

Section 11.5: Binomial Theorem

Key Topics: Pascal's Triangle, $\binom{n}{r}$, The Binomial Theorem

Briefly explain how to obtain the row entries of Pascal's Triangle.

Expand $(2x - 3y)^4$

The Symbol $\binom{n}{r}$ _____

If r and n are integers with _____, then we define

$\binom{n}{r} =$ _____, Note that $\binom{n}{0} =$ __, and $\binom{n}{n} =$ __, because _____.

Evaluate the binomial coefficient $\binom{6}{4}$.

THE BINOMIAL THEOREM

If n is a natural number, then the binomial expansion of $(x + y)^n$ is given by

$$(x + y)^n = \binom{n}{0}x^n + \binom{n}{1}x^{n-1}y + \binom{n}{2}x^{n-2}y^2 + \cdots + \binom{n}{r}x^{n-r}y^r + \cdots + \binom{n}{n}y^n$$

$$= \text{_____}.$$

The coefficient of $x^{n-r}y^r$ is $\binom{n}{r} = \text{_____}$.

Expand $(2x - 3y)^4$

PARTICULAR TERM IN A BINOMIAL EXPANSION

The term containing the factor x^r in the expansion of $(x + y)^n$ is

_____.

This term also contains the factor y^s .

Find the term containing x^3 in the expansion of $(3x + y)^8$.