IB DIPLOMA · MATHS AA · SL

The binomial theorem

10 questions · 52 marks

Answer all questions. The marks available are shown against each part. Every question is taken unaltered from a past paper; the source is noted beneath it. Some questions are taken from higher level papers, where they examine the same standard level content.

1. 4 marks

[Maximum mark: 4]

Find the coefficient of x^8 in the expansion of $(2x-5)^{11}$.

IB 8824 – 7105 Maths AA · November 2024 Paper 2 TZ1 SL, Question 2

2. 4 marks

[Maximum mark: 4]

Find the coefficient of x^6 in the expansion of $(2x-5)^9$.

IB 8824 – 7110 Maths AA · November 2024 Paper 2 TZ2 SL, Question 2

3. 5 marks

[Maximum mark: 5]

Consider the expansion of $(3+x^2)^{n+1}$, where $n \in \mathbb{Z}^+$.

Given that the coefficient of x^4 is 20412, find the value of n.

IB 2221 – 7110 Maths AA · May 2021 Paper 2 TZ1 SL, Question 6

4. 5 marks

[Maximum mark: 5]

Consider the expansion of $(2x+k)^{10}$, where $k \in \mathbb{Z}$.

Given that the coefficient of x^6 is 8.4×10^6, find the possible values of k.

IB 2225 – 7115 Maths AA · May 2025 Paper 2 TZ2 SL, Question 4

5. 5 marks

[Maximum mark: 5]

Consider the expansion of $(x+k)^{11}$, where $k>0$.

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

In the expansion, the coefficient of x^7 is 1320.

(b) Find the value of k. [4]

IB 2225 – 7120 Maths AA · May 2025 Paper 2 TZ3 SL, Question 3

6. 5 marks

[Maximum mark: 5]

In the expansion of $(x+k)^7$, where $k \in \mathbb{R}$, the coefficient of the term in x^5 is 63.

Find the possible values of k.

IB 2221 – 7114 Maths AA · May 2021 Paper 1 TZ2 SL, Question 4

7. 5 marks

[Maximum mark: 5]

Consider the expansion of $(3+x^2)^{n+1}$, where $n \in \mathbb{Z}^+$.

Given that the coefficient of x^4 is 20412, find the value of n.

IB 2221 – 7107 Maths AA · May 2021 Paper 2 TZ1 HL, Question 5

8. 5 marks

[Maximum mark: 5]

In the expansion of $(x+k)^7$, where $k \in \mathbb{R}$, the coefficient of the term in x^5 is 63.

Find the possible values of k.

IB 2221 – 7111 Maths AA · May 2021 Paper 1 TZ2 HL, Question 3

9. 7 marks

[Maximum mark: 7]

Bob invests 1000 dinar in an account which pays a nominal annual interest rate of 4% compounded **quarterly**.

The amount of money in the account after one complete year can be written as $1000(1+k)^4$ where $k \in \mathbb{Q}$.

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

(b) Expand and simplify $(1+x)^4$. [2]

(c) Hence or otherwise, find the amount of money in the account after one complete year, giving your answer correct to the nearest dinar. [4]

IB 2225 – 7109 Maths AA · May 2025 Paper 1 TZ1 SL, Question 3

10. 7 marks

[Maximum mark: 7]

Bob invests 1000 dinar in an account which pays a nominal annual interest rate of 4% compounded **quarterly**.

The amount of money in the account after one complete year can be written as $1000(1+k)^4$ where $k \in \mathbb{Q}$.

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

(b) Expand and simplify $(1+x)^4$. [2]

(c) Hence or otherwise, find the amount of money in the account after one complete year, giving your answer correct to the nearest dinar. [4]

IB 2225 – 7106 Maths AA · May 2025 Paper 1 TZ1 HL, Question 2