

Surname	
Other Names	
Candidate Signature	

Centre Number						Candidate Number				
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Examiner Comments		Total Marks

MATHEMATICS

AS LEVEL QUESTION COMPILATION

CM

Questions on: Sequences and Series (Binomial Expansion)

Instructions to candidates:

- In the boxes above, write your centre number, candidate number, your surname, other names and signature.
- Answer ALL of the questions.
- You must write your answer for each question in the spaces provided.
- You may use a calculator.

Information to candidates:

- Full marks may only be obtained for answers to ALL of the questions.
- The marks for individual questions and parts of the questions are shown in round brackets.
- There are 5 questions in this question paper. The total mark for this paper is 40.

Advice to candidates:

- You should ensure your answers to parts of the question are clearly labelled.
- You should show sufficient working to make your workings clear to the Examiner.
- Answers without working may not gain full credit.



1 Expand

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

giving each term in its simplest form.

(4)



Question 1 continued**TOTAL 4 MARKS**

1 5 3 3 2 2 1 1 8 0 0 0 4



- 2 (a) Find the first four terms, in ascending powers of x , of the binomial expansion of $(1 + ax)^{12}$, where a is a constant. Give each term in its simplest form. (3)

Given that the coefficient of x^2 in this expansion is 594,

- (b) find the possible values of a . (3)



Question 2 continued**TOTAL 6 MARKS**

1 5 3 3 2 2 1 1 8 0 0 0 4



- 3 (a) Find the first 4 terms, in ascending powers of x , of the binomial expansion of

$$(2 - kx)^7$$

where k is a non-zero constant. Give each term in its simplest form. (4)

Given that the coefficient of x^3 is 20 times greater than the coefficient of x ,

- (b) find the value(s) of k . (3)



Question 3 continued**TOTAL 7 MARKS**

1 5 3 3 2 2 1 1 8 0 0 0 4



- 4 (a) Find, in ascending powers of x , the first 4 terms of the binomial expansion of

$$\left(1 + \frac{x}{3}\right)^{10}$$

giving each term in its simplest form.

(4)

- (b) Use your expansion to find an approximation for $(1.038)^{10}$, giving your answer to 4 decimal places.

(3)

- (c) Explain how you could make your answer to part (b) more accurate.

(1)



Question 4 continued**TOTAL 8 MARKS**

1 5 3 3 2 2 1 1 8 0 0 0 4



- 5** (a) Find the first 3 terms, in ascending powers of x , in the binomial expansion

$$(1 + px)^9$$

where p is a constant. Give each term in its simplest form.

(3)

The first 3 terms are $1, -18x$ and qx^2 , where q is a constant.

- (b) Find the value of p and the value of q .

(3)



Question 5 continued

TOTAL 6 MARKS



1 5 3 3 2 2 1 1 8 0 0 0 4

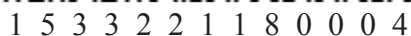


- $$\left(1 - \frac{x}{4}\right)^6$$

(3)

- $$\left(2 - \frac{x}{5}\right) \left(1 - \frac{x}{4}\right)^6$$

(3)

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Question 6 continued**TOTAL 6 MARKS**

1 5 3 3 2 2 1 1 8 0 0 0 4



- 7 (a) In ascending powers of x , find the first 4 terms of the binomial expansion of

$$(1 - 5x)^7$$

giving each term in its simplest form.

(3)

$$g(x) = (a + bx)(1 - 5x)^7$$

Given that the binomial expansion of $g(x)$ contains the terms 3 and $-109x$,

- (b) (i) find the values of a and b ,

- (ii) find the coefficient of x^3 in the binomial expansion of $g(x)$.

(5)



Question 7 continued

TOTAL 8 MARKS



- 8 (a) In ascending powers of x , find the first three terms in the binomial expansion of

$$\left(3 - \frac{x}{4}\right)\left(2 + \frac{x}{5}\right)^5$$

up to and including the term in x^2 .

(4)

- (b) Given that n is a positive integer, use the definition

$${}^nC_r = \frac{n!}{r!(n-r)!}$$

to prove that ${}^nC_1 = n$.

(1)

In the expansion of $(3x + 1)^p$, where p is a positive integer, the coefficient of x is 24.

- (c) (i) Find the value of p .

(2)

- (ii) Determine the coefficient of x^2 in this expansion.

(2)



Question 8 continued

TOTAL 9 MARKS



1 5 3 3 2 2 1 1 8 0 0 0 4

