1   Expand $\dfrac{1}{1+x}$ as a polynomial in x up to and including the term in x^3.

2   Expand $(1 - x)^{1/2}$ as a polynomial in x up to and including the term in x^3.

3   Expand $(1 - 4x)^{-3}$ as a polynomial in x up to and including the term in x^3.

4   Given $(1 - 2x)^{1/3}$
   a Expand as a polynomial in x up to and including the term in x^3.
   b Find the exact value of the expression if x = 1/8
   c Use the expansion to get a values to 4 decimal places for $\sqrt[3]{6}$

5   The binomial expansion of $(1 - kx)^{-3}$ as a polynomial has coefficient of 27 for the x term.
   a Find the value of k
   b Find the coefficient of the x^2 term.

6   Take the expression $(1 - 5x)^{3/2}$ and,
   a Expand as a polynomial in x up to and including the term in x^3.
   b Find the exact value of the expression if x = 1/100
   c Use the expansion to get a value of $\sqrt{95}$ to 6 decimal places.
   d How could you improve the accuracy of the value gained?

7   Given $(1 + 2/x)^{-1/2}$,
   a Expand as a polynomial in x up to and including the term in x^3.
   b Find the exact value of the expression if x = 9
   c Use the expansion to get a value of $\sqrt{11}$ to 6 decimal places.
   d How could you improve the accuracy of the value gained?

8   Given $(16 - 5x)^{1/4}$
   a Expand up to and including the term in x^2
   b Use x = 0.1 to find an estimate for the value of $\sqrt[4]{1.5}$ to 5 decimal places.

9   For the following expression

$$\frac{3 - 2x}{(1 - x)(x + 2)}$$

Expand using partial fractions and then use the binomial expansion to find the expression as polynomial in x up to and including the x^3 term.

PHYSICS FACTORY

10   The function f(x) is given by

$$\frac{4x^2 - 5x - 5}{(x - 5)(x + 4)}$$

a Show that the function can expanded in the form

$$A + \frac{B}{(x - 5)} + \frac{C}{(x + 4)}$$

and find the values for A, B and C.

b Hence, expand as a binomial series up to the term in x^2.

c Show that the expansion is better than 99% accurate using x = 1 as a test value.

d How could you make the value of given by the expansion more accurate?

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