



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. **10** [1]

(b) Find the term containing x^4 . **$129024x^4$** [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 . **$k = \pm 2$**

3. [Maximum mark: 5]

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

(a) Write down the number of terms in this expansion. **10** [1]

(b) Find the term in x^4 . **$10450944x^4$** [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 .

$k = \pm 2.5$

5. [Maximum mark: 6]

(a) Find the term in x^5 in the expansion of $(x + 3)^8$. **$1512x^5$** [4]

(b) Hence, find the term in x^6 in the expansion of $7x(x + 3)^8$. **$10584x^6$** [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. **11** [1]

(b) Find the coefficient of x^{10} . **68040** [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 . $p = \pm 3$

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 .

$$a = \frac{3}{4}$$

9. [Maximum mark: 6]

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

$$17010x^5$$

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 .

$$n = 7$$

11. [Maximum mark: 6]

(a) Expand $(2 + x)^4$ and simplify your results. $16 + 32x + 24x^2 + 8x^3 + x^4$ [3]

(b) Hence, find the term in x^2 in $(2 + x)^4 \left(1 + \frac{1}{x^2}\right)$. $25x^2$ [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 . $n = 10$ [1]

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

(c) Write down an expression for the sixth term in the expansion. $3360p^6q^4$ [3]

