General Binomial Expansion Mixed Exam Questions

Attempt these exam questions independently showing full and clear solutions. Check each answer as you go against the exam board mark scheme.

1.

(i) Expand $(1+2x)^{\frac{1}{2}}$ as a series in ascending powers of x, up to and including the term in x^3. **[3]**

(ii) Hence find the expansion of $\dfrac{(1+2x)^{\frac{1}{2}}}{(1+x)^3}$ as a series in ascending powers of x, up to and including the term in x^3. **[5]**

(iii) State the set of values of x for which the expansion in part **(ii)** is valid. **[1]**

2.

(a) Find the binomial expansion of $(1+6x)^{-\frac{1}{3}}$ up to and including the term in x^2. *(2 marks)*

(b) (i) Find the binomial expansion of $(27+6x)^{-\frac{1}{3}}$ up to and including the term in x^2, simplifying the coefficients. *(3 marks)*

(ii) Given that $\sqrt[3]{\dfrac{2}{7}} = \dfrac{2}{\sqrt[3]{28}}$, use your binomial expansion from part **(b)(i)** to obtain an approximation to $\sqrt[3]{\dfrac{2}{7}}$, giving your answer to six decimal places. *(2 marks)*

3.

$$\mathrm{f}(x) = \frac{3x^2+16}{(1-3x)(2+x)^2} = \frac{A}{(1-3x)} + \frac{B}{(2+x)} + \frac{C}{(2+x)^2}, \qquad |x| < \tfrac{1}{3}.$$

(a) Find the values of A and C and show that $B = 0$.

(4)

(b) Hence, or otherwise, find the series expansion of $\mathrm{f}(x)$, in ascending powers of x, up to and including the term in x^3. Simplify each term.

(7)