

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

$$\left(2 - \frac{x}{2}\right)^7, \text{ giving each term in its simplest form.}$$

(4)

(b) Explain how you would use your expansion to give an estimate for the value of 1.995^7

(1)

$$\text{(a) } \left(2 - \frac{x}{2}\right)^7 = 2^7 + {}^7C_1 2^6 \left(-\frac{x}{2}\right) + {}^7C_2 2^5 \left(-\frac{x}{2}\right)^2 + \dots$$

(1 mark)

$$= 128 + 7(64)\left(-\frac{x}{2}\right) + 21(32)\left(-\frac{x}{2}\right)^2 + \dots$$

(1 mark)

$$= 128 - 224x + 168x^2 + \dots$$

(1 mark) (1 mark)

(b) need to solve

$$\left(2 - \frac{x}{2}\right) = 1.995$$

$$\Rightarrow x = 0.01,$$

so

$x = 0.01$ is substituted into expansion.

(1 mark)