Recurrence relations

Gold

A sequence $u_1, u_2, \ldots$ is given by:

$$u_{n+1} = ku_n + 3$$

where k is a positive constant. You are given that $u_1 = 2$.

a Find expressions for u_2 and u_3 in terms of k.

b Given that u_3 is double u_2, find the value of k.

Silver

A sequence $u_1, u_2, \ldots$ is given by:

$$u_{n+1} = 5u_n + c$$

where c is a constant. You are given that $u_1 = 1$.

a Find expressions for u_2, u_3 and u_4 in terms of c.

b Given that u_4 is 150 more than u_3, find the value of c.

Bronze

A sequence $u_1, u_2, \ldots$ is given by:

$$u_{n+1} = 5u_n + 4.$$

If $u_1 = -2$, find the values of u_2, u_3 and u_4.