2 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]

Jan 2006

1 Solve the equation $\dfrac{2x}{x-2} - \dfrac{4x}{x+1} = 3$. [5]

6 **(i)** Find the first three non-zero terms of the binomial expansion of $\dfrac{1}{\sqrt{4-x^2}}$ for $|x| < 2$. [4]

(ii) Use this result to find an approximation for $\displaystyle\int_0^1 \frac{1}{\sqrt{4-x^2}}\,\mathrm{d}x$, rounding your answer to 4 significant figures. [2]

(iii) Given that $\displaystyle\int \frac{1}{\sqrt{4-x^2}}\,\mathrm{d}x = \arcsin\left(\tfrac{1}{2}x\right) + c$, evaluate $\displaystyle\int_0^1 \frac{1}{\sqrt{4-x^2}}\,\mathrm{d}x$, rounding your answer to 4 significant figures. [1]

Jun 2006

2 **(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 $\dfrac{3+2x^2}{(1+x)^2(1-4x)}$. [4]

Jan 2007

1 Solve the equation $\frac{1}{x} + \frac{x}{x+2} = 1$. [4]

Jan 2007

5 Find the first four terms in the binomial expansion of $(1+3x)^{\frac{1}{3}}$.

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

[7]

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

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

5 Express $\frac{4}{x(x^2+4)}$ in partial fractions. [6]

1 Express $\dfrac{x}{x^2-4}+\dfrac{2}{x+2}$ as a single fraction, simplifying your answer. [3]

6 **(i)** Find the first three non-zero terms of the binomial series expansion of $\dfrac{1}{\sqrt{1+4x^2}}$, and state the set of values of x for which the expansion is valid. [5]

(ii) Hence find the first three non-zero terms of the series expansion of $\dfrac{1-x^2}{\sqrt{1+4x^2}}$. [3]

1 Express $\dfrac{3x+2}{x(x^2+1)}$ in partial fractions. **[6]**

2 Show that $(1+2x)^{\frac{1}{3}} = 1 + \frac{2}{3}x - \frac{4}{9}x^2 + \ldots$, and find the next term in the expansion.

State the set of values of x for which the expansion is valid. **[6]**