

- 1 Expand each of the following, simplifying the coefficient in each term.
- a** $(1+x)^4$ **b** $(1-x)^5$ **c** $(1+4x)^3$ **d** $(1-2y)^3$
e $(1+\frac{1}{2}x)^4$ **f** $(1+\frac{1}{3}y)^3$ **g** $(1+x^2)^5$ **h** $(1-\frac{3}{2}x)^4$
- 2 Expand each of the following, simplifying the coefficient in each term.
- a** $(x+y)^3$ **b** $(a-b)^5$ **c** $(x+2y)^4$ **d** $(2+y)^3$
e $(3-x)^3$ **f** $(5+2x)^4$ **g** $(3-4y)^5$ **h** $(3+\frac{1}{2}x)^4$
- 3 Find the first four terms in the expansion in ascending powers of x of
- a** $(1+x)^{10}$ **b** $(1-x)^6$ **c** $(1+2x)^8$ **d** $(1-\frac{1}{2}x)^7$
e $(1+x^3)^6$ **f** $(2+x)^9$ **g** $(3-x)^7$ **h** $(2+5x)^{10}$
- 4 Find the coefficient indicated in the following expansions.
- a** $(1+x)^{20}$, coefficient of x^3 **b** $(1-x)^{14}$, coefficient of x^4
c $(1+4x)^9$, coefficient of x^2 **d** $(1-3y)^{14}$, coefficient of y^3
e $(1-\frac{1}{3}x)^{12}$, coefficient of x^4 **f** $(1-\frac{1}{2}x)^{16}$, coefficient of x^5
g $(1+\frac{2}{5}x)^{15}$, coefficient of x^2 **h** $(1+y^2)^8$, coefficient of y^6
- 5 Express each of the following in the required form where a and b are integers.
- a** $(1+\sqrt{5})^3$ in the form $a+b\sqrt{5}$ **b** $(1-\sqrt{3})^4$ in the form $a+b\sqrt{3}$
c $(2+\sqrt{2})^3$ in the form $a+b\sqrt{2}$ **d** $(1+2\sqrt{3})^4$ in the form $a+b\sqrt{3}$
- 6 **a** Expand $(1+x)^6$ in ascending powers of x up to and including the term in x^3 , simplifying each coefficient.
b By substituting a suitable value of x into your answer for part **a**, obtain an estimate for
i 1.02^6 **ii** 0.99^6
giving your answers to 4 decimal places.
- 7 **a** Expand $(1+2y)^8$ in ascending powers of y up to and including the term in y^3 , simplifying each coefficient.
b By substituting a suitable value of y into your answer for part **a**, obtain an estimate for
i 0.98^8 **ii** 1.01^8
giving your answers to 4 decimal places.
- 8 Expand and simplify
- a** $(1+x)^4 + (1-x)^4$ **b** $(1-\frac{1}{3}x)^3 - (1+\frac{1}{3}x)^3$
- 9 The coefficient of x^2 in the expansion of $(1+ax)^4$ in ascending powers of x is 24, where a is a constant and $a < 0$. Find
- a** the value of a ,
b the value of the coefficient of x^3 in the expansion.