum_{r=1}^{121} a_r$

(4)