

1 (i) Find the first three terms of the binomial expansion of $\frac{1}{\sqrt[3]{1-2x}}$. State the set of values of x for which the expansion is valid. [5]

(ii) Hence find a and b such that $\frac{1-3x}{\sqrt[3]{1-2x}} = 1 + ax + bx^2 + \dots$. [3]

2 Find the first three terms in the binomial expansion of $(4+x)^{\frac{3}{2}}$. State the set of values of x for which the expansion is valid. [5]

3 (i) Express $\frac{x}{(1+x)(1-2x)}$ in partial fractions. [3]

(ii) Hence use binomial expansions to show that $\frac{x}{(1+x)(1-2x)} = ax + bx^2 + \dots$, where a and b are constants to be determined.

State the set of values of x for which the expansion is valid. [5]

4 Find the first four terms in the binomial expansion of $\sqrt{1+2x}$. State the set of values of x for which the expansion is valid. [5]

- 5 Find the first three terms in the binomial expansion of $\sqrt[3]{1+3x}$ in ascending powers of x . State the set of values of x for which the expansion is valid. [5]

- 6 (i) Given that

$$\frac{3+2x^2}{(1+x)^2(1-4x)} = \frac{A}{1+x} + \frac{B}{(1+x)^2} + \frac{C}{1-4x},$$

where A , B and C are constants, find B and C , and show that $A = 0$. [4]

- (ii) Given that x is sufficiently small, find the first three terms of the binomial expansions of $(1+x)^{-2}$ and $(1-4x)^{-1}$.

Hence find the first three terms of the expansion of $\frac{3+2x^2}{(1+x)^2(1-4x)}$. [4]

- 7 Find the first 4 terms in the binomial expansion of $\sqrt{4+2x}$. State the range of values of x for which the expansion is valid. [6]