8. (a) Find the first 3 terms, in ascending powers of x, of the binomial expansion of

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

giving each term in its simplest form.

(4)

(b) Explain how you could use your expansion to estimate the value of 1.925^6
You do not need to perform the calculation.

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(1)

(a) $\left(2+\frac{3x}{4}\right)^6 = 2^6 + 2^5\left(\frac{3x}{4}\right)\times 6 + 2^4\left(\frac{3x}{4}\right)^2 \times 15$

$= 64 + 144x + 135x^2$

(b) To estimate $(1.925)^6$ put $1.925 = 2+\frac{3x}{4}$

ie $x = -0.075 \times 4/3 = -0.1$

Since x is small the expansion terms will decrease so the method is valid.