



# 1.9 – Binomial expansion

Student name: \_\_\_\_\_ Score: \_\_\_\_\_

1. [Maximum mark: 5]

Consider the expansion of  $(x + 4)^9$

(a) Write down the number of terms in this expansion. [1]

(b) Find the term containing  $x^4$ . [4]

2. [Maximum mark: 7]

Consider the expansion of  $x^2 \left(2x^3 + \frac{k}{x}\right)^{10}$ . The constant term is 46080.

Find  $k$ .

3. [Maximum mark: 5]

Consider the expansion of  $(3x + 4)^9$ .

(a) Write down the number of terms in this expansion. [1]

(b) Find the term in  $x^4$ . [4]

4. [Maximum mark: 5]

The third term in the expansion of  $\left(2x + \frac{k}{2}\right)^6$  is  $375x^4$ . Find the possible values of  $k$ .

5. [Maximum mark: 6]

(a) Find the term in  $x^5$  in the expansion of  $(x + 3)^8$ . [4]

(b) Hence, find the term in  $x^6$  in the expansion of  $7x(x + 3)^8$ . [2]

6. [Maximum mark: 6]

Consider the expansion of  $\left(2x^3 + \frac{3}{2x^2}\right)^{10}$

(a) Write down the number of terms of this expansion. [1]

(b) Find the coefficient of  $x^{10}$ . [5]

7. [Maximum mark: 6]

Consider the expansion of  $\left(\frac{x^4}{3} + \frac{p}{x^2}\right)^{12}$ . The constant term is 40095. Find the possible values of  $p$ .

8. [Maximum mark: 6]

In the expansion of  $ax^3(2 + ax)^{11}$ , the coefficient of the term in  $x^5$  is 11880. Find the value of  $a$ .

9. [Maximum mark: 6]

Let  $f(x) = (x^2 + 3)^7$ . Find the term in  $x^5$  in the expansion of the derivative,  $f'(x)$ .

10. [Maximum mark: 7]

Given that  $\left(1 + \frac{2}{3}x\right)^n(3 + nx)^2 = 9 + 84x + \dots$  find the value of  $n$ .

11. [Maximum mark: 6]

(a) Expand  $(2 + x)^4$  and simplify your results. [3]

(b) Hence, find the term in  $x^2$  in  $(2 + x)^4\left(1 + \frac{1}{x^2}\right)$ . [3]

12. [Maximum mark: 6]

The fifth term in the expansion of the binomial  $(a + b)^n$  is given by  $\binom{10}{4}p^6(2q)^4$ .

(a) Write down the value of  $n$ . [1]

(b) Write down  $a$  and  $b$ , in terms of  $p$  and/or  $q$ . [2]

(c) Write down an expression for the sixth term in the expansion. [3]

