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Sequences / Sigma Notation
| Past Paper Question | C1 Edexcel June 2013 Q4

A sequence $a_1, a_2, a_3, \ldots$ is defined by

$$a_1 = 4$$
$$a_{n+1} = k(a_n + 2), \qquad \text{for } n \geqslant 1$$

where k is a constant.

(a) Find an expression for a_2 in terms of k. **(1)**

Given that $\sum_{i=1}^{3} a_i = 2$,

(b) find the two possible values of k. **(6)**

(a) when $n=1$

$\therefore a_2 = k(a_1+2)$

$= k(4+2)$

$= 6k$

(b) $\sum_{i=1}^{3} a_i = 2$

$\therefore a_1 + a_2 + a_3 = 2$

$\therefore 4 + 6k + k(6k+2) = 2$

$\therefore 4 + 6k + 6k^2 + 2k = 2$

$\therefore 6k^2 + 8k + 2 = 0$

$\therefore 3k^2 + 4k + 1 = 0$

$\therefore (3k+1)(k+1) = 0$

$\therefore 3k+1 = 0$ or $k+1 = 0$

$\therefore k = -\frac{1}{3}$ or $k = -1$

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