Binomial Expansion

Question Paper 3

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Series
Sub Topic	Binomial Expansion
Booklet	Question Paper 3

Time Allowed: **63 minutes**

Score: **/52**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1 The coefficient of x^2 in the expansion of $\left(k + \frac{1}{3}x\right)^5$ is 30. Find the value of the constant k. [3]

2 Find the coefficient of x in the expansion of $\left(x + \frac{2}{x^2}\right)^7$. [3]

3 **(i)** Find the terms in x^2 and x^3 in the expansion of $\left(1 - \frac{3}{2}x\right)^6$. [3]

(ii) Given that there is no term in x^3 in the expansion of $(k + 2x)\left(1 - \frac{3}{2}x\right)^6$, find the value of the constant k. [2]

4 The coefficient of x^3 in the expansion of $(a + x)^5 + (1 - 2x)^6$, where a is positive, is 90. Find the value of a. [5]

5 In the expansion of $(1 + ax)^6$, where a is a constant, the coefficient of x is -30. Find the coefficient of x^3. [4]

6 **(i)** Find the first 3 terms in the expansion, in ascending powers of x, of $(1 - 2x^2)^8$. [2]

(ii) Find the coefficient of x^4 in the expansion of $(2 - x^2)(1 - 2x^2)^8$. [2]

7 Find the term independent of x in the expansion of $\left(x - \frac{1}{x^2}\right)^9$. [3]

8 **(i)** Find the first 3 terms in the expansion of $\left(2x - \frac{3}{x}\right)^5$ in descending powers of x. [3]

(ii) Hence find the coefficient of x in the expansion of $\left(1 + \frac{2}{x^2}\right)\left(2x - \frac{3}{x}\right)^5$. [2]

9 **(i)** Find the first 3 terms in the expansion of $(1 + ax)^5$ in ascending powers of x. [2]

(ii) Given that there is no term in x in the expansion of $(1 - 2x)(1 + ax)^5$, find the value of the constant a. [2]

(iii) For this value of a, find the coefficient of x^2 in the expansion of $(1 - 2x)(1 + ax)^5$. [3]

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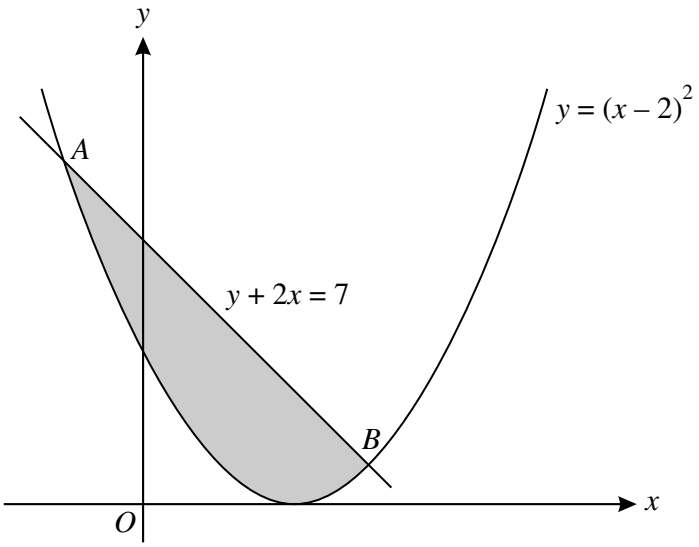

The diagram shows the curve $y = (x - 2)^2$ and the line $y + 2x = 7$, which intersect at points A and B. Find the area of the shaded region. [8]

11 **(i)** Find the first three terms, in descending powers of x, in the expansion of $\left(x - \frac{2}{x}\right)^6$. [3]

(ii) Find the coefficient of x^4 in the expansion of $(1 + x^2)\left(x - \frac{2}{x}\right)^6$. [2]