

7. (a) Expand  $\left(1 + \frac{3}{x}\right)^2$ , simplifying each term.

(2)

(b) Use the binomial expansion to find, in ascending powers of  $x$ , the first four terms in the expansion of

$$\left(1 + \frac{3}{4}x\right)^6,$$

simplifying each term.

(4)

(c) Hence find the coefficient of  $x$  in the expansion of

$$\left(1 + \frac{3}{x}\right)^2 \left(1 + \frac{3}{4}x\right)^6.$$

(2)

**(Total for Question 7 is 8 marks)**