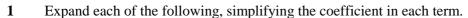
SEQUENCES AND SERIES



a
$$(1+x)^4$$

b
$$(1-x)^5$$

c
$$(1+4x)^3$$

d
$$(1-2y)^3$$

e
$$(1 + \frac{1}{2}x)^4$$

b
$$(1-x)^5$$
 c $(1+4x)^3$ **f** $(1+\frac{1}{3}y)^3$ **g** $(1+x^2)^5$

$$g (1+x^2)^5$$

h
$$(1-\frac{3}{2}x)^4$$

2 Expand each of the following, simplifying the coefficient in each term.

$$\mathbf{a} \quad (x+y)^3$$

b
$$(a-b)^5$$

$$\mathbf{c} \quad (x+2y)^4$$

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 $(1-\frac{1}{2}x)^7$

d
$$(1-\frac{1}{2}x)^7$$

e
$$(1+x^3)^6$$

f
$$(2+x)^9$$

g
$$(3-x)^7$$

h
$$(2+5x)^{10}$$

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

$$\mathbf{g} (1 + \frac{2}{5}x)^{15}$$
, coefficient of x^2

h
$$(1+y^2)^8$$
, coefficient of y^6

Express each of the following in the required form where a and b are integers. 5

a
$$(1 + \sqrt{5})^3$$
 in the form $a + b\sqrt{5}$

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 $a + b\sqrt{2}$

c
$$(2 + \sqrt{2})^3$$
 in the form $a + b\sqrt{2}$ **d** $(1 + 2\sqrt{3})^4$ in the form $a + b\sqrt{3}$

a Expand $(1+x)^6$ in ascending powers of x up to and including the term in x^3 , simplifying 6

b By substituting a suitable value of x into your answer for part **a**, obtain an estimate for

giving your answers to 4 decimal places.

a Expand $(1+2y)^8$ in ascending powers of y up to and including the term in y^3 , simplifying 7 each coefficient.

b By substituting a suitable value of y into your answer for part **a**, obtain an estimate for

$$i = 0.98^8$$

giving your answers to 4 decimal places.

8 Expand and simplify

a
$$(1+x)^4 + (1-x)^4$$

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

The coefficient of x^2 in the expansion of $(1 + ax)^4$ in ascending powers of x is 24, where a is 9 a constant and a < 0. Find

a the value of a.

b the value of the coefficient of x^3 in the expansion.