Newton's Binomial Theorer

Here we remind you what is Newton's Binomial Theorem is all a

Firstly, let us remind ourselves what is the **binomial coefficien** ways to choose k objects (the order is not important) from the replacement, and thus can be found as

$$\binom{n}{k} = \frac{n!}{k!(n-k)!}$$

The simplest idea to prove it is to subsequently consider the nu each object: the first object can be chosen by n ways; the secon rest of the objects thus there is only $n-1$ possible option, the options and so on until we choose the kth object amongst $n -$ care about objects' order, we should divide produced number b possible permutations of k element set, which is similarly $k \cdot (k$ $1 = k!$, thus we get:

$$\frac{n \cdot (n-1) \cdot \ldots \cdot (n-k+1)}{k!} = \frac{n}{k!(n -}$$

Newton's binomial theorem, basically, states the relation betw coefficients and $(a+b)^n$:

$$(a+b)^n = \binom{n}{0}a^n + \binom{n}{1}a^{n-1}b^1 + \binom{n}{2}a^{n-2}b^2 + \ldots + ($$

It is quite easy to come up with a proper proof for it. Consider t expression:

$$(a+b)^n = (a+b) \cdot (a+b) \cdot \ldots \cdot (a -$$

Thus, further transformations require us to choose in each mul as a result, terms like $a^l b^{n-l}$ are formed. To state the coefficien consider that it is simply the number of time this exact term has the multiplication. In other words, it is the number of ways to ch term from whilst the rest of the power of b forms inevitably. Th binomial by definition and we have proven the theorem.