

Lower 6 Chapter 8

Binomial Expansion

Chapter Overview

1. Pascal's Triangle
2. Factorial Notation
3. Binomial Expansion
4. Using Expansions for Estimation

4

Sequences
and series

4.1

Understand and use the binomial expansion of $(a + bx)^n$ for positive integer n ; the notations $n!$ and ${}^n C_r$ link to binomial probabilities.

Use of Pascal's triangle.

Relation between binomial coefficients.

Also be aware of alternative notations

such as $\binom{n}{r}$ and ${}^n C_r$

Pascal's Triangle:

Starter

a) Expand $(a + b)^0$

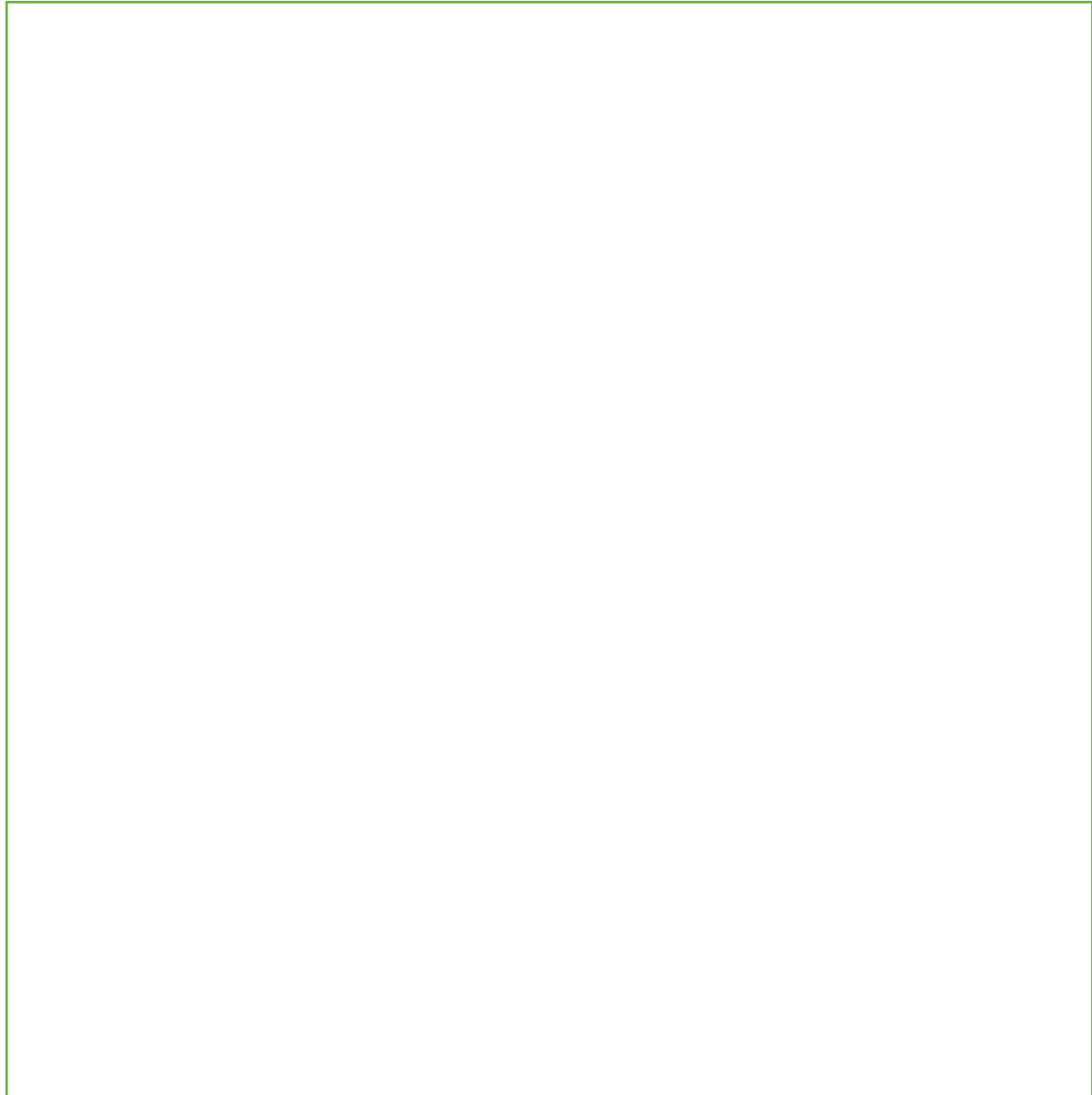
b) Expand $(a + b)^1$

c) Expand $(a + b)^2$

d) Expand $(a + b)^3$

e) Expand $(a + b)^4$

What do you notice about the powers of a and b?



Example

Find the expansion of $(2 + 3x)^4$

Example

Find $(1 - 2x)^3 =$

Finding a single term example:

The coefficient of x^2 in the expansion of $(2 - cx)^5$ is 720.

Find the possible value(s) of the constant c .

Test Your Understanding

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

$$(2 + kx)^7$$

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

(4)

Given that the coefficient of x^2 is 6 times the coefficient of x ,

(b) find the value of k .

(2)

Extension

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The number of pairs of positive integers x, y which solve the equation:

$$x^3 + 6x^2y + 12xy^2 + 8y^3 = 2^{30}$$

is:

- A) 0
- B) 2^6
- C) $2^9 - 1$
- D) $2^{10} + 2$