

Binomial Coefficients

In general, the coefficients of the terms of the binomial expansion of $(x + y)^n$ are given by:

$${}_n C_r = \binom{n}{r} = \frac{n!}{r!(n-r)!}$$

Ex 2.

Evaluate $\binom{9}{5}$

Ex 3.

Evaluate $\binom{7}{0}$

Ex 4.

Evaluate ${}_{12}C_{10}$

The Binomial Theorem

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

(Note: works for any positive integer n , and any complex #'s x and y)

Ex 5.

Write the binomial expansion of $(x + y)^8$.

Ex 6.

Expand $\left(\frac{m}{3} - n\right)^4$.

Ex 7.

Expand $\left(\frac{2}{r^3} + \frac{4}{\sqrt{r}}\right)^3$

Ex 8.

Find the fourth term of $(2c - d)^{12}$.

Q: If you have 10 black socks and 10 green socks in a drawer (all mixed up), how many socks do you need to take out to be sure that you have a pair of the same color?