

# 4.1 Binomial Expansion

## Question Paper

Course	CIEAS Maths
Section	4. Sequences & Series
Topic	4.1 Binomial Expansion
Difficulty	Very Hard

**Time allowed:** 50  
**Score:** /40  
**Percentage:** /100

**Question 1**

Expand  $(3 - 2x)^5$ .

[3 marks]

**Question 2**

Find the coefficient of the term in  $x^4$  in the expansion of  $(4 - 3x)^7$ .

[3 marks]

**Question 3**

Given that  ${}^n C_3 = 35$  find the value of  $n$ .

[3 marks]

**Question 4a**

(a) Use the first three terms, in ascending powers of  $x$ , in the expansion of  $(3 - 5x)^4$  to find an approximation for  $(2.6)^4$ .

[5 marks]

**Question 4b**

(b) Using your calculator, find the percentage error in the approximation from part (a) to the exact value of  $(2.6)^4$ .

[2 marks]

**Question 5**

In the expansion of  $(m - \frac{1}{4}x)^5$ , the coefficient of the  $x^3$  term is -10.

Find the possible values of  $m$ .

[3 marks]

**Question 6**

In the expansion of  $(3a + \frac{1}{2}x)^6$ , the coefficient of the  $x^3$  term is equal to the coefficient of the  $x^5$  term. Find the values of  $a$ , giving your answers in the form  $\frac{\sqrt{m}}{n}$ , where  $m$  and  $n$  are integers to be found.

[3 marks]

**Question 7a**

(a) Find the first three terms in the expansion of  $(4 - 3x)^9$ .

[3 marks]

**Question 7b**

(b) Given that  $x$  is small such that  $x^3$  and higher powers of  $x$  can be ignored show that  $(3 - 2x^2)(4 - 3x)^9 \approx 786432 - 5308416x + 15400960x^2$

[3 marks]

**Question 8**

In the expansion of  $(p + qx)^9$ , the coefficient of the  $x^3$  term is double that of the  $x^5$  term. Find  $p$  in terms of  $q$ .

[3 marks]

**Question 9**

In the expansion of  $(1 - 3x)^n$ , the coefficient of the  $x^3$  term is -3240.  
Find the value of  $n$ .

[4 marks]

**Question 10**

In the expansion of  $(a + bx)^8$ , the coefficient of the  $x^5$  term is -870 912.

In the expansion of  $(a + bx)^{12}$ , the coefficient of the  $x^3$  term is -1 557 135 360.

Find the possible values of  $a$  and  $b$ .

[5 marks]