

4.

**In this question you must show all stages of your working.
Solutions relying on calculator technology are not acceptable.**

A sequence $u_1, u_2, u_3, \dots$ is defined by

$$u_{n+1} = 3(u_n)^2 - 1$$

$$u_1 = k$$

where k is a real constant.

(a) Show that

$$u_3 = 27k^4 - 18k^2 + 2 \quad (3)$$

Given that

$$u_3 - 5u_2 = 11$$

(b) find the possible values of k .

(3)