Binomial expansion

M/J/2005/Q1

Expand $(1 + 4x)^{-\frac{1}{2}}$ in ascending powers of x, up to and including the term in x^3, simplifying the coefficients. [4]

Expand $(2 + 3x)^{-2}$ in ascending powers of x, up to and including the term in x^2, simplifying the coefficients. [4]

Expand $(1 + x)\sqrt{(1 - 2x)}$ in ascending powers of x, up to and including the term in x^2, simplifying the coefficients. [4]

Expand $\sqrt{\left(\frac{1-x}{1+x}\right)}$ in ascending powers of x, up to and including the term in x^2, simplifying the coefficients. [5]

(i) Express $\dfrac{3x^2 + x}{(x + 2)(x^2 + 1)}$ in partial fractions. [5]

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

(i) Express $\dfrac{10}{(2-x)(1+x^2)}$ in partial fractions. [5]

(ii) Hence, given that $|x| < 1$, obtain the expansion of $\dfrac{10}{(2-x)(1+x^2)}$ in ascending powers of x, up to and including the term in x^3, simplifying the coefficients. [5]

(i) Express $\dfrac{2-x+8x^2}{(1-x)(1+2x)(2+x)}$ in partial fractions. [5]

(ii) Hence obtain the expansion of $\dfrac{2-x+8x^2}{(1-x)(1+2x)(2+x)}$ in ascending powers of x, up to and including the term in x^2. [5]

(i) Express $\dfrac{1+x}{(1-x)(2+x^2)}$ in partial fractions. [5]

(ii) Hence obtain the expansion of $\dfrac{1+x}{(1-x)(2+x^2)}$ in ascending powers of x, up to and including the term in x^2. [5]

Let $f(x) = \dfrac{3x}{(1+x)(1+2x^2)}$.

(i) Express $f(x)$ in partial fractions. [5]

(ii) Hence obtain the expansion of $f(x)$ in ascending powers of x, up to and including the term in x^3. [5]

(i) Express $\dfrac{5x - x^2}{(1 + x)(2 + x^2)}$ in partial fractions. [5]

(ii) Hence obtain the expansion of $\dfrac{5x - x^2}{(1 + x)(2 + x^2)}$ in ascending powers of x, up to and including the term in x^3. [5]