

THE BINOMIAL THEOREM

AS Unit 1: Pure Mathematics A

WJEC past paper questions: 2010 – 2017

Total marks available 77 (approximately 1 hour 30 minutes)

1. In the binomial expansion of $(a + 3x)^5$, the coefficient of the term in x^2 is eight times the coefficient of the term in x . Find the value of the constant a . (4)
(January 10)

2. a) Write down the expansion of $(1 + x)^6$ in ascending powers of x up to and including the term in x^3 . (2)
 b) By substituting an appropriate value of x in your expansion in (a), find an approximate value for 0.99^6 . **Show all your working** and give your answer correct to four decimal places. (3)
(Summer 10)

3. **Use the binomial theorem** to express $(1 + \sqrt{3})^5$ in the form $a + b\sqrt{3}$, where a, b are integers whose values are to be found. (5)
(January 11)

4. a) Use the binomial theorem to expand $(3 + 2x)^4$, simplifying each term of the expansion. (4)
 b) In the binomial expansion of $(1 + \frac{x}{4})^n$, the coefficient of x^2 is five times the coefficient of x . Given that n is a positive integer, find the value of n . (4)
(Summer 11)

5. a) Use the binomial theorem to expand $(x + \frac{3}{x})^4$, simplifying each term of the expansion. (4)
 b) The coefficient of x^2 in the expansion $(1 + 2x)^n$ is 760. Given that n is a positive integer, find the value of n . (3)
(January 12)

6. Using the binomial theorem, write down and simplify the first four terms in the expansion of $(1 - 2x)^6$ in ascending powers of x . (4)
(Summer 12)

7. In the binomial expansion of $(a + 4x)^6$, where $a \neq 0$, the coefficient of the term in x^2 is twice the coefficient of the term in x . Find the value of a . (4)
(January 13)
8. a) Using the binomial theorem, write down and simplify the first three terms in the expansion of $(1 + 2x)^7$, in ascending powers of x . (3)
b) Use your answer to part (a) to find the first three terms in the expansion of $(1 - 4x)(1 + 2x)^7$ in ascending powers of x . (3)
(Summer 13)
9. a) **Use the binomial theorem** to express $(1 + \sqrt{6})^5$ in the form $a + b\sqrt{6}$, where a, b are integers whose values are to be found. (5)
b) The coefficient of x^2 in the expansion $(1 + 3x)^n$ is 495. Given that n is a positive integer, find the value of n . (3)
(January 14)
10. a) Write down the expansion of $(1 + x)^6$ in ascending powers of x up to and including the term in x^3 . (2)
b) **Showing all your working**, substitute an appropriate value of x in your expansion in part (a) to find an approximate value for 1.1^6 . (3)
(Summer 14)
11. a) Using the binomial theorem, write down and simplify the first four terms in the expansion of $(1 - \frac{x}{2})^8$, in ascending powers of x . (4)
b) The first two terms in the expansion of $(2 + ax)^n$ in ascending powers of x are 32 and $-240x$ respectively. Find the value of n and the value of a . (4)
(Summer 15)
12. **Use the binomial theorem** to express $(\sqrt{3} - 1)^5$ in the form $a + b\sqrt{3}$, where a, b are integers whose values are to be found. (5)
(Summer 16)
13. a) Use the binomial theorem to expand $(x + \frac{2}{x})^4$, simplifying each term of the expansion. (4)
b) In the binomial expansion of $(a + 2x)^6$, where $a \neq 0$, the coefficient of the term in x^2 is equal to the coefficient of the term in x . Find the value of a . (4)
(Summer 17)