THEOREM OF THE DAY

Pascal’s Rule For any positive integers $n$ and $k$,

\[
{n + 1 \choose k} = {n \choose k} + {n \choose k-1}.
\]

This is read as “$n + 1$ choose $k = n$ choose $k + n$ choose $k-1$”, invoking its combinatorial interpretation: the number of choices if you must select $k$ objects from $n + 1$ is the same as the number of choices if you are selecting from $n$ objects and have an initial choice of whether to take $k$ or $k−1$. This suggests an easy combinatorial proof: a choice of $k$ from a row of $n + 1$ objects will either exclude the last object, in which case all $k$ must be chosen from the first $n$; or it will include it, leaving $k − 1$ to be chosen from the first $n$.

Web link: ptri1.tripod.com. See the wikipedia entry on nomenclature.