11. The binomial expansion, in ascending powers of x, of

$$\left(3 + \frac{k}{9}x\right)^7$$

where k is a **positive** constant, can be written in the form

$$A + Bx + Cx^2 + \dots$$

where A, B and C are constants.

(a) Find the value of A

(1)

Given that $B + C = 406$

(b) show that

$$9k^2 + 81k - 58 = 0$$

(3)

(c) Hence find

(i) the value of k

(ii) the value of C

(3)

(d) Find the first 2 non-zero terms, in ascending powers of x in the series expansion of

$$f(x) = \left(3 + \frac{k}{9}x\right)^7 + \left(3 - \frac{k}{9}x\right)^7$$

giving each term in simplest form.

(2)